DOCTORAL (PHD) DISSERTATION

THE EVOLUTION OF EU SPACE LAW: FROM FRAGMENTATION TO UNIFICATION

Toward a Coherent Legal Framework for European Union Strategic Autonomy in Outer Space?

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SUBMITTED FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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on Boudour Mefteh's PhD dissertation to be submitted for preliminary defence

Debrecen, 10 April 2026

The main purpose of Boudour Mefteh's thesis is to identify the requirements for a comprehensive legal and policy framework to govern the various dimensions of the space sector, such as economic, environmental and security dimensions, and the rapid technological development in this field. In doing so, her research primarily focuses on the European Union, which has proven to be an excellent case study for illustrating how legal fragmentation among national, regional and emerging EU programmes is impeding, or at least slowing down, the development of a single strategic vision for space governance.

The thesis topic is highly intriguing and complex, presenting significant challenges due to the various opportunities offered by space exploration. The subject's intricacy is further compounded by the multifaceted political interests and legal regulations at play, the numerous interconnections with security, economic and environmental policies, and the multi-level nature of the legal framework. The importance of this research topic is clear from both an international and a European perspective.

The research problem is clearly identified, and the hypotheses and research questions provide an appropriate basis for the targeted comparative analysis. The thesis is well structured, with two main parts that mirror the analytical process of first outlining the problem of fragmentation and then examining how a unified approach could provide a solution. Part I provides a layered analysis of national space laws, EU-level instruments and external comparisons with other powers (the US and China), which collectively support the assertion that fragmentation undermines the internal market, legal certainty and competitiveness. Building on this foundation, Part II explores strategic autonomy, legal competences, and provides a detailed assessment of the EU Space Act proposal.

The final conclusions of the research are based on a creative and comprehensive analysis of the relevant regulatory environment and academic literature. The thesis's originality is evident in the way it reframes "fragmentation" as not only a descriptive feature of European space governance, but also a core explanatory variable for Europe's loss of competitiveness and lack

of strategic autonomy. In analysing fragmentation, the thesis distinguishes its vertical dimension (EU–Member State relations), its horizontal dimension (divergent national space laws) and its institutional dimension (EU–ESA overlap). It then connects these layers to concrete market and security consequences. This multi-level conceptualisation of fragmentation is one of the most significant scientific contributions of the thesis, as it provides a framework that can be used to analyse other strategic policy areas of the European Union.

Overall, Boudour's research work demonstrates his ability to identify the main research problems of the examined topic, to conduct in-depth research and to communicate the findings to the scientific community in a professional manner. As the supervisor of the research, I support the acceptance of the dissertation for the final defence.

Dr. Ildikó Bartha, supervisor
Professor of Law
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Preliminary remarks

The thesis elaboration was developed over a long period, before the official release of the EU Space Act draft in June 2025. Thus, some of the initial chapters use future-oriented language, such as “the upcoming EU space act.” The author is aware of the use of this terminology across the chapters. However, to preserve the authenticity of the research process and to document the gradual maturation of this work parallel to real-time legal developments, these citations have been intentionally left. They thus reflect the state of knowledge and analysis at the time of writing. Following the release of the draft, the thesis moves to present-tense language to describe the current legal landscape and to engage with the text as published. Given the ongoing negotiations of the Act in progress between the European Parliament and the Council, it can be seen that the Act has not entered into force. Although there have been several other versions of the Act produced during the negotiation process, this analysis centers mainly on the first proposal of the Act made by the European Commission, which will serve as the major frame of reference for the study. Its final provisions will become applicable from January 1, 2030.

Table of contents

INTRODUCTION 6

I. BACKGROUND OF THE STUDY: 8
II. STATEMENT OF THE PROBLEM AND DEFINED TERMS 10
1. STATEMENT OF THE PROBLEM 10
2. TERMINOLOGICAL CLARIFICATIONS 12
A. The role of the EU in space law 12
B. The Space Law definition 13
C. The concept of "Fragmentation" 15
D. Unification: To what degree of Harmonization? 16
III. PURPOSE OF THE THESIS 17
IV. RESEARCH QUESTIONS AND HYPOTHESES 18
V. JUSTIFICATION AND SIGNIFICANCE 19
VI. LITERATURE REVIEW 19
1. INTERNATIONAL SPACE LAW LITERATURE REVIEW 19
2. EUROPEAN SPACE LAW AND POLICY LITERATURE REVIEW 21
VII. METHODOLOGY 22
VIII. LIMITATIONS 23
IX. ORGANIZATION OF THE THESIS 24

PART I. A FRAGMENTED APPROACH: LAW AS A HINDRANCE TO EU SPACE ACTIVITIES 25

CHAPTER 1: EU MEMBER STATES NATIONAL SPACE LAW 27

I. INTERNATIONAL LEGAL FOUNDATIONS FOR THE ADOPTION OF NATIONAL SPACE LEGISLATION 28
1. THE LEGAL FRAMEWORK FOLLOWING FROM THE OUTER SPACE TREATY 29
2. THE ROLE AND SCOPE OF NATIONAL SPACE LAW 30
3. GLOBAL APPROACHES TO HARMONIZING SPACE LAW AND REGULATORY FRAMEWORKS 30
4. STRUCTURAL CONSEQUENCES OF DECENTRALIZED AUTHORIZATION UNDER THE OUTER SPACE TREATY 31
II. ANALYZING CURRENT NATIONAL SPACE LAW REGIMES OF SELECTED EU MEMBER STATES 32
1. DRIVERS BEHIND THE ADOPTION OF NATIONAL SPACE FRAMEWORKS IN THE EU 33
A. Austria 33
B. Belgium 34
C. Denmark 34
D. France 35
E. Luxembourg 35
2. KEY CHARACTERISTICS OF EU MEMBER STATES' SPACE FRAMEWORKS 36
A. Austria 36
B. Belgium 37
C. Denmark 38
D. France 39

E. Luxembourg 40
3. AUTHORIZATION, MONITORING, AND TRANSFER PROCEDURES IN NATIONAL SPACE LAWS... 41
A. Austria 41
B. Belgium 42
C. Denmark 43
D. France 44
E. Luxemburg 45
F. Comparison of the authorization procedures in EU national space law 46
4. REGISTRATION PROCEDURES FOR SPACE OBJECTS UNDER NATIONAL SPACE LAWS 48
A. Austria 48
B. Belgium 48
C. Denmark 49
D. France 49
E. Luxemburg 49
F. Comparison of the Registration procedures of space objects between EU national space law 50
5. LIABILITY AND INSURANCE REQUIREMENTS UNDER NATIONAL SPACE LAWS 51
A. Austria 51
B. Belgium 51
C. Denmark 52
D. France 52
a. Liability towards third parties 52
b. Liability towards persons participating in the space operation 53
c. Insurance 53
E. Luxembourg 54
F. Comparison of liability and Insurance requirements 55
6. SPACE DEBRIS AND OTHER COVERED ISSUES 56
A. Austria 56
B. Belgium 56
C. Denmark 56
D. France 57
E. Luxembourg 57
F. Comparing the framework of space debris in EU national space law 58

CHAPTER 2: EU REGIONAL LEGISLATION RELATED TO THE SPACE SECTOR 62

I. FOUNDATIONAL LEGAL FRAMEWORKS 62
1. TREATY ON THE FUNCTIONING OF THE EUROPEAN UNION 63
2. EU REGULATION (2021/696): ESTABLISHING THE EUROPEAN UNION SPACE PROGRAMME . 64
II. INSTITUTIONAL LEGISLATION OF SPACE ACTIVITIES IN THE EU: A DUAL-AGENCY MODEL.. 66
1. FRAMEWORK AGREEMENT BETWEEN ESA AND THE EU (2004) 66
2. THE LEGAL FRAMEWORK GOVERNING EUSPA AND THE LAYERED INSTITUTIONAL STRUCTURE 68
3. AGENCIFICATION AND THE INSTITUTIONAL DESIGN OF EU SPACE GOVERNANCE 70
III. OTHER EU REGIONAL LEGISLATION GOVERNING DIFFERENT ACTIVITIES RELATED TO THE SPACE SECTOR 71
1. SPACE TECHNOLOGY AND TELECOMMUNICATIONS 71
A. Telecommunications Framework Directive 71
B. Radio Spectrum Policy Programme 73
2. ENVIRONMENTAL AND SUSTAINABILITY FRAMEWORKS 74

A. EU Green Deal 74
B. Environmental Impact Assessments 75
C. EU Taxonomy Regulation 75
D. The zero debris charter 76
3. EXPORT AND DUAL-USE REGULATIONS 77
4. DATA PROTECTION AND CYBERSECURITY 78
A. General Data Protection Regulation (GDPR) 78
B. Cybersecurity Act 79

CHAPTER 3: STRUCTURED SPACE LAW GOVERNANCE IN THE U.S. AND CHINA: A COMPARATIVE LEGAL ANALYSIS 82

I. JUSTIFYING THE COMPARISON 82
II. U.S SPACE FRAMEWORK 83
1. INSTITUTIONS FOR SPACE ACTIVITIES IN THE UNITED STATES 83
2. THE GENESIS OF U.S. SPACE LAW AND ITS CODIFICATION 85
A. The Evolution of Commercial Space Law and Government Regulation 86
B. Legislation Supporting National Security, Scientific Research, and Human Spaceflight 87
C. The U.S. Space Force and the Militarization of Space 87
3. COMPARING U.S. AND EU LEGAL FRAMEWORKS: IMPLICATIONS FOR SPACE ACTIVITIES AND THE IMPACT OF FUTURE EU POLICIES ON THE U.S. 88
III. CHINA'S SPACE LEGISLATION: A FUNCTIONAL FRAMEWORK IN DEVELOPMENT 89
1. GENERAL FRAMEWORK AND STRUCTURE 89
2. EVALUATION OF THE CURRENT SYSTEM 90
3. RECENT DEVELOPMENTS AND LEGISLATIVE CHALLENGES IN CHINA 91
IV. SUGGESTIONS TO POLICYMAKERS FOR BETTER GLOBAL SPACE GOVERNANCE 92

PART II. A UNIFIED APPROACH: TOWARD A COMMON EU SPACE LAW FOR A COMPETITIVE POSITION IN SPACE 95

CHAPTER 4: THE NEED FOR AN EU STRATEGIC AUTONOMY IN OUTER SPACE; USING LAW AS A TOOL 96

I. CLARIFYING THE CONCEPT OF STRATEGIC AUTONOMY 96
1. STRATEGIC AUTONOMY: A CONCEPTUAL CLARIFICATION 96
2. POSITIONING THE EU AS AN AUTONOMOUS SPACE ACTOR 98
A. Strategic Autonomy in Outer Space: European or Union-Based? 99
B. Galileo as a Pillar of the EU's Strategic Autonomy in Outer Space 99
II. CHALLENGES TO THE REALIZATION OF STRATEGIC AUTONOMY IN OUTER SPACE 101
1. SECURING STRATEGIC AUTONOMY THROUGH SPACE 101
2. NAVIGATING EU SPACE GOVERNANCE: INSTITUTIONAL CHALLENGES AND THE ROLE OF ESA AND MEMBER STATES 102
A. The Role of ESA in Facilitating European Space Cooperation 102
B. The Strategic Implications of the EU-ESA Association 103
C. The Influence of Member States in Shaping EU Strategic Autonomy in Space 104
3. THE CIVIL-MILITARY COORDINATION IN EU SPACE GOVERNANCE: DIVERGENT LEGAL FRAMEWORKS 105
III. THE ROLE OF LAW IN STRENGTHENING EU SPACE STRATEGIC AUTONOMY: OBJECTIVES AND RATIONALE BEHIND THE ESTABLISHMENT OF EU SPACE LAW 106

1. AUTONOMOUS ACCESS TO SPACE THROUGH EUROPEAN LAUNCH CAPABILITIES 107
2. INTEGRATING SPACE SAFETY/SECURITY 108
3. ENHANCING THE RESILIENCE OF SPACE INFRASTRUCTURE 110
4. PROMOTING THE LONG-TERM SUSTAINABILITY OF SPACE ACTIVITIES 112

CHAPTER 5: ASSESSING THE LEGAL BASIS FOR EU ACTION IN SPACE LAW: COMPETENCE, PROCEDURES, AND EXPECTATIONS 115

I. POSSIBLE LEGAL BASIS FOR EU SPACE REGULATION: SCOPE AND LIMITS 115
1. CORE PROVISIONS: ARTICLE 189 TFEU 116
2. INTERNAL MARKET HARMONIZATION: ARTICLES 114–115 TFEU...................................... 117
3. THE “FLEXIBILITY CLAUSE”: ARTICLE 352 TFEU... 118
4. OTHER RELEVANT TFEU ARTICLES 119
A. Industry and Networks (Arts. 170-173)... 119
B. Competence Classification (TFEU Art. 2 and TEU)... 119
5. IS IT LEGAL FOR THE EU TO ADOPT A BINDING SPACE LAW? 120
II. PROCEDURES AND CHALLENGES IN ESTABLISHING AN EU SPACE ACT 121
1. TARGETED STAKEHOLDER CONSULTATION 121
2. CHALLENGES: DELAYS IN FINALIZING THE EU SPACE ACT DRAFT, A HESITATION OR UNCERTAINTY ABOUT ITS EFFECTIVENESS? 123
A. Diverging National Interests 123
B. Institutional and political dynamics 125
C. Positive effects of deliberations... 126
III. EXPECTATIONS AND RECOMMENDATIONS FOR THE COMING EU SPACE ACT 126

CHAPTER 6: THE EU SPACE ACT DRAFT: A LEGAL ANALYSIS OF ITS SCOPE, IMPLICATIONS, AND FUTURE ENFORCEMENT 129

I. OVERVIEW OF THE PROPOSAL 130
1. SCOPE OF THE PROPOSAL.. 131
2. COMPLIANCE WITH INTERNATIONAL SPACE LAW 132
3. LEGAL BASIS, SUBSIDIARITY AND PROPORTIONALITY 134
A. Legal basis 134
B. Subsidiarity (for non-exclusive competence)... 135
C. Proportionality / balance 135
3. ACHIEVING CORE PILLARS: SAFETY, RESILIENCE, SUSTAINABILITY, WITHIN A SINGLE MARKET FRAMEWORK 137
A. Free movement; One single market: 137
B. Safety... 138
C. Resilience 138
D. Sustainability.. 139
What about the zero debris charter ? Risk of Fragmentation or Added Value? 140
4. THE EXTRATERRITORIAL SCOPE AND GLOBAL IMPACT OF THE EU SPACE ACT PROPOSAL . 141
A. The Brussels Effect and EU Space Law 141
B. The legal framework for the non-EU space operators.. 142
a. Who can access the Internal market ?... 142
b. Registration and Certification Requirements... 143
c. Equivalence of Foreign Laws... 144
5. THE INFLUENCE OF ACT-IFICATION 144

II. COMPARATIVE ANALYSIS OF EU SPACE ACT PROPOSAL AND NATIONAL SPACE LAWS 146
1. AUTHORIZATION 146
A. Authorization of Space Activities under the Draft EU Space Act 146
B. Aligning National Authorization Regimes 147
2. REGISTRATION 149
A. The Union Register of Space Objects and the E-certificate 149
B. Interaction with National Registries 149
3. DEBRIS MITIGATION 150
A. EU vision for debris management 150
B. National Gaps and Required Adjustments 151
4. ENVIRONMENTAL SUSTAINABILITY 151
A. Environmental Sustainability in the EU Space Act 151
B. National Gaps and Required Adjustments 152
5. GAPS IN THE EU SPACE ACT: SPACE RESOURCES AND NATIONAL SECURITY 153
III. FUTURE ADOPTION AND ENFORCEMENT 153
1. CURRENT IMPLEMENTATION CHALLENGES 155
2. THE FRAGILITY OF CONSENSUS: LEGISLATIVE NEGOTIATION AND THE COUNCIL PRESIDENCY COMPROMISE 157
3. TOWARDS THE POTENTIAL ABANDONMENT OF THE EU SPACE ACT? 160

CONCLUSION 163

BIBLIOGRAPHY 169

Introduction

The current effort to unify the European Union (EU) space policy and law is a remarkable move in its history of strategies for governing outer space. It not only signals the internal evolution of the EU space industry but also geopolitical response to the rapid reconfiguration of the international geopolitical landscape. The war in Ukraine, the election of Donald Trump as U.S. president, and mounting domestic political instability within key EU Member States are symptoms of the general uncertainty pervading international relations today. In this light, the geopolitical significance of space has become all the more apparent, calling for a more robust and cohesive European policy and legal order for space. Space technologies that were at first viewed as civilian or commercial in scope are now decisive to military operations, situational awareness, and civil protection. The trend has raised the strategic value of space assets for European security and resilience.[1]

Against this background, the European Commission has committed to being the first "geopolitical Commission," explicitly invoking the development of space in parallel with the broader EU strategic autonomy agenda.[2] However, the future direction of EU space law remains an open question (even after the act proposal was revealed). It is urgent to establish legal objectives and frameworks that can support the Union's aspirations while addressing the outstanding issues facing the space industry.

The EU's decision to pursue a unified space law is supported by several interconnected factors. In a conference held in Paris in 2024, hosted by the "Institut français des relations internationals", focusing on *The Future European Space Law: a New Model of Development?* Mr. Rodolphe Munoz, who worked for eight years at the European Commission in DG DEFIS unit B1, among his activities, is now following the development of EU space law within the Commission, he has gone into these details during his presentation:

Firstly, the development of orbital traffic and the associated increase in space debris have posed huge safety challenges. The populated orbits of Earth pose threats not only to current operations but also to future missions. One of the main objectives of the future EU space regulation is thereby to establish a unified European approach to space safety. Harmonization would reduce legal uncertainty, reduce operational risk, and provide a common benchmark for public and private players.

Second, the differences in space regulation have destroyed Europe's space security and resilience. Member States differ considerably when it comes to their preparedness and response strategies. With increased levels of threat, both kinetic and cyber, a uniform legal regime must be implemented to ensure at least minimum levels of resilience across the Union. The new space law attempts to include a dedicated chapter on resilience in order to formalize threat-readiness norms and enable common security objectives.[3]

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[1] European External Action Service. "EU Space Strategy for Security and Defence." Last modified April 14, 2023. https://www.eeas.europa.eu/eeas/eu-space-strategy-security-and-defence-0_en.

[2] European Commission. "EU Space Strategy for Security and Defence." Last modified March 10, 2023. https://defence-industry-space.ec.europa.eu/eu-space/eu-space-strategy-security-and-defence_en.

[3] Council of the European Union. "Space: Council Approves Conclusions on the EU Space Strategy for Security and Defence." Last modified November 14, 2023. https://www.consilium.europa.eu/en/press/press-releases/2023/11/14/space-council-approves-conclusions-on-the-eu-space-strategy-for-security-and-defence/.

Third, the sustainability of the environment became a more urgent matter in the regulation of outer space. Although the EU is not interested in overly regulating this sector, it is interested in having a "common language" to ensure that commitments made become efficiently and easily applicable to space activities. The double objective is to promote environmental responsibility proportionally and enable the industry to benefit from EU funding on the basis of green readiness criteria, for example, through the Green Deal Industrial Plan.[4]

Lastly, the inherent motivation for achieving legal unification is to eliminate fragmentation of the market. There are currently only 13 EU Member States with national space laws, and others are following in that direction. The laws differ considerably in the manner in which they deal with such critical matters as licensing, liability, safety, and environmental requirements. This patchwork of laws threatens to generate unlevel playing fields, and companies can select jurisdictions with fewer requirements strategically. A harmonized regulatory context would avoid regulatory arbitrage and facilitate the development of a truly competitive and well-performing internal market for space services.[5]

It is worth mentioning that, while harmonization of space law is usually welcomed, some industry stakeholders don't agree on how best to balance regulation and innovation. The critics caution that excessive legal regulation can restrain entrepreneurial enthusiasm, restrict flexibility, and ultimately lower the competitiveness of Europe in the new space economy. These concerns reinforce the need for a balanced regulatory approach; one that finds a middle road between regulatory consistency and innovation incentives.

I. Background of the study:

In the last couple of years, there has been growing momentum for the establishment of a single EU space law, although it should be noted that no official legislative proposal has come out yet from the European Commission (at the time of writing this part of the thesis). Still, several policy communications and political signals offer proof that the EU is preparing for such an initiative. For instance, the 2022 Communication on Space Traffic Management[6] (STM) of the European Commission referred to the need for a more harmonized internal market approach to the regulation of space, notably for safety, resilience, and environmental concerns.[7] This direction was also supported by the conclusions of the French Presidency of the Council of the EU, which stressed the regulatory coherence while ensuring respect for national competencies.[8] In October 2022, the European Parliament also voted for a resolution to create a shared EU

[4] European Commission. "The Green Deal Industrial Plan." Last modified February 1, 2023. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/green-deal-industrial-plan_en.

[5] Institut français des relations internationales (Ifri). (2025). *The Future European Space Law: a New Model of Development?* [Video]. YouTube. https://www.youtube.com/watch?v=AISL8UWrEFI

[6] European Commission and High Representative of the Union for Foreign Affairs and Security Policy, *Joint Communication to the European Parliament and the Council: An EU Approach for Space Traffic Management – An EU Contribution Addressing a Global Challenge* (JOIN/2022/4 final), Strasbourg, February 15, 2022, accessed June 9, 2025, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52022JC0004.

[7] European Space Policy Institute, *ESPI Report 71: Towards a European Approach to Space Traffic Management (Executive Summary)* (Vienna: ESPI, January 2020).

[8] Assemblée nationale, "Loi européenne sur l'espace," Dossiers législatifs, accessed July 17, 2024, https://www.assemblee-nationale.fr/dyn/16/dossiers/loi_europeenne_espace.

legal framework for space. Afterwards, the EU Space Strategy for Security and Defense,[9] published in March 2023, reaffirmed the necessity to proceed in the direction of a European space law.[10] Most recently, in September 2024, the Commissioner for Defense and Space Commissioner, Mr. Andrius Kubilius, in his mission letter from Ursula von der Leyen letter included the necessity of the creation of such a law, proof that this is becoming an apparent institutional priority.[11]

At the national level, there have been some signs of support, most notably in France, where the National Assembly adopted a resolution in March 2024 calling for the creation of a European space law[12] with a similar initiative expected in the Council. However, this enthusiasm remains limited across the EU: while many Member States have welcomed the idea of greater coordination,[13] they remain cautious regarding the law's scope and potential implications for national competencies and industrial autonomy.

The attempt to achieve European space law is further indicative of tensions surrounding the issue of EU competitiveness at the international level. Competitiveness, particularly in areas regarded as being truly strategic, such as space, has been elevated to top-tier issues by the present European Commission. It is worth noting that Mario Draghi, former president of the European Central Bank (ECB), was asked to prepare a report on the future of European competitiveness, released in September 2024.[14] The report contains a section specifically directed to space and identifies several major problems, such as a lack of public investment, fragmented governance between the EU and national levels, very poor investment in research and development, and civil-military coordination, along with space companies that have difficulty evolving. In light of these problems, the report comes up with several sets of policy recommendations.[15] It recommends creating a true Single Market for space by adopting a common legal framework for the entire EU. These proposals support the idea that a harmonized European space law could help overcome current structural barriers and strengthen the EU's strategic and industrial position in the global space sector.[16] As a result, an objective legal

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[9] Council of the European Union, *Council Conclusions on the EU Space Strategy for Security and Defence* (ST-14512-2023-INIT), November 13, 2023, accessed June 9, 2024, https://data.consilium.europa.eu/doc/document/ST-14512-2023-INIT/en/pdf.

[10] European Commission. *EU Space Strategy for Security and Defence*. Brussels, March 10, 2023. https://defence-industry-space.ec.europa.eu/eu-space/eu-space-strategy-security-and-defence_en (accessed June 3, 2024).

[11] Ursula von der Leyen, *"Mission Letter to Andrius Kubilius, Commissioner-Designate for Defence and Space"* (Brussels, 17 September 2024), European Commission, November 14, 2023. https://commission.europa.eu/document/download/1f8ec030-d018-41a2-9759-c694d4d56d6c_en?filename=Mission+letter+&utm (accessed June 3, 2024).

[12] Assemblée nationale, *Proposition de résolution relative à l'adoption d'une loi européenne sur l'espace*, n° 1944, déposée le 5 décembre 2023; rapport n° 1991 déposé le 13 décembre 2023; adoptée le 5 mars 2024,

[13] European Parliamentary Research Service (EPRS), "EU Capabilities in Space: Scenarios for Space Security by 2050," EPRS Briefing 772914 (European Parliament, April 2025), accessed July 17, 2025, https://www.europarl.europa.eu/RegData/etudes/BRIE/2025/772914/EPRS_BRI(2025)772914_EN.pdf.

[14] *The Future of European Competitiveness – In-Depth Analysis and Recommendations*, European Commission, September 9, 2024, https://commission.europa.eu/document/download/ec1409c1-d4b4-4882-8bdd-3519f86bbb92_en?filename=The%20future%20of%20European%20competitiveness_%20In-depth%20analysis%20and%20recommendations_0.pdf.

[15] Balázs Bartóki-Gönczy and Katarzyna Malinowska, "Paradigm Shift in the European Union's Space Policy: Institutional Restructuring and Its Possible Consequences for the CEE Region," *Frontiers in Political Science* 7 (2025): 1536170, https://doi.org/10.3389/fpos.2025.1536170.

[16] *The Future of European Competitiveness – In-Depth Analysis and Recommendations*.

framework would serve to reduce fragmentation across the Union, make Europe a more strategic autonomous entity, and help ensure industrial competitiveness and security.

II. Statement of the Problem and Defined Terms

1. Statement of the problem

Recent political discourse often gives the impression that the European Union has turned into a "*super state*" of a sort, a "*United States of Europe*," which "relegated" its member states to semi-autonomous provinces within a large empire.[17] This perception arises from the active role of the European Commission as the leading institution in overseeing EU policies, the existence of a European Parliament that enacts legislation applicable across the Union, and the Court of Justice of the European Union, which enforces such legislation even against the preferences of individual member states.[18] However, this image of a fully unified European polity does not reflect the reality in all policy areas, particularly in the emerging field of space governance, where significant legal and institutional fragmentation persists. At present, the European space governance framework is fragmented at several levels (even after the release of the EU Space Law proposal, as most of its rules will be applied from 2030).

Firstly, the domain and policy-making space are clearly divided between the EU and its Member States. Secondly, the EU shows fragmentation vis-à-vis other European space actors which include the European Space Agency (ESA), whose mandate, although clearly institutionally distinct, nevertheless overlaps with that of the EU in several programme areas, notably those carried out under the European Union Space Programme (EUSP).

The lack of consistency between laws and institutions reduces the potential for the EU to formulate a comprehensive space policy strategy and hinders the organization's response to the fast-evolving environment in the area of space operations.[19] The main legal hurdle lies in the fact that the EU is not a party to the essential international treaties on space, such as the 1967 Outer Space Treaty (OST).[20] The OST's structure excludes supranational entities such as the EU from becoming parties,[21] while other treaties like the Liability Convention, Rescue Agreement, and Registration Convention permit accession by intergovernmental organizations; the EU has not pursued quasi-party status under any of these. This bars the EU from ever being considered a "state of registry" for space objects, thereby limiting its jurisdictional scope under international space law.[22] All legal rights and responsibilities under the UN space treaties remain with those EU Member States that are parties to them, rather than

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[17] Frans G. von der Dunk, "The European Union and Space—Space for Competition?" in *Proceedings of the 61st Colloquium on the Law of Outer Space* (Eleven International Publishing for the International Institute of Space Law, 2018), 285–300., https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1107&context=spacelaw.
[18] Ibid.
[19] Ibid.
[20] United Nations, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* (Outer Space Treaty), opened for signature January 27, 1967, entered into force October 10, 1967, 610 U.N.T.S. 205, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html
[21] Von der Dunk, "The European Union and Space—Space for Competition?"
[22] Ibid.

with EU institutions. Although the European Union has possessed international legal personality since the entry into force of the Lisbon Treaty (Article 47 TEU), this personality does not extend to assuming treaty obligations in areas where competence has not been conferred upon it. As space activities fall predominantly within shared or retained national competences, the Union cannot autonomously act as a party to the UN space treaties nor fully represent European space interests at the global level.

Within the EU legal order, fragmentation is further entrenched by the limited competences granted to the Union in space law. Article 189(2) of the Treaty on the Functioning of the European Union (TFEU) allows the EU to legislate for supporting space activities, including creating a European space programme. It clearly prohibits the harmonization of Member States' laws and regulations, thus allowing various national legislations on licensing, liability, safety, and access to the market to remain.[23] These national laws express varying strategic priorities, economic capacities, and legal traditions and reflect these differences through a kind of patchwork legal framework rather than a unitary regime. But this is where the second problem comes in, which assaults the very core of the EU legal order as evolved over time by its member states. On the one hand, in areas of competition, free trade, and market regulation, the European treaties accord a robust and overarching function to the EU institutions. The Internal Market has been in existence for a long time for the free movement of goods[24] and services,[25] as well as capital and individuals for economic purposes; that is to say, hurdles like import/export duties and quotas among Member States have been eliminated and subject to some exceptions. Taxation policies are increasingly harmonized among Member States,[26] and external trade competences have been transferred from individual states to the EU institutions, all within the framework of EU lawmaking.[27] Most importantly, the EU institutions, particularly the European Commission, are tasked with ensuring free and fair competition within this Internal Market, including prohibitions on cartels, monopolies, and improper state aid[28], when such issues have a significant international impact. On the other hand, this comprehensive Internal Market (formerly Common Market) regime was never intended to apply to the space sector, which in 1957 was nearly nonexistent in Europe, even in the public sector, while the private European space industry only began to emerge in the 1980s with operators like SES (Société Européenne des Satellites).[29] For this reason, the EU's initial attention to space was very broad, and no significant initiatives were undertaken to exercise standard EU competences in this field. This lack of attention was also shaped by the sector's connection to security matters, on which the Union had been systematically excluded for decades.[30] It was not until 1994 that the EU promulgated its first space-themed directive, the

[23] Ibid.
[24] See Arts. 28–37, Treaty on the Functioning of the European Union.
[25] See Arts. 56–62, Treaty on the Functioning of the European Union.
[26] See Arts. 110–113, Treaty on the Functioning of the European Union.
[27] Von der Dunk, "The European Union and Space—Space for Competition?"
[28] See Arts. 101–109, Treaty on the Functioning of the European Union.
[29] Von der Dunk, "The European Union and Space—Space for Competition?"., See, e.g., K. Madders, A New Force at a New Frontier (1997), 528–32.
[30] See F. G. von der Dunk, Europe and Security Issues in Space: The Institutional Setting, 4 Space and Defense (2010), 71–99.

Satellite Directive[31], addressing the liberalization of the satellite telecommunications market. This proved that the EU could enact legislation in space-themed areas through existing legal competences, though this remained the rule rather than the exception. At the institutional level, fragmentation also arises from the parallel existence of ESA, an intergovernmental agency with its own programmes, memberships, and procurement policies, alongside the EU's space initiatives such as the European Union Space Programme.[32] The parallel existence of ESA and EU programmes with varying aims and governing structures exemplifies the persistent institutional fragmentation paralyzing Europe's potential to be a single space power.

This fragmented institutional and especially legal landscape undermines Europe's competitiveness; The increasing commercialization and militarization of space require rapid and coherent responses; something difficult to achieve with Europe's current divided approach, and which this thesis will try to analyze, highlighting the steps taken in order to fix this dilemma by making one unified EU space law, which also brings challenges.

2. Terminological Clarifications

Here, we try to explain the central concepts guiding this research. The word "evolution," as used in the title, means a process of transformation that implies movement or development from one particular legal, institutional, or policy state to another. It indicates both the dynamic nature of the changes being studied and the continuity that is possible between different stages of evolution. This application reflects a conceptual model in which change is neither sudden nor discrete but rather the result of incremental modification in practice, interpretation, or structure over time.

A. The role of the EU in space law

The European Union legal contribution in the area of space is a represents a gradual but decisive transformation from a marginal player's role to that of a key institution in Europe's space-governance structure. The development is part and parcel of the EU's broader pattern of increasing competences, with the area of space issues exemplifying at the same time both the integrative exclusivity of supranational integration and the durability of intergovernmental channels.[33]

The institutional structure of space in Europe began in 1962 with the creation of the European Space Research Organisation (ESRO)[34] for space research and the European Launcher Development Organisation (ELDO)[35] for the development of European launch capabilities,

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[31] Commission Directive 94/46/EC of 13 October 1994 amending Directive 88/301/EEC and Directive 90/388/EEC with regard to satellite communications (Satellite Directive), OJ L 268/15 (1994).

[32] Von der Dunk, "The European Union and Space—Space for Competition?".

[33] Frans von der Dunk, "Chapter 4: European Space Law," in *Handbook of Space Law*, ed. Frans von der Dunk and Fabio Tronchetti (Cheltenham: Edward Elgar, 2015), 205–224, https://www.elgaronline.com/view/edcoll/9781781000359/9781781000359.00016.xml.

[34] *Convention for the Establishment of a European Space Research Organisation (ESRO Convention)*. Done at Paris June 14, 1962. Entered into force March 20, 1964. Expired October 30, 1980. 158 UNTS 35; UKTS 1964 No. 56; Cmnd. 2489.

[35] Convention for the Establishment of a European Organisation for the Development and Construction of Space Vehicle Launchers (ELDO Convention). Done at London March 29, 1962. Entered into force February 29, 1964. Expired October 30, 1980. 507 UNTS 177; UKTS 1964 No. 30; Cmnd. 2391; ATS 1964 No. 6.

which were then consolidated into ESA in 1975 with the ESA Convention. The law here established new elements in the shape of the optional programme mechanism and interim application of treaties so as to accommodate flexible and differentiated state involvement in ESA programmes.[36]

For many decades, the EU's legal predecessor, the European Community (EC), had no formal presence in outer space. The transition was made gradually, beginning with indirect action through the regulation of the internal market and industrial policy. But focused on its primary task of building an internal market and a single economic space.[37] The attitude began to shift with the more universal liberalization of markets, particularly in the telecommunications market. The Single European Act[38] of 1986 entrusted the EC with the responsibility to initiate activities in research and development of technology, by default encompassing space-related activities. Notably, the strategic role of space exploration and use was formally acknowledged for the first time in the Toksvig Report, released by the European Parliament in 1986. It was only in the 2000s that the EU began to establish itself as a space actor, and this was clinched with the adoption of Article 189 of the TFEU by the Lisbon Treaty, which formally confirmed space policy as an EU and Member States shared competence.[39]

But the EU has financed and initiated some of its main space programmes, such as Galileo (navigation), Copernicus (Earth observation), and, more recently, GovSatCom and IRIS², through its own budget and legislative means, with ESA often acting as the technical implementer.[40] In light of this, we can say that "*The European legal 'spacescape' presents a rather complex and constantly evolving picture.*"[41], which we will analyze further in different chapters of this thesis.

B. The Space Law definition

International space law, as a branch of public international law, possesses one of its most characteristic aspects: states are at the same time both the primary authors and the primary subjects of their rules, rights, and obligations; States are in short both the "*makers*" and the potential "*breakers*" of the legal norms they themselves make, something that also characterizes space law**.**[42]

If we want to go straight to the most common definition, we can say that International space law can be described, depending on the United Nations Office for Outer Space Affairs (UNOOSA) "*As the body of law governing space-related activities. Space law, much like*

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[36] Ibid p. 207–209.
[37] Balázs Bartóki-Gönczy, "National Space Law: European Best Practices for an Effective and Competitive National Regulatory Environment," in *Proceedings of the Central and Eastern European eDem and eGov Days 2024 (CEEeGov '24)*, (New York: Association for Computing Machinery, 2024), 42–50, https://doi.org/10.1145/3670243.3670247.
[38] *Single European Act*. 1987. *Official Journal of the European Communities*, L 169: 1–28.
[39] von der Dunk, "Chapter 4: European Space Law," In *Handbook of Space Law*, p. 252.
[40] Ibid p. 258–265
[41] Ibid.
[42] Frans von der Dunk, "Chapter 2: International Space Law," in *Handbook of Space Law*, ed. Frans von der Dunk and Fabio Tronchetti (Cheltenham: Edward Elgar, 2015), https://www.elgaronline.com/edcollchap/edcoll/9781781000359/9781781000359.00011.xml.

general international law, comprises a variety of international agreements, treaties, conventions, and United Nations General Assembly resolutions, as well as rules and regulations of international organizations". Most often, the phrase "space law" refers to the norms, guidelines, and standards of international law found in the five international treaties and five sets of guidelines governing space activities that were created under the United Nations auspices. [43] This could be enough to understand the main concept of space law; however, for a deeper analysis, a more profound definition is needed**.**

The origins of international space law are rooted in a much older tradition, public international law, which began taking shape in 17th century Europe, specifically with the 1648 Peace of Westphalia, that treaty formalized the notion of sovereign states as legal persons; a notion that would eventually prove central to the shaping of the law of outer space.[44] Flash forward again to 1957, when the Soviet Union put Sputnik-1, the world's first artificial satellite, into orbit. Humanity had reached outer space, remotely, not bodily, and it quickly became obvious that this new frontier could not be governed by domestic laws alone.[45] Space was international in character, and it demanded a legal code devised and agreed upon at the international level.

What followed was a rarity during the Cold War era: superpower collaboration. Despite political rivalry of the most intense sort, both the United States and the Soviet Union saw advantages in keeping outer space as a zone for peaceful endeavor, namely, scientific research. For the United States, initial Soviet achievements in space were a shock, generating fear of a "missile gap", and they saw international legal prohibitions as a way of reining in Soviet advancements. Meanwhile, the Soviets, recognizing that their lead was unlikely to be lasting, had an interest in negotiating limits that would prevent the U.S. from gaining long-term military dominance in space. [46]

This fortuitous coincidence of strategic interests led to the setting up of the UN Committee on the Peaceful Uses of Outer Space (COPUOS) in 1958, first on an ad hoc basis, and from 1959 on a permanent basis. COPUOS developed over the years as the point of focus for the creation of the legal framework of space, particularly with the support of the UNOOSA, which has been located in Vienna since 1993.[47] Initially having 18 members, COPUOS now consists of 104 members,[48] and it serves as the focal multilateral platform for the progressive development of and codification of space law internationally.

When it comes to the core substance of international space law, the Outer Space Treaty is the basis of international space law, called the "*magna carta*"; It is the most fundamental and overarching of the UN space treaties and is the foundation of international space law. It cannot

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[43] United Nations Office for Outer Space Affairs. (n.d.). *Space law*. https://www.unoosa.org/oosa/en/ourwork/spacelaw/index.html (accessed July 22, 2024)

[44] von der Dunk, "Chapter 2: International Space Law," in *Handbook of Space Law*, p. 34

[45] See, Stephan Hobe, "Historical Background," in *Cologne Commentary on Space Law*, vol. 1, ed. Stephan Hobe, Bernhard Schmidt-Tedd, and Kai-Uwe Schrogl (Cologne: Carl Heymanns Verlag, 2009), 2–12; von der Dunk, "Chapter 2: International Space Law," in *Handbook of Space Law*, p. 36.

[46] von der Dunk, "Chapter 2: International Space Law," in *Handbook of Space Law*, p. 36.

[47] Ibid. p 37.

[48] United Nations Office for Outer Space Affairs, "COPUOS Membership Evolution," accessed June 12, 2025, https://www.unoosa.org/oosa/en/ourwork/copuos/members/evolution.html.

be spelled out here with all its provisions, but general treaty principles guide and inform the whole body of space law.[49] At the center of the OST are state responsibility and state liability for conduct in outer space, evidence of the state-centric characterization of the law of space. These articles remain some of the most legally significant and contentious under the treaty. A second core concern is defining outer space as a physical and legal arena, establishing how far-reaching the treaty is. This includes ongoing disagreement over the legal lower boundary of outer space and whether or not there is an innocent right of passage through it.[50] All of these matters permeate the OST and subsequent treaties, setting fundamental parameters for all legal control of outer space activity. In addition to the OST, the Rescue Agreement (1968)[51] also specifies states' duties to rescue astronauts in distress and to return space objects to their launching states. The Liability Convention (1972)[52] extends the treaty's regime of liability by setting out when states are liable for damage to Earth or to aircraft caused by their space objects, including absolute liability for damage on the ground or to an aircraft. It is worth mentioning that the Registration Convention (1976)[53] makes outer space activities more transparent by obliging states to register any space objects launched. The Moon Agreement (1984)[54], on the other hand, deals with the use of the Moon and other celestial bodies, with an emphasis on peaceful use and benefit-sharing for all mankind, but it has not enjoyed wide adherence. Besides customary international law and pertinent UN resolutions, these treaties form the original *corpus juris spatialis*, which sets out the first framework for outer space activities. Together, these treaties form the principle "*body of law*" that governs how we proceed to explore and use outer space.

C. The concept of "Fragmentation"

One of the main notions of this thesis, and that will be repeated frequently, is "fragmentation". We can also consider it as the reason that led to the action toward the project of a unified Space Law in the EU. According to the Cambridge dictionary, it means: "the action or process of breaking something into small parts or of being broken up in this way". [55]

For a deeper understanding of this concept and its use in this dissertation, we can say that fragmentation in law can thus be defined as a situation where different laws govern the same subject in different ways, despite the fact that they are dealing with similar issues. This implies

[49] von der Dunk, "Chapter 2: International Space Law," in *Handbook of Space Law*, p. 49.
[50] Ibid p 50.
[51] United Nations. *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space* (Rescue Agreement), opened for signature April 22, 1968, entered into force December 3, 1968, 672 U.N.T.S. 119. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/rescue-agreement.html .
[52] United Nations, *Convention on International Liability for Damage Caused by Space Objects* (Liability Convention), opened for signature March 29, 1972, entered into force September 1, 1972, 961 U.N.T.S. 187, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/liability-convention.html
[53] United Nations, *Convention on Registration of Objects Launched into Outer Space* (Registration Convention), opened for signature January 14, 1975, entered into force September 15, 1976, 1023 U.N.T.S. 15, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/registration-convention.html
[54] United Nations, *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies* (Moon Agreement), opened for signature December 18, 1979, entered into force July 11, 1984, 1363 U.N.T.S. 3, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/moon-agreement.html
[55] Cambridge University Press, s.v. "fragmentation," *Cambridge Dictionary*, https://dictionary.cambridge.org/fr/dictionnaire/anglais/fragmentation (accessed June 12, 2025)

that the rules are not uniform and do not present a single system of law but rather a number of parallel systems of law that are similar and at times contradictory to one another. Such differences may result from the country's tradition and structure of law, as well as the nature of the activity being regulated. In the case of space law, countries can create the law in different ways depending on the level of technology they have, for example, and the economic and strategic reasons they have, even their general policy for space could influence their rules. To give an example, one country might have strict licensing procedures, while another might be more liberal in order to encourage innovative activity. As such, while all countries operate under the same international law, their national laws could differ.

Within the context of the European Union, this creates a problem where operators operating in several Member States will be required to comply with several sets of laws. This is the reason why the concept of fragmentation can be defined as a 'patchwork' of laws. In other words, the diversity of national choices is reflected in the concept of fragmentation, which can sometimes be positive, allowing countries to act with different types of laws according to their needs. Yet, the problem occurs when the differences become too extensive. In an integrated system, such as the EU, the concept of fragmentation can sometimes make the environment, unfortunately, more complex and less predictable. In this sense, fragmentation is no longer just a matter of difference; it is a matter of the consequences that these differences have on coordination and efficiency. In this case, we find differing rules, for instance, in the areas of licenses, liability, safety, or environmental protection (we will cover this in more detail in Chapter I). Divergences of these laws are understandable; they are for national interests and sovereignty, as explained. But as Europe tries to build a more united and competitive space sector, these divergences have started to cause real problems. Imagine a space company trying to do activities in multiple EU countries. A launch company based in one Member State would be subject to one set of debris and safety rules there, but then be confronted with a completely new set in another Member State. This patchwork is confusing and unpredictable, especially for companies trying to go international and do space activities across borders. It also makes the EU less attractive to investors, who prefer clean, consistent systems of law, as it impacts what we call "legal certainty".

D. Unification: To what degree of Harmonization?

While doing this research, I have conducted several interviews and asked questions to professionals about the 'upcoming' EU space act. One shared point of view is that the European Commission generally prefers using the word Unification over Harmonization, even though the latter is more frequent. The answer to my question: why? It is not always fulfilled.

According to the Cambridge dictionary, Unification is defined as "*the forming of a single thing by bringing together separate parts*"[56]. While Harmonization is defined as "*the act of making systems or laws the same or similar in different companies, countries, etc. so that they can work together more easily*". [57] At first sight, harmonization and unification appear to be

[56] Cambridge University Press, s.v. "unification," *Cambridge Dictionary*, https://dictionary.cambridge.org/fr/dictionnaire/anglais/unification?q=Unification (accessed June 16, 2025).
[57] Cambridge University Press, s.v. "harmonization," *Cambridge Dictionary*, https://dictionary.cambridge.org/fr/dictionnaire/anglais/harmonization (accessed June 16, 2025).

synonymous; their meaning within EU law is more nuanced than the basic dictionary definitions suggest. As Eva J. Lohse[58] shows, their difference nonetheless is more subtle than the common shorthand equating directives with harmonization and regulations with unification *(directives = harmonization" and "regulations = unification*). The former distinction is indeed essentially one of legislative technique rather than one of substantive effect. Thus, whereas harmonization consists of the adoption of multiple national acts which are only materially equivalent, leaving some flexibility in the manner of application of the rules by the Member States, unification consists of a single legal act directly applicable in all Member States and applying uniformly throughout the Union.[59] However, even directives may in practice leave little scope, while regulations may be used to approximate national laws, so that in practice the threshold between harmonization and unification is often gradual, not categorical. In the end, therefore, the difference does not lie in the instrument but in the degree of uniformity reached in practice: while harmonization may actually bring about considerable convergence, at times even de facto unification, unification seeks from the outset the same legal framework for all Member States. In addition, Article 189 of the TFEU actually prohibits the harmonization of national space laws but does not exclude a certain degree of harmonization on different legal bases, which will be discussed in detail in Chapter V.

In this thesis, the terms "EU space law" or "EU Space Act" are used depending on the context of the chapter. "EU space law" reflects the current fragmented EU space law (as the existing legal system in this area) or a future EU-level space *legal system*, while "EU Space Act", "EU Space Act proposal", or "draft EU Space Act" (used interchangeably) will refer to the coming EU space act as *a single legal instrument*.

III. Purpose of the thesis

The core purpose of this study is to establish that while technological advancements remain the fundamental facilitator in the development of the space sector, they can't be used optimally without a comprehensive legal and policy framework. Without a coordinated legal and policy framework, progress can be weak, and long-term objectives such as autonomy, resilience, and competitiveness in outer space may be jeopardized. This study focuses in particular on the European Union and thus is a case study through which it illustrates how legal fragmentation, among national legislation, regional, and emerging EU programs, is suffocating the development of a single, strategic vision for space governance. On the basis of a reflection of the legislative framework and regional policy measures in the EU, the study identifies that the lack of legal cooperation and legal coherence are two of the most important dimensions restricting Europe's role and position in the international space arena. With the growing

[58] Eva J. Lohse, "The Meaning of Harmonisation in the Context of European Union Law – a Process in Need of Definition," in *Theory and Practice of Harmonisation*, ed. Mads Andenas and Camilla Baasch Andersen (Cheltenham: Edward Elgar Publishing, 2012), 45–46; see also P.J. Slot, "Harmonisation," *European Law Review* 21 (1996): 378–379; B. Kurcz, "Harmonisation by Means of Directives – Never-Ending Story?" *European Business Law Review* 12 (2001): 287–288; A. Jeammaud, "Unification, Uniformisation, Harmonisation: de quoi s'agit-il?" in F. Osman, ed., *Vers un code européen de la consommation/Towards a European Consumer Code* (Brussels: Bruylant, 1998), 35–43.
[59] *Ibid.*

presence of "new space actors"[60] interested in changing or adopting national space laws, the EU experience offers some crucial lessons. One of the main arguments of the study is that national legal systems, though necessary, are not enough in themselves. For national legislation to be conducive to innovation and competitiveness, it has to be placed within a richer, clearly defined strategy of regulatory coordination, public-private partnership, and cross-border cooperation. Lastly, this research posits that the establishment of a harmonized and binding European space law could not only address the long-standing issues of fragmentation but also help create a more stable and attractive environment for investment, research, and foreign collaboration in the space sector. However, it needs to be supported by other factors, other than that it would play against the EU.

IV. Research Questions and Hypotheses

In light of the above considerations, the present thesis is guided by the following research questions:

1. What are the practical manifestations of the fragmentation of EU member states' space laws?
2. At the regional level, to what extent were the existing EU instruments tailored to the particular characteristics of space activities?
3. How does the emerging regime of space law within the EU compared to that of leading space-faring nations like the United States or China?
4. Would the creation of a common EU space Act significantly contribute to the Union's goal of becoming strategically autonomous in outer space?
5. Does the EU have the legal competence to adopt a harmonized space law? And how can it play the role of a global space actor and regulator if it is not a signatory to the UN space treaties?
6. Does the draft of EU Space Act cover the set of issues needed?
7. Would its implementation be easy?

To answer these questions, the study is structured around a single primary hypothesis, supported by two secondary sub-hypotheses. The general assumption is that the lack of an EU-harmonized legal order has been a high price for the EU's ability to build a robust, independent presence in outer space. This gap in legal fragmentation is perceived to be one of the major factors contributing to the Union's lack of competitiveness, as well as its strategic autonomy in the field of space in the long term. The first sub-hypothesis is that a patchwork of national laws, along with regional regulations and institutions filled with gaps, has created a fragmented legal environment. This fragmentation has generated regulatory uncertainty, which increasingly makes it hard for private actors to function within the union. As a result, investment has been discouraged, innovation has been restrained, and the development of a dynamic and integrated European space sector has been greatly blocked. On the other hand,

[60] United Nations Office for Outer Space Affairs, *Space Law for New Space Actors – Advisory Services*, accessed June 17, 2025, https://www.unoosa.org/oosa/ourwork/spacelaw/capacitybuilding/advisory-services/index.html.

the second sub-hypothesis is that the development of a coherent and consistent EU space law would be able to address such challenges. By establishing legal certainty and a less fragmented regulatory framework, such a law would be able to lead to predictability and consistency for the purpose of attracting investment and supporting cooperation among Member States. In so doing, it would provide the foundations for an independent and competitive European outer space capacity; a consequence in line with wider EU objectives of strategic autonomy and industrial leadership.

V. Justification and Significance

This research is very timely and relevant, having developed in tandem with the evolving discourse on the EU proposal for space law. Throughout this process, major shifts in terminology and approach emerged, for instance, the shift from the community to debate potentially having a "European Space Act" rather than a "space law." This comparatively minor but consequential change reflects broader strategic and political thinking that this study attempts to unpack. The study has been conducted through discussions with the space law community experts. It monitored the delays and developments around the EU proposal very closely, capturing views and concerns articulated by the different actors. To enrich the analysis, the author interviewed key stakeholders on several occasions during major space law events. The insights gained certainly enriched the analysis and anchored it in the experiences and expectations of people actively shaping the future of space governance in Europe. By institutionalizing the capture of these dynamics, reactions, and other developments, the study aims to help academic discourse around EU space law, but also offers a practitioner-focused perspective that can shape future policy debate and legal response.

VI. Literature review

1. International space law literature review

Despite the legal framework that was previously mentioned in this introduction, some theoretical frameworks are also worth mentioning, since they will be the basis of our research and have inspired further research as well, and would help us gather more insights to do our analyses and evaluations.

The first literature that we will review is the " Space Law: A Treatise" by Francis Lyall and Paul B. Larsen 2018; This monograph is among the most comprehensive and accessible guides to the complex world of space law. Written by two leading authorities, Lyall and Larsen guide readers through a systematic tour of the evolution and present status of legal norms for outer space. The book does not simply offer treaty outlines; it gets at how such legal instruments actually work. One of its positives is the way in which it bridges international principles and domestic application, and connects problems of public law to the extended role of commercial actors. The first part of the book sets the stage by considering the basic legal sources, e.g., the UN space treaties and space law in countries, putting the reader into legal as well as historical context. Through the course of the chapters, the authors increasingly address more concrete, practical issues, for example licensing, liability, operation of satellites, and space debris. These sections are expressly helpful in understanding the everyday ramifications of legal norms,

which numerous theoretical studies do not. Significantly, the book does not shun the future. It touches on new issues like space tourism, private control of space assets, and militarization of space, all set within a legal framework that never forgets the laws and regulations of our everyday world. While it's an international book in scope, its relevance to the readers is especially of interest to those interested in European matters, especially now that the EU has been focusing on establishing a clearer regulatory scheme. In any case, Space Law: A Treatise is not only academic but thoughtful and readable, a necessity for anyone who wishes to study both the letter and the spirit of space law.

Secondly, "Handbook of Space Law" edited by Frans Von Der Dunk and Fabio Tronchetti, Handbook of Space Law, Cheltenham, Edward Elgar, 2015. It brings together leading experts to provide a wide-ranging yet still in-depth overview of the legal regimes governing space activities. In contrast to textbooks that try to lay the basics, this volume takes the reader on a journey through advanced and current legal debates from the basic UN treaties to more recent problems of space resource utilization, traffic management, and environmental sustainability. Each chapter critically considers an aspect of the subject matter, merging legal analysis with policy implications. The interdisciplinary-nature and the international-nature of the discussion in this book are what set it apart and give it a real plus. It looks not only at how the legal landscape is charted but also at how legal norms intersect with geopolitical realities and technological progress. A special focus is given to commercialization, security, and the increasing importance of non-state actors-these are just the kinds of issues that will be paramount for the EU as it attempts to forge its own space policy and regulatory regime.

Third, "Space Law: Overview." by Lyall, Francis 2021; In this concise yet informative book, Francis Lyall offers a systematic overview of the fundamental principles of space law, addressed to those readers interested in gaining a quick yet solid introduction to the topic. The paper follows the development of legal norms for use in outer space, with particular emphasis on key international treaties like the UN space treaties and the institutional role of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS). Lyall explains how state responsibility, liability, and non-appropriation principles have shaped the legal framework since the Cold War. The overview is brief but rich in legal analysis. It also deals with practical implications of the evolution of space law, especially with commercial and private entities taking on more space operation functions.

Fifth, the "Space Law" book By Gyula Gál. 1969; This book First published in Hungarian in 1963. However, the presently available English version surpasses being merely a translation. The present edition has been heavily revised and is largely up to date. For instance, the author looks at the Outer Space Treaty of 1967 and the Agreement Governing the Rescue and Return of Astronauts of 1968. The author starts with an introductory chapter giving a scientific background before delving into the evolution of space law with emphasis on the problems such as astronaut liability, legal status of space objects, sovereignty over airspace, and legal status of celestial bodies and outer space. In a chapter on "Legal Problems of Practical Exploitation", he treats weather and communications issues, the two industries where space exploration has so far proved to be of any real use. In the last chapter, the author deals with international cooperation in space science. As annexes, the texts of the Rescue Agreement and the Outer

Space Treaty are reproduced. One cannot consider this book to constitute a major contribution to the field of space law, but it deserves laurels for having provided a useful academic overview.

Sixth, Frans G. von der Dunk (ed.), International Space Law (International Law Series, vol. 19, 2020). This edited volume, in the International Law Series, is a thoughtfully selected collection of seminal texts and articles that have shaped the development of space law as it is today. Edited and introduced by Frans von der Dunk, the volume is both a record of history and a legal map of how the field has progressed, from the regulation of space in the Cold War era under the UN treaties to contemporary concerns with commercial spaceflight, resource extraction, and space sustainability. What makes this volume unique is its documentary nature; it brings together foundational documents and landmark judicial interpretations in one place. Von der Dunk's introductory explanation of each section places the texts in context, so that the volume is more than a compilation, but a critical companion to the evolution of international space law. The book includes perspectives both on the successes and limitations of existing legal instruments, and also on how gaps in regulation have spurred new proposals at national and regional levels, including within the EU.

Seventh, "The limits of law: challenges to the global governance of space activities." by Freeland, Steven 2020; The ways in which space technology is changing and the difficulties that the existing international legal and governance framework has in addressing certain applications of space; moreover, the need to take these developments into account when creating frameworks for future space operations. The usage and exploration of space by humans, as well as their reliance on space-related technologies, provide a number of serious problems for the continued global regulation of these activities. The best method to handle these issues so that humanity may keep using space for peaceful reasons and reap major rewards for the good of the whole world community is a crucial question. This article identifies some of the most significant issues that will need to be taken into account when creating suitable legal, regulatory, and policy frameworks for upcoming space activities in order to best serve the interests of present and future generations.

2. European space law and policy literature review

In the first place, we have "The new European Union space policy in order to maintain Europe's position among space leaders." by Kolczyński, Piotr 2019**;** In order to address the present global issues facing the space sector, this study reviews the EU's current space strategy. The ultimate goal of this study is to provide the European Commission with recommendations for a well-balanced space strategy that would guarantee efficient and sustainable space exploration and use for the benefit of all EU member states. The special characteristics of Europe's space industry are researched in order to create the most effective space policy. This essay makes the case that ensuring European autonomy in space access and use must be the primary goal of EU space policy. The problems and possibilities associated with the fast expansion of the private space sector's operations are thoroughly examined by the author. The importance of symbiotic collaboration between governmental institutions and private businesses in terms of reciprocal advantages is emphasized. The paper's conclusion is that the moment is perfect for the European Union to develop a visionary and audacious space strategy.

Moreover, we can also refer to the "Re-affirming Europe's ambitions in space: Past, present and future perspectives." by Antoni, Ntorina, Maarten Adriaensen, Angeliki Papadimitriou, Christina Giannopapa, and Kai Uwe Schrogl 2018; This paper provides a summary of space policy developments in Europe, both historical and contemporary. Numerous problems that have impacted EU enlargement over the past ten years have put the European integration endeavor in jeopardy. At the same time, the space sector is changing swiftly. In response to these challenges, the European Union (EU) and the European Space Agency (ESA) issued a Joint Statement on "Shared Vision and Goals for the Future of Europe in Space" on October 26, 2016, pledging to keep improving their cooperation in space. Europe's common goal is to remain a dominant player in space and a top choice for international alliances. The European Commission echoes the goals and shared vision of the Joint Statement in its announcement on its "Space Strategy for Europe." Then, on December 2, 2016, ESA adopted the resolution "Towards Space 4.0 for a United Space in Europe." With these developments in space policy, the development of a comprehensive European Space Strategy may help Europe's future in space and beyond. This strategy will make an effort to meet the particular requirements, commitments, and features of Europe in order to deepen European integration.

Furthermore, "A Coherent European Procurement Law and Policy for the Space Sector: Towards a Third Way." by Hobe, Stephan, Eva Hofmannová, and Jan Wouters 2011; The authors clarified that space is a strategically significant issue that requires a coordinated response by European space players. Diverse public procurement strategies shouldn't impede collaboration across the European Space Agency, the European Union, and its constituent Member States. The research offers a space procurement toolset that takes into account industry-specific requirements. Every instrument is evaluated considering the goals of policy, the state of the market, and the European Union and European Space Agency's legislative frameworks.

Despite the valuable doctrines outlined above, the added contribution of this thesis to the scientific discourse lies in offering the first comprehensive analysis that traces the European Union's shift toward the need for unified space law. It provides a detailed account of this evolution, examines the divergences among national EU space laws that contribute to fragmentation, outlines the process leading to the development of the EU Space Act, and concludes with a scientific assessment of the released draft, all within a single coherent study.

VII. Methodology

This research adopts a primarily doctrinal legal analysis supplemented with a comparative and critical approach. The study critically examines the existing legal provision for regulating space activities in the European Union in a systematic analysis of the EU primary and secondary sources of law and national space legislation in selected EU Member States. Through this comparative legal method, critical divergences and convergences in member states' regulatory frameworks; above all, under themes of licensing processes, liability frameworks, and private sector involvement. The normative aspect of the research not only interprets existing law provisions but also examines their adequacy in serving broader EU policy goals such as competitiveness and strategic autonomy in outer space. Comparative legal examination goes beyond the EU geographic limits, to examine more centralized approaches to law among

developed space powers, specifically the United States and China. In addition, the research is also critically observing the most recent policy efforts, especially the debates regarding shaping unified EU space law. By combining legal interpretation with insights from expert interviews conducted during the course of relevant space law conferences and meetings, the research combines empirical awareness with doctrinal interpretation. These interviews, which typically consisted of one or two targeted questions posed to sector professionals prior to the release of the EU Space Act proposal, included discussions with experts such as with Hermann Ludwig Moeller, the Director of the European Space Policy Institute (ESPI) during an event in the Institute, and Mr. Guillaume de La Brosse, Head of Unit for Innovation and New Space (Space Defence) at the European Commission, at the EU Space Days event, among others. The intent and purpose of these discussions were not the incorporation of the feedback offered by the participants into the body of the analysis presented in the thesis. Instead, they were an intellectual sounding board that aided the further clarification of the fundamental concepts presented and the identification of the most appropriate analytical route to be taken. The feedback offered by the participants was beneficial in the more precise and appropriate development of the overall argument presented. Such qualitative feedback presents a more realistic view of how legal fragmentation manifests in real space governance and more informed suggestions for additional regulatory development. Sources include treaties, EU legislation, national space law, policy reports, academic work, and institutional papers. Research also draws on international space law instruments and soft law rules that have been adopted by the United Nations. Together, the multi-method offers a tough contextualized and critical legal analysis of the challenges and opportunities of EU space governance.

VIII. Limitations

The limitations of this research have a close correspondence with the dynamic and multifaceted nature of the subject. With the European Union in ongoing development of its vision for a unified space law, there are many relevant policies and legal discussions still under development. This study will be concerned with the institutional and legal aspects of EU space governance and not with the technical, operational, or programmatic management of space activities. So it does not deal with the engineering or scientific aspects of the space industry, which are equally important but not within the legal purview of this research. In addition, the research is based solely on legally available documents, policy reports, academic literature, and institutional books. It omits classified or internal records of EU institutions, ESA, or Member States. While this is transparent and scholarly, it also adds some information constraints, most notably in understanding internal negotiations and strategic intentions. The study also draws upon a restricted pool of specialist interviews collected at selected scholarly and professional conferences within space law. Though these conversations yielded insights of significance, they are not completely indicative of all stakeholders that shape EU space governance. Additionally, the geographical scope of such interviews was largely European professionals, which might not take into account the general international views on the changing role of the EU in space. Notwithstanding these shortcomings, this research seeks to contribute, in a timely manner and supported by law, to the debate on the future of EU space law and its prospective implications for governance, competitiveness, and strategic autonomy.

IX. Organization of the Thesis

This thesis has two principal parts, each of which is further subdivided into three chapters. Each chapter is further broken down into sections and subsections to facilitate an exhaustive and methodical discussion of the research questions.

PART I, titled A Fragmented Approach: Law as a Hindrance to EU Space Activities, explores the existing legal fragmentation of the European Union’s space regulation. It begins with ***Chapter 1***: EU Member States National Space Law, which overviews legislation on the national stage and its implications on legal coherence. ***Chapter 2***: EU Regional Space Legislation examines the EU-level implemented legal frameworks and their interconnection with national schemes. ***Chapter 3***: Comparing EU Space Law Framework to Other Space Powers: U.S, A Structured Approach locates the EU's legal framework in comparative perspective with world space great powers to highlight structural and strategic differences.

Moving on to **PART II,** titled A Unified Approach: Towards a Harmonized EU Space Law for a Competitive Position in Space, analysis is directed towards possible solutions and the way forward. ***Chapter 4***: The Need for an EU Strategic Autonomy in Outer Space; Using Law as A Tool emphasizes the means through which legal harmonization can promote autonomy and competitiveness. ***Chapter 5***: Assessing the Legal Basis for EU Action in Space Law: Competence, Procedures, and Expectations examines the Union’s legal competences and the procedural challenges of adopting a shared space law. Finally, ***Chapter 6***: The EU Space Act Proposal: A Legal Analysis of Its Scope, Implications, and Future Enforcement provides a comprehensive critique of the EU draft space law, outlining its anticipated role as it restructures the Union's policy towards space governance.

PART I. A FRAGMENTED APPROACH: LAW AS A HINDRANCE TO EU SPACE ACTIVITIES

The current European space law landscape

To this degree, there is a marked difference between those states with long-standing traditions in space activities, typically those that possess launching capability, and those for whom national law demonstrates a less extensive or future role in space, often restricted to satellite operations. The latter have been in a position to convert institutional and technical expertise into national legal systems, resulting in well-defined laws with regulatory certainty and predictability. In contrast, the second set of states favors open-textured, flexible frameworks applied case by case, revealing not only a lack of technical infrastructure but also limited political or industrial prioritization of space. For operators and investors, this distinction manifests in two principal concerns: the existence or non-existence of national space law, and the varying degrees of legal rigidity or uncertainty across states.[61]

This loophole within the European Union reflects an even deeper structural issue. Though the EU wishes to be a competitive actor in outer space worldwide, the EU's legal framework remains fragmented. Instead of a single consistent space law, the EU has a patchwork of national legislation, sectoral regional policies, and institutional arrangements with overlapping or undefined competences. As this **PART I** of the thesis demonstrates, such fragmentation is not simply an echo of legal diversity but has tangible effects on the Union's prospects for the coordination of space activities, regulation of new players, and long-term strategic autonomy.

Chapter 1 focuses on the selected EU Member States of France, Luxembourg, Belgium, Austria, and Denmark, examining the content and function of their domestic space laws. Particular attention is given to authorization and supervision regimes, liability regimes, registration systems, and how each legal framework deals with issues such as insurance, debris mitigation, and the role of private actors. Convergence patterns are found in those fields where international obligations (such as those deriving from Articles VI-VIII of the Outer Space Treaty) have guided national implementation. Divergences are nevertheless stark, not only in legislative ambition but also in rationales and institutional capacity.

Chapter 2 shifts to the EU regional level, discussing how EU law and policy instruments, namely the Lisbon Treaty, Regulation (EU) 2021/696, the Framework Agreement with ESA, and other sectoral regulations, attempt to regulate space activities, but unfortunately add fragmentation. While these regulations are important, they are still fragmented, and their fragmented use shows the absence of an overall legal architecture. While environmental sustainability, telecommunications, data management, cyber-security, and export control laws regulate their respective fields to some degree, no legal act exists that brings all of those together in one space law system.

The European case is put into a comparative context in ***Chapter 3*** where it is compared to both the United States and China's legal architectures. Both countries have had the advantage of a

[61] European Space Policy Institute, *National Space Legislation in Europe* (ESPI Report No. 21, June 2011), 7, https://www.files.ethz.ch/isn/124779/espi%20report%2021.pdf.

more centralized approach that has allowed for increased legal predictability and coordinated policies. The U.S. has had decades of commercial law that regulates business transactions while China has developed its legal framework quickly in accordance with its national strategy.

Chapter 1: EU Member States National Space Law

National space legislation is the tool to implement the international obligations of States at the national level; The OST governs the global regulatory framework for outer space, emphasizing the principle of state responsibility. It requires states to authorize, supervise and be responsible for their space activities and liable for any damage. However, a lack of detailed binding technical rules for implementing the general OST obligations has led to diverse authorization requirements since Member States adopted different approaches for regulation. Existing divergence among national legal systems poses real barriers to cross-border activity. For example, if a space company wants to launch a satellite constellation that will operate over several Member States, it may be required to obtain authorization in each of them, each with different rules, conditions, and administrative procedures. Such fragmentation increases costs and uncertainty for operators, especially new and small ones. There are, at present, 13 EU countries that have adopted their own national space laws to date,[62] with varying requirements, sophistication, and scope. This number might increase as more countries think about implementing their own national laws, which cover a wide range of activities from launching and operating satellites to space debris management and agreements on international cooperation. By referring to national laws in this chapter "*we do not consider it as national space regulation if the State only regulates the management of space frequencies and orbital slots or lays down the rules of the functioning of the space agency (ex. Poland). We consider as national space law legal acts aiming to lay down rules relating to authorization and supervision of national space activities as forseen by Art. VI. of the Outer Space Treaty*." [63] In this matter, international law made the first major step by drawing the main lines so the nations could follow in making their national space law. These guidelines are mainly incorporated in *Articles VI, VII, and VIII of the Outer Space Treaty*, which this chapter will analyze in detail. **(I)**

In the second section, to demonstrate the fragmentation in the current national EU space law, this chapter will adopt a comparative approach to explore the common points and differences between some different EU member state national space regimes. For this purpose, the comparison will be done on ***Austria, Belgium, Denmark, France, and Luxembourg*** as a case study. These countries have been selected for the reason that they represent several different legal traditions and approaches to space law within the EU, either small countries that interpret the space activities or those with a great history in the sector. The comparison will provide a useful guide to the position of national legislation concerning space activities in Europe today. **(II)** It should be noted that parts of this chapter, along with the detailed national space law

[62] This includes Austria, Belgium, Denmark, Finland, France, Cyprus, Luxembourg, the Netherlands, Portugal, Sweden, Slovakia, Slovenia and Italy. Additionally, Spain is developing one. Estonia's space law is expected to come into force on January 1, 2026. See; European Parliamentary Research Service (EPRS), "EU Capabilities in Space: Scenarios for Space Security by 2050," .

[63] Bartóki-Gönczy, "National Space Law – European Best Practices for an Effective and Competitive National Regulatory Environment,"

analyses of the selected EU member states used, are based on a study conducted by legal experts[64] in the field.

I. International Legal Foundations for the Adoption of National Space Legislation

Since national space law is at the core of international space law and can be described as the collection of domestic laws and regulations enacted by countries in order to regulate activities in space by any entity within their jurisdiction. They concern matters relating to licensing, authorization, supervision of space activities, liability for damage, environmental protection, and the management of space resources. National space law is meant to ensure that the activities of each country in space are conducted in such a way as to be consistent with international obligations under treaties such as the OST. In other words, it is the national implementation of international space law or international space-related obligations, applicable to governmental and private space actors.[65]

Along with what has been said above, the meaning of "national activities in outer space" deserves our attention, since it can contain some ambiguity, as the OST does not define this term specifically. According to the prof. Frans von der Dunk, there have been several scholarly discussions regarding the real meaning of it, leading to the development of three main theories regarding what the words actually mean. These theories came up in an attempt to define which activities a state was responsible for based on the treaty, particularly private or nongovernmental entities that perform activities in space.[66] With the increasing expansion of the space industry globally, the role of national legislation has been important. States have had no choice but to lay down national laws as a way of putting into action and enforcing international space law obligations within domestic jurisdictions. National laws represent the link between international obligations, such as the OST, and practical regulation at the domestic level, according to which space activities are ruled.[67]

[64] gbf Avocats SA, *Droit spatial national: Étude portant analyse de différentes législations spatiales nationales, en vue d'une réflexion de lege ferenda*, prepared by Laurent Chassot et al. (Zurich and Geneva, 2021), commissioned by Département fédéral de l'économie, de la formation et de la recherche (DEFR), Secrétariat d'État à la formation, à la recherche et à l'innovation (SEFRI). available at: https://www.swiss-space-law.admin.ch/dam/de/sd-web/Jxxw4rsAqaov/droit-spatial-national%5B1%5D.pdf (This chapter draws substantially on this study, originally published in French. Portions of the analysis are based on the author's arguments, which have been translated and critically adapted for the purposes of this thesis. The source is used here as a conceptual foundation to illustrate the fragmentation of EU space law, while the comparison, interpretation, and conclusions remain those of the present author.)
[65] Frans von der Dunk, "Chapter 3: National Space Law," in *Handbook of Space Law*, ed. Frans von der Dunk and Fabio Tronchetti (Cheltenham: Edward Elgar, 2015), https://www.elgaronline.com/edcollchap/edcoll/9781781000359/9781781000359.00011.xml.
[66] Frans von der Dunk, "Scoping National Space Law: The True Meaning of 'National Activities in Outer Space' of Article VI of the Outer Space Treaty," in *Proceedings of the International Institute of Space Law 2019*, ed. P. J. Blount et al. (The Hague: Eleven International Publishing, 2020), 227–237., https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1116&context=spacelaw.
[67] Chassot et al., *Droit spatial national*, p.11.

1. The legal framework following from the Outer Space Treaty

We will start by focusing here on Art. VI of the OST to which we attribute the adoption by States of a national space law.[68] This provision, in fact, affirms the principle of international responsibility for all their space activities, whether carried out by government bodies or private actors, and calls on them to subject the activities carried out by the latter category (private actors) to an authorization and monitoring regime.[69] It follows, however, from Article VI, 3rd sentence of the Outer Space Treaty that the international organization and the States Parties to the Treaty, which are members of the same organization are jointly responsible at the international level. They must guarantee, in accordance with the responsibility of States for national activities, that the activity is carried out in accordance with the provisions of the OST[70]. This means that the responsibility of states is extended to all space activities, whether carried out by government agencies or nongovernmental entities. In other words, under this statement, states bear the responsibility for ensuring that any undertakings by private entities, such as commercial organizations, are in conformity with the international obligations within the treaty. To this end, states are obliged to establish mechanisms for authorizing and supervising them, in order for such private activities to be in accordance with the standards of international space law. Simply, even where the private companies get involved in space activities, their relevant countries have to regulate, supervise, and take responsibility for them to ensure compliance with the international space law, which will be more detailed in this paper.

In addition, art. VII of the OST, which makes States responsible "*liable*" for any damage caused by a space object that they launch or "*procures the launching"* of an object[71] and therefore encourages them to regulate these activities. [72] It deals with the issue of international liability of states for damage caused by their space activities. It lays down that any state launching or procuring the launching of an object into outer space, and any state from whose territory or facility an object is launched, is internationally liable for damage caused by that object to another state or to persons and property on Earth, in airspace, or in outer space. Also, it holds the launching state(s) liable in respect of damaging effects arising from space activities performed by either government or private operators. The intent of this section is to ensure states exercise due care when launching objects into outer space, lest they be held liable in case damage results from such. Therefore**,** the Liability Convention clarified the contours of the liability regime thus established.[73]

[68] Annette Froehlich and Vincent Seffinga, eds., *National Space Legislation: A Comparative and Evaluative Analysis*, Studies in Space Policy, vol. 15 (Cham: Springer International Publishing, 2018), p 9, https://link.springer.com/book/10.1007/978-3-319-70431-9; Chassot et al., *Droit spatial national*.

[69] Article VI of the outer Space treaty.

[70] Michael Gerhard, In *Cologne Commentary on Space Law*, Vol. I, *Outer Space Treaty*, 2017, n° 82 ad art. VI.; Hobe, Stephan, and Vshen. "Legal Status of Outer Space and Celestial Bodies." In *Routledge Handbook of Space Law*, edited by Ram Jakhu and Paul Stephen Dempsey, 25ff, 37. New York: Routledge, 2017; Frans von der Dunk, "Chapter 2: International Space Law," in *Handbook of Space Law*, p., 54-55; Chassot et al., *Droit spatial national*

[71] Article VII of the Space Treaty.

[72] Froehlich and Seffinga, p. 10; Chassot et al., *Droit spatial national*., p11.

[73] Ibid.

Finally, Article VIII of the OST sets out the principle of international competence of States with regard to space objects registered in their national register, regardless of their location. The Registration Convention of 1974 specifies that space objects must be registered by their launching State. This results in a delimitation of the jurisdiction of each State, an important factor in defining the scope of national space law.[74]

2. The role and scope of national space law

International space law gives national space legislation its essential architecture. In 2017, there were fourteen representative specimens, that is to say, more or less complete, in the world[75]. Today, by 2024 there are more than 30 national laws on space in the world. Countries such as the United States, Russia, Japan, and Luxembourg have established fully articulated laws to govern the varied space activities. Recently, newer space nations like the United Arab Emirates and Australia have enacted clear national space laws in light of regulating their commercial and civil space activities. The expansion characterizes a more general trend in the global governance of space activities with regard to problems bordering on liability, sustainability, and space resource utilization. This trend of increased national legislation reflects the increasing commercialization of space and recognition by an increasing number of countries of the need for clarity in the regulatory systems that guide their national activities concerning space in relation to international agreements. The preceding succinct presentation of international space law has indeed highlighted the approvals made by the treaties to their contracting States on certain points: to authorize and supervise space activities, as well as to register the space objects for which they are responsible.[76]

This is the obligatory part of national space law, its content at a minimum, you could say. On the edge of these obligatory legislative interventions, the international responsibility that weighs on States (responsibility and liability), however, encourages them to regulate space activities within their jurisdiction, through the adoption of various detailed requirements in terms of security, environmental protection, etc. Even if, at such a level of detail, they are not strictly speaking an international obligation, they are the indirect result of it: prevention is better than cure. To prevent this, States' own financial motivations can also be taken into account, namely the need to equip themselves with a legal basis to take action against private space actors for whose activities they are internationally responsible. [77]

3. Global Approaches to Harmonizing Space Law and Regulatory Frameworks

To make sure that national laws from different countries worldwide are still under the international space law umbrella, two initiatives must be mentioned in this regard: The first

[74] Article VIII of the Space Treaty.

[75] Gerhard ,In *Cologne Commentary on Space Law*, no. 72 ad art. VI; an updated list referencing all national legislation relating to space activities is available on the website of the United Nations Office for Outer Space Affairs, https://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html (accessed July 29, 2024); Chassot et al., Droit spatial national,, p18.

[76] See, Boudour Mefteh, "International Space Law Guidelines for Adopting National Space Legislation," *Boletines del Observatorio Jurídico Aeroespacial*, no. 16 (2024), 83-101

[77] Froehlich and Seffinga., 11; Chassot et al., *Droit spatial national*, p18.

one is the *Resolution (UN) 68/74 on recommendations on the content of national space law ;* On December 11, 2013, the United Nations General Assembly adopted Resolution 68/74 entitled "Recommendations on national legislation relating to the peaceful exploration and use of outer space." [78]Based on a report prepared by the Working Group on National Legislation of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space[79], which engaged in the inventory and analysis of the national space legislation of Member States.

The second initiative is the *Sofia Guidelines for a Model National Space Law*. Building on earlier work developed within the "Project 2001 Plus" symposium held in Cologne in 2005, the Committee on Space Law of the International Law Association (ILA) elaborated and adopted in 2012 a set of non-binding model guidelines for national space legislation, known as the *Sofia Guidelines*.[80] These Guidelines constitute a form of soft law intended to assist States in the development or reform of domestic space legislation. The *Project 2001 Plus* structured national space law into five fundamental thematic modules:[81] authorization of space activities, monitoring of space activities, liability, state recourse and insurance, registration of space objects, along with other aspects. These mentioned points served as the basis for the Sofia Guidelines, which were formulated as guidelines for national legislators, with the aim of promoting an approach based both on the implementation of international law and on the needs of the space sector.[82]

4. Structural Consequences of Decentralized Authorization under the Outer Space Treaty

In light of this, we can say that Article VI of the OST outlines the decentralized system of governance through the authorization and continuous supervision by States of their activities in outer space, without the content, methods, or extent of such control being standardized. Although this was an appropriate approach during the early years of the use of space, which was largely dominated by governmental activities, over the years, this approach has resulted in significant divergences in the practices of States with the increase in the number of actors in space activities. To address this problem, soft-law instruments such as the Sofia Guidelines mentioned above have been developed.

However, in the contemporary space environment, this decentralized structure is increasingly under pressure due to the exponential growth of private actors, the emergence of mega-constellations, space resource utilization, and the criticality of space infrastructure for national interests. As such, national authorization has emerged as the dominant regulatory interface for activities that, by their very nature, possess a transnational character. The open-ended

[78] UN, General Assembly Resolution 68/74 of December 11, 2013, Recommendations on National Legislation Relating to the Peaceful Exploration and Use of Outer Space, A/RES/68/74; Chassot et al., *Droit spatial national*. p19.
[79] COPUOS, Legal Subcommittee, Report of the Working Group on National Legislation Relating to the Peaceful Exploration and Use of Outer Space on the Work Carried Out in the Framework of its Multi-Year Work Plan, A/AC.105/C.2/101.
[80] ADI, Resolution No. 6/2012 of August 30, 2012, Space Law, (accessed July 29, 2024).
[81] Gerhard, In *Cologne Commentary on Space Law*, no. 73 ad art. VI; Chassot et al., Droit spatial national.
[82] For more details about the procedures and examples of national space laws, see the UNOOSA national space law Database: https://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html

obligations of the OST, such as "*authorization*,"[83] "*continuing supervision*,"[84] and "*due regard*,"[85] confer considerable discretion upon States, thereby enabling markedly different legal outcomes for similar activities. This discretion, in turn, has enabled the States to develop unique agendas in the regulation of international law. As a result, the fragmentation of international law at the national level is no longer considered to be simply an implementation issue; instead, it is considered to be an inherent feature of the existing international legal regime. Indeed, the OST is best characterized as a framework treaty that facilitates differentiation rather than central harmonization, without providing tools for addressing emerging national differences once they materialize.

In the context of the EU, the structural flexibility of the authorization regime raises particular concerns. Indeed, the coexistence of several national authorization regimes within the framework of an extremely integrated internal market might create problems of legal security for operators of cross-border activities, induce the risk of regulatory competition between Member States, and create difficulties in the allocation of responsibilities and liabilities under international law. Finally, the lack of standards might become an increasingly worrying problem in the light of the EU's ambitions regarding the support of large-scale space infrastructure, including the mega-constellations, as any inconsistencies in the regulation, supervision, and enforcement of the rules regarding space debris might create cumulative systemic risks. The following comparative analysis of some of the EU Member States aims to demonstrate how the decentralized implementation of the OST has contributed to the creation of the fragmented European space governance, thereby supporting the case for the adoption of a unified legal regime within the framework of the EU.

II. Analyzing Current National Space Law Regimes of Selected EU Member States

This part of the chapter will adopt a normative comparative approach to explore the common points and differences between some different EU member state national space regimes. For this purpose, the comparison will be done on ***Austria, Denmark, Belgium, France, and Luxembourg*** as a case study. These countries have been selected for the reason that they represent several different legal traditions and approaches to space law within the European Union. The comparison will provide a useful guide to the position of national legislation concerning space activities in Europe today.

In doing so, the aim is not to offer a broad overview of all of the Member States, but to identify states that demonstrate a variety of models, reflecting the current variation in national space law. In fact, there are significant variations amongst these states in terms of the development and size of their space industry, which has a significant influence on the regulation process. It is known that France is a state that has a highly developed and sophisticated space industry,

[83] Article VI OST.
[84] Ibid.
[85] Article IX OST.

offering a highly detailed legislative framework. While Luxembourg has a strategically innovation-oriented approach to space law, specifically designed to attract new actors to emerging sectors, including space resources, making it the only EU country to regulate it. Belgium and Denmark are examples of medium-sized space actors, offering a highly organized approach to authorization, including a balance of administrative needs and operational practicality, while Austria represents a small state with a highly research-oriented approach, in which the scope for design must be limited in terms of capacity. At the same time, it is also worth noting that the regimes show different philosophies with regard to supervision and intervention by the State. As a demonstration, there are regimes that show a more intense supervision and intervention, while others show a more facilitating approach that seeks to promote commercial engagement while respecting international law requirements. Such differences are also noteworthy with regard to the examination of the operationalization of the Member States' duties under Article VI of the OST, with regard to liability, compliance, and risk allocation. Last but not least, it is also worth noting that there are differences with regard to the time that the regimes were adopted, with some regimes having been adopted earlier and then having been adjusted over time with regard to technological developments and commercial expansion, while others were adopted more recently, reflecting more recent developments with regard to commercialization, sustainability, and space debris mitigation, for example. On one hand, it is possible to see the diversity of approaches and, therefore, to speak of the phenomenon of fragmentation.

Depending on what was presented above, international law drew the main lines so the nations could follow in making their national space law, which is mainly about the: Authorization, liability, registration, and continuous supervision. But as a first step, despite the shared reason, which is that states wanted to comply with their international obligations under the United Nations treaties relating to outer space. We need to keep in mind that other specific purposes may emerge behind each country creating its own national law, which can differ from one to another and have its own special features too.

1. Drivers behind the Adoption of National Space Frameworks in the EU

Each member state that has adopted space law has its own national priorities and motivations that led to the creation of a variety of different legislations.

A. Austria

When Austria began its space activities as a member of the European Space Agency, there was no need for national space legislation.[86] The original reason why Austria nevertheless adopted the Austrian Outer Space Act[87] lies in the launch of two small satellites, TUGSAT-1 and UniBRITE. Beyond this first consideration, Austria also recognized the need to adopt national

[86] Austrian explanatory report, Vorblatt und Erläuterungen zur Regierungsvorlage: Bundesgesetz über die Genehmigung von Weltraumaktivitäten und die Einrichtung eines Weltraumregisters (Weltraumgesetz) vom 6. December 2011, 1466 of the Beilagen XXIV. GP. Accessed July 9, 2024. https://www.parlament.gv.at/PAKT/VHG/XXIV/I/I_01466/fnameorig_232781.html ; Chassot et al., *Droit spatial national*, p23.

[87] Austrian Outer Space Law, Bundesgesetz über die Genehmigung von Weltraumaktivitäten und die Einrichtung eines Weltraumregisters (Weltraumgesetz), vom 6. December 2011, StF BGBl. I Nr. 132/2011, 27. December 2011.

space legislation to meet the international obligations binding on the State under the United Nations treaties relating to outer space.[88] The expected increase in the use of small satellites and the growth of commercial telecommunications companies developing, purchasing or operating satellites have further reinforced the need for national legislation.[89] In the absence of such a legislative framework, Austria feared it would be unable to take recourse against the private entities responsible for the damage that Austria would be required to compensate under its international responsibility. Nor would it be able to authorize activities or require insurance to be taken into consideration.[90]

B. Belgium

Belgium has promulgated its national space legislation[91] with the primary aim of complying with its international obligations under the United Nations treaties relating to outer space.[92] Its second motivation lies in the evolution of space activities since the launch of the first artificial Earth satellite in 1957 [93]: With the increase in the number of private commercial actors and the privatization of intergovernmental organizations carrying out space activities of public interest.[94] These two phenomena necessarily led to a loss of control over the space activities concerned by the State, which nonetheless remains bound by its international commitments.[95] The activities of private entities should therefore be subject to regulation in order to limit their potential consequences for the internal legal order and to safeguard economic order and public security.[96] Although no space activities had been carried out on its territory at the time of the promulgation of the law, Belgium looked to the future and considered it likely that space activities could take place under the jurisdiction of Belgium and that others would be carried out from Brussels by the European Union.[97] Finally, the Belgian Space Law aims to ensure legal certainty, in order to attract recognized and experienced space players who will benefit from a clear and balanced situation and to exclude less reputable players who prefer the regulatory void.[98]

C. Denmark

Denmark has adopted its national space legislation and the so called the Danish Outer Space Act[99], intending to provide a regulatory framework and ensure the safety of space activities.[100]

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[88] Austrian explanatory report, Allgemeiner Teil; Froehlich and Seffinga., 86-87;Chassot et al., *Droit spatial national* p 23.
[89] Ibid.
[90] Ibid.
[91] Law of September 17, 2005, relating to launch activities, flight operations, or guidance of space objects, MB, November 16, 2005 (hereinafter: Belgian space law), consolidated text as revised by the Law of 1er December 2013, MB, January 15, 2014.
[92] Draft law relating to launch activities, flight operations, or guidance of space objects, Doc. Speak., Chamber, 2004-2005, February 14, 2005, no. 51-1607/001 (hereinafter: Belgian space bill), p. 14; Chassot et al., *Droit spatial national* p25.
[93] Ibid, p. 5; Chassot et al., *Droit spatial national,.*
[94] Ibid.
[95] Ibid.
[96] Ibid.
[97] Ibid.
[98] Ibid, p. 6.
[99] Lov nr. 409 af 11.05.2016 om activiteter i det ydre rum (hereinafter:Danish Outer Space Act).
[100] § 1 of the Danish Outer Space Act; Froehlich and Seffinga, p. 103; Chassot et al., *Droit spatial national*, 27.

This objective is achieved through the authorization and continuous monitoring of activities in outer space, the registration of space objects and the establishment of a liability and redress regime.[101] Furthermore, although not legally binding on Denmark, international standards and guidelines are mentioned as being relevant to national space legislation; in particular, international standards relating to how to conduct space activities and international guidelines on the reduction of space debris.[102] The law aims to create legal certainty for space activities carried out by private entities by establishing a legislative framework which nevertheless does not introduce unnecessary obstacles.[103]

D. France

The authorization regime provided for by the national legislation adopted in 2008 [104] aims to enable the State to better control operations likely to engage its international responsibility, in particular for space activities carried out by private companies.[105] The legislation aims, on the one hand, to fill a void and thus strengthen legal certainty[106]; on the other hand, it aims to ensure the legal competitiveness of the French legal space framework, so as to encourage commercial demand for the use of space, on which the dynamism of space operators depends.[107] In other words, France is aiming for a larger space industry with more investments in this sector, and intends to ensure that activities carried out by private actors comply with international obligations.[108]

E. Luxembourg

Luxembourg established itself very early in the space sector as a state conducive to entrepreneurship and the development of commercial activities.[109] However, until 2020, this State did not have a specific national space law, but had legislated on particular aspects, namely the exploration and use of space resources, in order to allow private operators to ensure their rights regarding resources extracted in space.[110] The project appears to have been strongly influenced by the Space Resources Exploration and Utilization Act adopted in 2015 by the United States.[111] Luxembourg was the first European country and the second in the world to

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[101] Ibid.
[102] Forslag til lov om aktiviteter i det ydre rum, Lovforslag nr. L 128, Folketinget 2015–16, 24. Februar 2016. Accessed July 10, 2024. https://www.ft.dk/ripdf/samling/20151/lovforslag/l128/20151_l128_som_fremsat.pdf (hereinafter: Danish explanatory report), 7-8; Froehlich and Seffinga 103; Chassot et al., *Droit spatial national*.
[103] Danish explanatory report, 7; Froehlich and Seffinga, 103; Chassot et al., *Droit spatial national*.
[104] Law No. 2008-518 of June 3, 2008 relating to space operations, JORF No. 0129 of June 4, 2008, as amended by Law No. 2013-431 of 28 May 2013(hereinafter:French law relating to space operations).
[105] Pierre Lasbordes, Report made on behalf of the Committee on Economic Affairs, Environment and Territorial Affairs on the bill, adopted by the Senate, relating to space operations (No. 614), No. 775, April 2, 2008 (cited as: Report on the Space Operations Bill), 7; Chassot et al., *Droit spatial national*, 30.
[106] Report on the Space Operations Bill, 16.
[107] Report on the Space Operations Bill, 15-16.
[108] Froehlich and Seffinga, 77; Chassot et al., *Droit spatial national*.
[109] Gladysz Lehmann, Blazej, Bob Calmes, Geoffroy Leclercq, and Laurent Schummer, "In Review: Space Law, Regulation and Policy in Luxembourg." Arendt & Medernach. December 17, 2020. https://www.lexology.com/library/detail.aspx?g=5fc8ab60-c27e-4533-81f8-c8a0a7d38179. Accessed July 11, 2024; Chassot et al., *Droit spatial national*, 32.
[110] Luxembourg Space Agency, Law of July 20, 2017 on the Exploration and Use of Space Resources (hereinafter: Law on Exploration and Utilization of Space Resources).
[111] Froehlich and Seffinga. 126; Chassot et al., *Droit spatial national*.

legislate in this area[112] , hoping to contribute to the economic growth and diversification of the Luxembourg economy.[113] Currently, the Luxembourg space sector is diversifying, including space activities not linked solely to the transmission of television programs. The Law on Space Activities was adopted in 2020 [114]aims to provide an authorization regime for private individuals who wish to carry out a space activity or launch a space object.[115] The aim is to cover "all cases in which the liability of the Luxembourg State could be engaged", whether on the basis of responsibility in the event of damage (liability), or on the basis of the outer Space Treaty which makes States more generally responsible. It was considered necessary to legislate at the national level to authorize such activities and subject them to the control of state authorities.[116] The main purpose of the law is to regulate the consequences of the international obligations arising for the Luxembourg State from accession to the outer Space Treaty and the Liability Convention.[117]

This part shows that even if the different member states can adopt their national space laws at different times following different needs, they do, however, share the same vision when it comes to their international responsibility and the importance of supervising their private entities' activities.

2. Key Characteristics of EU Member States' Space Frameworks

Before diving into detailing the main rules component of the national space law of each chosen country, this part will briefly demonstrate the special features of each

A. Austria

Austria, unlike Belgium, as will be discussed below, deliberately chose to adopt an unlimited personal scope of application, which it considers an appropriate solution to avoid gaps in the control of space activities. The potential overlap between the competing jurisdictions of several States was thus preferred to the risk of a vacuum in jurisdiction over space activities, which could result from a more restrictive conception of the personal scope of the law.[118] Austria emphasizes environmental issues; Indeed, the authorization of space activity requires compliance with two obligations relating to the environment. First, the operator must comply with the general obligation not to cause harmful contamination or adverse changes to the environment.[119] This obligation is not further specified in the Austrian Outer Space Act or Ordinance. Second, the operator is required to adopt measures to limit the production of space

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[112] Ibid. 125.
[113] Ibid. 126.
[114] Law of December 15, 2020, relating to space activities and amending: 1° the amended law of July 9, 1937, on insurance tax known as "Versicherungssteuergesetz," 2° the amended law of December 4, 1967, concerning income tax (hereinafter: Luxembourg Space Activities Law).
[115] Chassot et al., *Droit Spatial,* p 32.
[116] Opinion of the Council of State No. 52.879 of February 15, 2019 on the draft law on space activities and amending the amended law of July 9, 1937, on insurance tax (hereinafter: Opinion of the Council of State on the bill), 1-2.
[117] Bill No. 7317 of June 12, 2018, on space activities and amending the amended law of July 9, 1937, on insurance tax, Chamber of Deputies, Ordinary Session 2017-2018 (hereinafter: Luxembourg space bill), 11.
[118] Austrian explanatory report, ad § 1; Froehlich and Seffinga, .,87; Chassot et al., *Droit spatial national*.
[119] § 4 and 5 of the Austrian Outer Space Act; Froehlich and Seffinga, .,94; Chassot et al., *Droit spatial national*, p23.

debris.[120] The inclusion of this obligation is explained by the fact that it is considered an important issue for the international community.[121] The obligation to take measures not only exists before authorization but also continues while the activity is carried out.[122] The operator is required to submit a report on the measures adopted.[123] In the context of the registration of space objects, the information to be provided by the operator is based on the list specified in Article IV of the Registration Convention. However, Austria also requires several details, ranging from the designation of the Committee on Space Research (COSPAR) to the date and time of the movement of the space object into a graveyard orbit, as well as the hyperlink to information on the space object, as well as any other information that the authority in charge may require.[124]

B. Belgium

One of the particularities of the Belgian Space Law lies in its scope of application, which it has chosen to restrict to space activities carried out on territories which are the property of the Belgian State or which are under its jurisdiction or control.[125] Belgium justifies its decision not to extend the scope of application of its space law to Belgian natural and legal persons, except where an international agreement so provides, on the ground that such a broad competence may be appropriate for major space-faring powers, which is not the case for Belgium. Such an extension would potentially endanger the interests of the Belgian State and would imply responsibility going well beyond the means allocated to it to exercise effective control and to fulfil its international commitments.[126]

In 2013, the Belgian Space Law was amended to reflect recent developments in space activities.[127] The revision clarified the scope of application of the Space Law with regard to certain types of activities currently being developed.[128] These types of activities are, on the one hand, suborbital flight activities and, on the other hand, the launch of (small) satellites lacking autonomous means of propulsion or maneuvering.[129] In particular, instructions given by a Belgian private entity to the launch service provider concerning the orbital positioning of a non-maneuverable satellite constitute an exercise of effective control, thereby bringing such satellites within the scope of application of the law.[130] The definition of an "*operator*" under the amendment explicitly includes satellites that lack autonomous propulsion or maneuvering capability, with the entity determining the object's position in outer space being considered the

[120] § 4 and 5 of the Austrian Outer Space Act.
[121] Austrian explanatory report, ad § 5; Froehlich and Seffinga, 94; Chassot et al., *Droit spatial national*.
[122] Ibid.
[123] § 2 (4) of the Austrian Outer Space Ordinance; Froehlich and Seffinga, 94; Chassot et al., *Droit spatial national*.
[124] § 6 (2) Verordnung der Bundesministerin/des Bundesministers für Verkehr, Innovation und Technologie zur Durchführung des Bundesgesetzes über die Genehmigung von Weltraumaktivitäten und die Einrichtung eines Weltraumregisters (Weltraumverordnung), StF BGBl. II Nr. 36/2015, 26. Februar 2015 (hereinafter: Austrian Outer Space Ordinance); Froehlich and Seffinga 93; Chassot et al., *Droit spatial national*.
[125] Art. 2 of the Belgian Space Law; Chassot et al., *Droit spatial national*, p25.
[126] Belgian space law bill, 15-16.
[127] Law of 1st December 2013 amending the law of September 17, 2005 relating to launch activities, flight operations or guidance of space objects, MB, January 15, 2014 (hereinafter:Belgian amendment law).
[128] Chassot et al., *Droit spatial national,* p25.
[129] Ibid.
[130] Art. 2 § 4 of the Belgian Amendment Law; Froehlich and Seffinga, 57; Chassot et al., *Droit spatial national*.

operator.[131] Additionally, the definition of "*effective control*" was amended from a requirement of "*master control or remote control means*" on a condition of "*authority exercised over activation means of control or remote control*", so as to include small satellites.[132] The Belgian Space Law provides that any activity falling within the scope of the law must be the subject of an environmental impact study, and its completion may be requested at different stages of the activity.[133] In any case, the law strictly requires the carrying out of an initial study which will assess the possible consequences on the environment on Earth or in outer space as part of the authorization request[134], with emphasis on technologies, components, and products used during activities, and possible consequences of activities on the environment of the Earth and outer space.[135] The authorization holder is required to communicate any movement, malfunction, or deviation of the space object that could be dangerous to people on Earth, aircraft in flight, or other space objects or that could cause damage.[136] Finally, the Belgian Space Law specifically regulates the return of space objects in accordance with the obligations arising from the Agreement of April 22, 1968, on the rescue of astronauts, the return of astronauts and the return of objects launched into outer space.[137] The law states that the rights of any victim of damage caused by the space object are guaranteed upon return or, if necessary, before the return of the object.[138] Belgium reserves the right not to return the space object to its owner if the victims' rights have not been guaranteed.[139]

C. Denmark

The scope of the law is based primarily on the territorial jurisdiction of the Danish State, but it is extended, on the basis of quasi-territorial jurisdiction, to vessels and devices (fixed installations such as drilling platforms), and is coupled with personal competence towards the Danish operators[140]. Note that the law thus excludes the activities of Danish owners[141], when the owner is not the operator and the activities are carried out outside Denmark or on Danish vessels or installations.[142] One of the unique aspects of the Danish Outer Space Act is the approach taken to the delimitation of outer space: outer space is defined as space beyond an altitude of 100 kilometres above sea level.[143] This definition has been included to clarify activities that fall within the scope of the law.[144] Suborbital flights, for example, will fall within the scope of the law, as long as the flights reach altitudes above 100 kilometers. Although the

[131] Art. 2 § 2 Ibid.
[132] Art. 3 of the Belgian Amendment Law; Froehlich and Seffinga, 57; Chassot et al., *Droit spatial national*.
[133] Art. 8 § 1 of the Belgian Space Law.
[134] Art. 7 § 2 5° and 8 § 2 of the Belgian Space Law.
[135] Art. 7 § 1 of the Royal Decree of March 19, 2008 implementing certain provisions of the law of September 17, 2005 relating to launch activities, flight operations or guidance of space objects,MB, April 11, 2008 (hereinafter:Belgian royal decree).
[136] Art. 16 § 1 of the Belgian Space Law; Chassot et al., *Droit spatial national*.
[137] Belgian space law bill, 33; Art. 17 § 1 of the Belgian Space Law.
[138] Art. 17 § 3 of the Belgian Space Law.
[139] Belgian space law bill, 33; Chassot et al., *Droit spatial national*, p26.
[140] "Operator" means: A natural or legal person who performs, or undertakes to perform, space activities. § 4(3) of the Danish Outer Space Act.
[141] "Owner" means: A natural or legal person who owns a space object. § 4(5) of the Danish Outer Space Act.
[142]Froehlich and Seffinga p 104; Chassot et al., *Droit spatial national*, p27.
[143] § 4(4) of the Danish Outer Space Act.
[144] Danish Explanatory Report, p. 9.

Danish State has clarified that this delimitation is without prejudice to the definition of outer space within the meaning of international law, this definition of domestic law creates a regulatory gap for possible space flights at an altitude below 100km.[145] It was advised to fill this gap by extending the law to regulate civil activities below 100 kilometers.[146] However, such an extension has not been promulgated.[147] Regarding the space activity authorization procedure, the application must contain a description of the planned space activity, which includes the planned launch date and location, the objective of the activity and the general characteristics of the activity, the planned launch date and location, the purpose of the activity and the general function of the space object, including technical specifications of its dimensions, weight, payload, data orbitals, operating period, and others.[148] In the context of liability for space activities, similarly to Article II of the Liability Convention, the operator is automatically held liable for damage caused by the space object on Earth or to aircraft in flight,[149] while for any other situation, liability will be assessed according to Danish civil liability law.[150] In these other situations, the operator's liability will be based on fault.[151]

D. France

The material scope has the particularity of also including the design and construction of space objects or components. During the authorization procedure, the authority verifies the conformity of systems intended for use in a space operation with the applicable technical regulations.[152] The law does not apply to the launching and guidance, for the purposes of national defense, of vehicles whose trajectory crosses outer space, in particular ballistic missiles.[153] In addition to the territorial scope, the personal scope includes on the one hand, any French operator, and on the other hand, any French natural or legal person, whether an operator or not, who intends to carry out when launching a space object.[154] This extension to non-operators aims to ensure that France adheres to its international authorization and surveillance obligations under Article VI of the Space Treaty.[155] The French authorization regime is one of the most detailed. The conditions and procedure are therefore the subject of a separate Decree. Detailed technical regulations[156] (safety and organizational conditions) with which the operator must comply are also concluded. An exemption from the conformity check is possible in the

[145] Ibid, pp. 8-9.
[146] Ibid, p. 8.
[147] Froehlich and Seffinga, 105, Chassot et al., *Droit spatial national*.
[148] Froehlich and Seffinga, 106p, "Bekendtgorelse nr. 552 af 31.05.2016 om krav ved godkendelse af aktiviteter i det ydre rum mv" [Danish Outer Space Ordinance], § 2(1) ; Chassot et al., *Droit spatial national*.
[149] § 11 Stk. 1. the Danish Outer Space Act; Danish Explanatory Report, p. 12.
[150] § 11 Stk. 2. of the Danish Outer Space Act.
[151] Danish Explanatory Report, p. 13 and 25; Chassot et al., *Droit spatial national*.
[152] Art. 4 of the French law relating to space operations; art. 11 of Decree No. 2009-643 of June 9, 2009 relating to authorizations issued pursuant to the French Law relating to space operations (hereinafter: French decree relating to authorizations); the Order of March 31, 2011 relating to technical regulations pursuant to Decree No. 2009-643 of June 9, 2009 relating to authorizations issued pursuant to Law No. 2008-518 of June 3, 2008 relating to space operations, amended by the Order of July 11, 2017 (hereinafter:French decree relating to technical regulations); Chassot et al., *Droit spatial national*, p 30.
[153] Art. 26 of the French law relating to space operations.
[154] Art. 2 of the French law relating to space operations; Space Operations Project Report, 27.
[155] Space Operations Project Report, 27-28; Chassot et al., *Droit spatial national*.
[156] Art. 4 of the French law relating to space operations; art. 11 of the French Decree relating to authorizations; French decree relating to technical regulations.

event of authorization granted by a foreign launching State based on equivalent criteria.[157] France also specifically regulates the exploitation of space data such the programming of an Earth observation satellite system or reception of Earth observation data.[158] Furthermore, authorizations can be issued in the form of licenses. As explained previously, in addition to the operators, any natural or legal person who intends to carry out the launch must apply for authorization.[159] Permissions can be accompanied by requirements particularly in the interest of the environment, for example, with a view to limiting the risks linked to space debris.[160] Regarding registration, France requires information beyond the list in art. IV of the 1974 Registration Convention, specifically the name of the manufacturer, the history of ownership and any security rights, real or personal, constituted over it, the mode of control in outer space, possible anomalies encountered during orbit or operation as a space vehicle.[161]

French legislation provides for an elaborate regime of liability and recourse;[162] The operator is the subject of this liability under domestic law, which is modeled on the regime of the Liability Convention. The State assumes subsidiary responsibility[163] in order to obtain authorization, the operator must take out insurance or present another financial guarantee.[164] The minimum amount is not provided for in the law, but is limited on a case-by-case basis, separately for the launch phase and the control phase of the activity.[165] An exemption from the obligation to insure is provided when the envisaged operation provides for the maintenance of a satellite in the geostationary orbit for a determined period, as well as in the event of impossibility, linked to the state of the insurance market, to be covered by insurance or to have one of the required financial guarantees.[166]

E. Luxembourg

The Space Activities Law requires authorization for any activity taking place in outer space for which Luxembourg is likely to be held internationally responsible.[167] The material scope is therefore deliberately designed to be broad, the same as the French one.[168] The competent authority to issue authorizations is the Minister responsible for space policy and legislation[169], or the Minister of Communications and Media. Article 13 of the law also includes a detailed provision on changes in control affecting the operator. Regarding liability issues, the operator is fully responsible for damage caused by its activity, including preparation.[170] The bill even provided for a total exemption from civil liability of the State, which was deleted in view of its incompatibility with the Convention on responsibility.[171] In the event of liability incurred, the

[157] Art. 44° of the French Law relating to space operations.
[158] Art. 17° of the French Law relating to space operations.
[159] Art. 4 of the French law relating to space operations.
[160] Art. 5 of the French law relating to space operations.
[161] Chassot et al., *Droit Spatial National.*
[162] Froehlich and Seffinga, 82; Chassot et al., *Droit spatial national*.
[163] Art. 13 ff of the French Law relating to space operations; Chassot et al., *Droit spatial nationa*,.
[164] Art. 6 para. I of the French law relating to space operations; .
[165] Art. 16 and 17 of the French law relating to space operations.
[166] Art. 17 and 18 of the French Decree relating to authorizations.
[167] Art. 21° of the Luxembourg Law on space activities; Chassot et al., *Droit spatial national*, p32.
[168] Luxembourg space bill, 11.
[169] Art. 5 ch. 1 of the Luxembourg Space Activities Law.
[170] Art. 4 of the Luxembourg Space Activities Law.
[171] Opinion of the Council of State on the bill, 2 and 10; Chassot et al., *Droit spatial national*.

principles of the civil code apply, so that the State has a subrogatory remedy against the operator.[172] Furthermore, the obligation of insurance or another financial guarantee is made a condition for granting authorization.[173] Unlike most other jurisdictions, Luxembourg law makes no provision relating to space debris. Article 4 of the bill which required operators to take adequate measures in this area,[174] was ultimately changed in the final act.[175] A particularity of Luxembourg, exploration and use of space resources activities are subject to approval[176]. according to the Law on Exploration and Utilization of Space Resources (*lex specialis*), and are not subject to the Space Activities Act (*lex generalis*).[177] Note that this last law is inspired by the first in the formulation and general concepts.[178] According to the Law on Exploration and Utilization of Space Resources, space resources are subject to appropriation.[179] The legislator maintains that this provision is consistent with Article II of the Space Treaty, since it does not authorize the appropriation of asteroids and celestial bodies in themselves and does not intend to establish any element of sovereignty over a celestial body or space.[180] Any person who explores or uses space resources without approval is punishable by imprisonment and/or a fine.[181]

3. Authorization, Monitoring, and Transfer Procedures in National Space Laws

A. Austria

Space activities are subject to authorization by the Federal Ministry of Transport, Innovation and Technology (now the Federal Ministry of Climate, Environment, Energy, Mobility, Innovation and Technology in 2020), the authorization conditions provided for by provisions other than those of the Austrian Outer Space Act remaining unchanged.[182] It should be noted that, in accordance with the text of the law and the explanatory report, both governmental and non-governmental space activities are subject to authorization.[183] Therefore, Austria has chosen to go beyond the authorization requirements under the Space Treaty, which only requires that non-governmental space activities be subject to national authorization. Austria argued that for a transparent and uniform treatment of the authorization practice, guaranteeing the exchange of information between local authorities, as well as due to the specific expertise held by the

[172] Luxembourg space bill, p. 15; Opinion of the Council of State on the bill, 2.
[173] Art. 6 (4) of the Luxembourg Space Activities Act.
[174] Luxembourg space bill, 12-13.
[175] The commentary relating to article 4 of the Luxembourg Space Bill (Luxembourg space bill, 13); Chassot et al., *Droit spatial national*.
[176] Art. 2 (1) of the Law on Exploration and Utilization of Space Resources.
[177] Luxembourg space bill, 11; Chassot et al., *Droit spatial national*.
[178] Blazej Gladysz Lehmann, Bob Calmes, Geoffroy Leclercq, and Laurent Schummer, "In Review: Space Law, Regulation and Policy in Luxembourg," Chassot et al., *Droit spatial national*.
[179] Art. 1 of the Law on Exploration and Utilization of Space Resources; Chassot et al., *Droit spatial national*.
[180] Draft law on the exploration and use of space resources, The Government of the Grand Duchy of Luxembourg, Ministry of the Economy, 9; Chassot et al., *Droit spatial national*.
[181] Art. 2 (1) and 18 of the Law on Exploration and Utilization of Space Resources.
[182] § 3 of the Austrian Outer Space Act; Chassot et al., *Droit spatial national*, p 62.
[183] Austrian explanatory report, ad § 3.

Federal Ministry of Transport, innovation and technology, the inclusion of government space activities seemed desirable.[184]

B. Belgium

The exercise of launch activities, flight operations or guidance of space objects by natural or legal persons in areas placed under the jurisdiction or control of the Belgian State or by means of installations, furniture or buildings, which are the property of the Belgian State or which are under its jurisdiction or control, are subject to prior authorization from the Minister responsible for space research and its applications within the framework of international cooperation.[185]Authorization must be requested by the operator and is granted on a personal and non-transferable basis.[186] Activities must be carried out in accordance with the Outer Space Treaty and other provisions of international law.[187] The operator must provide, with its authorization request, the information listed in Article 7 § 2 of the Belgian Space Law and the information required under other applicable legal or regulatory provisions. The King may add to the list of required information by Royal Decree, and the Minister may request additional information he deems necessary in connection with the application; the Minister taking into account the specific case, and the King taking into account the legal or factual circumstances requiring any authorization.[188] The Minister may, in particular, impose technical assistance from a third party, set conditions relating to the location of activities or the location of the operator's main establishment, or impose the conclusion of insurance for the benefit of third parties covering the damage that may result from authorized activities.[189] The Minister may grant the authorization for a fixed period, having regard to the activities to which it relates.[190] The Minister may request, from experts he designates for this purpose, a reasoned opinion based on legal, technical and economic criteria relating in particular to the reliability, know-how and experience of the operator, the reliability of the manufacturer in the areas concerned and their ability to comply with the rules applicable to the activities carried out as well as the solvency of the operator and the legal and financial guarantees it presents.[191] The Minister grants authorization only under specific conditions, taking into account, in particular, the danger that the use of nuclear energy sources may represent, the basic precautions to be taken with regard to public health and safety, environmental protection, and the standards of national law and international law applicable in the case.[192]

The Minister maintains a public directory of authorizations issued. This directory mentions the terms and conditions with which each authorization is attached. In addition, it is indicated, for each space object concerned, which is or are the State(s) of launch and the State of registration. The Minister ensures the maintenance and publication of the directory under the conditions set

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184 Ibid; Chassot et al., *Droit spatial nationa*l.
185 Art. 2 § 1 and art. 3 of the Belgian Space Law; Belgian space bill, 17, ad. art. 3; Chassot et al., *Droit spatial national*, p 67.
186 Art. 4 § 2 of the Belgian space law.
187 Art. 4 § 3 of the Belgian space law.
188 Art. 5 § 1 and 2 of the Belgian Space Law; Belgian space bill, 18, ad. art. 5.
189 Art. 5 § 1 and 2 of the Belgian Space Law.
190 Art. 5 § 2 of the Belgian Space Law.
191 Art. 7 § 6 of the Belgian Space Law.
192 Art. 8 § 9 of the Belgian Space Law; Chassot et al., *Droit spatial national*.

by the King.[193] However, in some cases, clearly mentioned in Article 11, the authorization may be withdrawn or suspended by the Minister.[194]

Control and monitoring of activities are carried out by experts designated by the Minister and administrative staff.[195] The Minister may be assisted by a committee of Belgian and/or foreign technical experts, hereinafter referred to as "the Committee". Its members may be designated, with the agreement of the competent ministers, within other Administrations concerned with the control or surveillance of the activities concerned. The operator must provide access to administrative staff, as well as experts designated by the Minister, to the installations, buildings and equipment which will be used for the exercise of the activities concerned.[196] Without prior authorization from the Minister, any transfer to a third party of activities or rights, which involves the transfer of effective control (criterion defined in Art. 3 § 3 of the law) of the space object, is prohibited.[197]

On the other hand, no authorization is required if the transfer does not transfer effective control to a third party.[198] All provisions applicable to the authorization referred to in Art. 4 are applicable *mutatis mutandis* (with the necessary changes having been made) to the transfer authorization. The Minister may attach conditions to the transfer authorization that are imposed either on the transferee operator or on the transferor operator.[199] (for example technical assistance in the event of problems encountered by the assignee operator)[200], or both. When the assignee operator is not established in Belgium, the Minister may refuse the authorization in the absence of a specific agreement with the State of which this third party is a national and which guarantees the Belgian State against any recourse against it under its international responsibility or under compensation for damage.[201]

C. Denmark

Space activity can only be undertaken after receiving permission from the Danish Minister of Education and Research.[202] Authorization is granted upon request from the operator and the required conditions mentioned in the Danish Outer Space Act.[203] To ensure continued monitoring of space activities after authorization, the law provides for information obligations on the operator, the right of the Danish Minister of Education and Research to access installations, buildings or other premises and to examine them, as well as the right to modify or withdraw the authorization in certain circumstances.[204] In the event of withdrawal, the operator may be ordered to have the space activity continued by another operator or to terminate the space activity.[205] In fact, the authorization requirement is not limited to non-

[193] Art. 14 § 3 of the Belgian Space Law.
[194] Art. 11 of the Belgian Space Law; Chassot et al., *Droit spatial national*.
[195] Art. 10 of the Belgian Space Law.
[196] Art. 7 § 6 of the Belgian Space Law.
[197] Art. 13 § 1 of the Belgian Space Law.
[198] Belgian space bill, p. 27, ad. art. 13; Chassot et al., *Droit spatial national*.
[199] Art. 13 § 4 of the Belgian Space Law.
[200] Belgian space bill, 28, ad. art. 13.
[201] Art. 13 § 5 of the Belgian Space Law; Chassot et al., *Droit spatial national*.
[202] Part 5 of the Danish Outer Space Act. Chassot et al., *Droit spatial national*, p 72.
[203] Part 2, 3, 5, 6, 7 and 13 of the Danish Outer Space Ordinance; .
[204] Part 8, 9, 16 and 17 of the Danish Outer Space Act.
[205] Part 9. (2) of the Danish Outer Space Act; Chassot et al., *Droit spatial national*.

governmental operators[206], but the Minister may grant exemptions from licensing and monitoring requirements[207], for example when the space activity is carried out by public owners or operators.[208]

The transfer of space objects or space activities to another owner or operator can only take place after approval by the Danish Minister of Education and Research, in accordance with the requirements for the initial authorization of planned space activities by the Danish Outer Space Act.[209] If an operator wishes to transfer space objects or space activities to another owner or operator domiciled in another state, the Danish Minister of Education and Research may impose requirements for prior agreement with that state which must assume all consequential liability in terms of damages and interests.[210] The reason for such a licensing regime is that, in cases where Denmark is the launching State of a given space object, it retains its responsibility under international law, regardless of whether the space object is transferred or not, space object or space activity, including control of the space object.[211]

D. France

Space operations pose real risks for the safety of people and property; the French legislator compares them to aerial and nuclear activities, which imply control very early in the operations concerned.[212] The three categories of conditions for issuing authorizations are stipulated in Article 4 of the French law relating to space operations.[213] In addition to these conditions, authorizations may be accompanied by requirements in the interest of the safety of people and property and the protection of public health and the environment.[214]

Licenses attesting, for a fixed period, that a space operator justifies moral, financial and professional guarantees can be issued by the administrative authority competent in matters of authorizations. These licenses can also attest to the conformity of the systems and procedures planned by the operator with the technical regulations issued. Finally, they can constitute authorization for certain operations[215] and are similar to the operating license and air operator certificate.[216]

The authorization procedure is regulated by a decree relating to space authorizations,[217] and are issued by the minister responsible for space activities (which is currently the minister of research), the latter adopts the technical regulations provided for in Article 4 paragraph 1st of

[206] Danish Explanatory Report, p. 21, ad Part 5.
[207] Part 18 of the Danish Outer Space Act.
[208] Danish Explanatory Report, p. 21, ad § 5; Chassot et al., *Droit spatial national*.
[209] Part 15 (1) of the Danish Outer Space Act.
[210] Part 15 (2) of the Danish Outer Space Act.
[211] Danish Explanatory Report, p. 26, ad § 15; Chassot et al., *Droit spatial national*.
[212] Report on the Space Operations Bill, 26, ad. art. 2; Chassot et al., *Droit spatial national*, p 82.
[213] Art. 4 para. 1 and 2 of the French law relating to space operations.
[214] Art. 5 of the French law relating to space operations.
[215] Art. 4 para. 3 the French law relating to space operations.
[216] See art. L. 330-1 and R. 330-5 of the Civil Aviation Code; Report on the Space Operations Bill, 30, ad. art. 4; Chassot et al., *Droit spatial national*.
[217] Art. 1 to 15 of Decree No. 2009-643 of June 9, 2009 relating to authorizations issued pursuant to Law No. 2008-518 of June 3, 2008 relating to space operations, JORF No. 0132 of June 10, 2009 (hereinafter: French decree relating to space authorizations).

the French law relating to space operations.[218] The articles 1-7 and 23 of the French law relating to space operations[219] regulate the activities of the "primary operator of space data"; any natural or legal person who ensures the programming of an Earth observation satellite system or the reception, from space, of data from space.[220]

Various authorities are authorized to carry out the necessary checks to verify compliance with the obligations of authorization holders.[221] The law also defines the means available to authorized agents and the protections available to operators subject to control.[222] With regard to the launch or control of a space object, the administrative authority or authorized agents may at any time give instructions and impose any measures deemed necessary in the interest of the security of people and property and the protection of public health and the environment, in order to react urgently in the event of a risk of damage.[223] The administrative authority or authorized agents consult the operator beforehand, except in the case where an immediate danger exists; [224] this measure provides access to the information available to the operator concerning the nature of the dangers and possible remedies.[225]

It is worth mentioning that the transfer authorization is issued by the Minister responsible for space upon presentation of a joint request from the operator having control of the space object and the recipient operator. For transfers for which the recipient operator is not subject to the provisions of the French Law relating to space operations, the transfer authorization request is presented by the operator having control of the space object; it provides full guarantees that the space object to be transferred will be registered after the transfer and that the transfer will be notified to the Secretary-General of the United Nations.[226]

E. Luxemburg

An authorization granted by the minister responsible for space policy and legislation is required for the exercise of any space activity as defined in the Luxembourg Space Activities Law.[227] This minister is currently the Minister of Communications and Media.[228] Obtaining the authorization referred to in Article 5 does not exempt from the need to obtain other required approvals or authorizations, where applicable.[229] The aim is to ensure that the launcher is sufficiently responsible and does not expose Luxembourg to an exorbitant risk in the context

[218] Art. 1 of the Decree relating to space authorizations. See the Order of March 31, 2011 relating to technical regulations pursuant to Decree No. 2009-643 of June 9, 2009 relating to authorizations issued pursuant to Law No. 2008-518 of June 3, 2008 relating to space operations, amended by the Order of July 11, 2017 (hereinafter:French decree relating to technical regulations).
[219] Specified by Decree No. 2009-640 of June 9, 2009 implementing the provisions provided for in Title VII of Law No. 2008-518 of June 3, 2008 relating to space operations, JORF No. 0132 of June 10, 2009.
[220] Chassot et al., *Droit Spatial National*.
[221] Art. 7 of the French law relating to space operations.
[222] Art. 7 and 7-1 of the French law relating to space operations.
[223] Chassot et al., *Droit Spatial National*.
[224] Art. 8 of the French law relating to space operations; Report on the Space Operations Bill, 35.
[225] Report on the Space Operations Bill, 36, ad. art. 8; Chassot et al., *Droit spatial national*.
[226] Art. 14 II. of the Decree relating to space authorizations; Chassot et al., *Droit spatial national*.
[227] Art. 5 (1) of the Luxembourg Space Activities Act, (Luxembourg space bill, 13, ad. art. 5); Chassot et al., *Droit spatial national*, p 88.
[228] Art. 1 of the Grand Ducal Decree of May 28, 2019 establishing the Ministries.
[229] Art. 5 (2) of the Luxembourg Space Activities Act.

of its liability in the event of damage.[230] The authorization request must be made in writing to the Minister of Communications and Media[231] and it is granted on a personal basis and is non-transferable, subject to the transfer regime according to article 12.[232] Authorizations are subject to payment by the operator of an annual fee to the State, the amount of which is between 2,000 and 50,000 euros, depending on the costs generated by the surveillance, and it may be increased by the costs of experts incurred without being able to exceed 500,000 euros per year.[233]

The granting of authorization implies for the operator the obligation to notify the Minister of Communications and Media spontaneously, in writing, and in a complete, coherent and understandable form of any substantial modification of the information on which the Minister has justified examining the application for authorization.[234]

In addition to the authorization regime described above, with the space activities monitoring system set up in Article 11 of the Luxembourg Space Activities Law, Luxembourg ensures its compliance with its international commitments.[235] Pursuant to this provision, operators authorized to carry out space activity are subject to continuous supervision by the Minister of Communications and Media.[236] In instance, in case of not following the conditions, the authorization may be withdrawn.[237]

Importantly, without prior authorization from the Minister of Communications and Media, any transfer to a third party of activities or rights that involve the transfer of effective control of the space object is prohibited. All provisions applicable to the authorization referred to in Article 6, paragraph 1.2 of the Luxembourg Space Activities Law apply to the transfer authorization.[238] The decision may be accompanied by special conditions imposed on the transferor and/or the transferee.[239] When the transferee operator is not established in Luxembourg, authorization may be refused in the absence of guarantees from the State of which the transferee is a national, intended to cover damage for which Luxembourg is liable.[240] The latter, in fact, remains in the launching state and retains responsibility even after the transfer of the object to a foreign operator.[241]

F. Comparison of the authorization procedures in EU national space law

From a comparative perspective, the authorization regimes of Austria, Belgium, Denmark, France, and Luxembourg show important divergences in scope, procedure, and control, despite addressing the same obligation of national authorization of space activities. Austria adopts a

[230] Luxembourg space bill,13, ad. art. 5.
[231] Art. 5 (3) of the Luxembourg Space Activities Act.
[232] Art. 5 (5) of the Luxembourg Space Activities Law; Luxembourg space bill, 4, ad. art. 5.
[233] Art. 8 (2) of the Luxembourg Space Activities Act; Chassot et al., *Droit spatial national*.
[234] Art. 8 (3) of the Luxembourg Space Activities Act.
[235] In particular art. VI of the Outer Space Treaty.
[236] Art. 11 of the Luxembourg Space Activities Law.
[237] Art. 9 of the Luxembourg Space Activities Law; Chassot et al., *Droit spatial national*, .
[238] Art. 12 of the Luxembourg Space Activities Law (similar to art. 13 § 1 of the Belgian Space Law).
[239] Luxembourg space bill, 16, ad. art. 12.
[240] Chassot et al., *Droit Spatial National.*
[241] Art. 12 of the Luxembourg Space Activities Law; Luxembourg space bill, 16, ad. art. 12; Chassot et al., *Droit spatial national*.

broader personal scope than that required under the Space Treaty. In accordance with the text of the law and the explanatory report, both governmental and non-governmental space activities are subject to authorization, whereas the Space Treaty only requires authorization for non-governmental activities. By contrast, Belgium, Denmark, France, and Luxembourg focus primarily on authorization requested by the operator, without expressly extending the requirement to all governmental activities in the same way.

While both Belgium and Denmark require the authorization of their ministers, there are some differences. For Belgium, the activities are required to be authorized prior to their commencement by the Minister who is responsible for space research. This authorization is granted on a personal and non-transferable basis and is accompanied by certain conditions that may be imposed either by the Minister or the King. Additionally, there is a public directory of authorizations. Control is achieved through the services of experts and administrative staff. Denmark requires prior permission from the Danish Minister of Education and Research and also monitors the activities after authorization through information obligations, inspection rights, and the right to vary the authorization.

All the above States, namely Belgium, Denmark, France, and Luxembourg, have the prior authorization requirement for the transfer of effective control, albeit in different ways. Belgium has a specific exclusion clause where there is no transfer of effective control. Denmark has the prior approval requirement for any transfer, which may include further conditions if the transferee is located in another State, such as the assumption of liability. France links transfer authorization directly to the concept of the launching State, requiring authorization when a transfer would make France internationally responsible. Luxembourg similarly prohibits transfers involving effective control without authorization, but places particular emphasis on guarantees from the transferee's State when the operator is not established in Luxembourg.

France and Luxembourg also differ markedly in the organization of administrative oversight. France defines three categories of authorization conditions, combining technical verification, assessment of the nature of operations, and protection of national defense and international commitments, within a procedure regulated by decree. Luxembourg, by contrast, subjects operators to continuous supervision by the Minister of Communications and Media but deliberately avoids organizing the surveillance system in detail, in order to adapt control to each specific case.

All these aspects show that, despite the fact that all five States require the authorization of space activities and the regulation of the transfer of control, the scope of the authorization, the role of public authorities, the level of supervision, and the conditions for the transfer differ from one Member State to another. This, in turn, reveals the disadvantages of the current system and the need for a unified European space law, which could ensure the consistency of the rules on authorization, the rules on the transfer of control, and the legal certainty in the European Union.

4. Registration Procedures for Space Objects under National Space Laws

A. Austria

The Federal Minister of Transport, Innovation and Technology maintains the Austrian register of space objects[242]. According to the Registration Convention, the obligation to register a space object falls to the "*launching State*", that is to say the State which launches or causes the launch of a space object. Austria considers itself to be the State which "*causes the launch of a space object*" when the space activity subject to authorization is carried out by the Austrian State itself.[243] Since outer space treaties do not regulate the change of operator, Austria generally adopts the "once a launching state, always a launching state" approach; a registration cannot be cancelled, but additional entries can be added to the United Nations Register of Space Objects.[244] The law also refers to the procedures provided for in the Registration Convention when other states may be considered launching states. The law lists the information that must be written in the national register, with further details provided in the Austrian Outer Space Ordinance.[245] The information required corresponds to that which must be transmitted to the Secretary-General of the United Nations under the Registration Convention of 1974,[246] in addition to the obligation of providing further data by the operator.[247]

B. Belgium

Registration has the effect of extending the jurisdiction of the Belgian State to the space object and constitutes the objective link between the launching State and the victim of damage.[248] A National Register of Space Objects is created where space objects of which Belgium is the launching State are registered, except when this registration is carried out by another State or an international organization, in accordance with the Convention on the Registration of Space Objects.[249] The data included in the Register are those mentioned in art. IV of the beforementioned treaty.[250] In addition to the above-mentioned information, the Register identifies the manufacturer of the space object and the operator, as well as lists the main constituent elements and instruments on board the space object.[251] Upon registration in the Register, the Minister communicates to the Secretary General of the United Nations the information to be included.[252] Information in the Register must be effective at the time of launch of the space object[253] and any modification of data must be subject to additional

[242] § 9 (1) of the Austrian Outer Space Act; Austrian Register for Space Objects. Accessed August 9, 2024. https://www.bmk.gv.at/en/topics/innovation/registry_for_space_objects.html; Chassot et al., *Droit spatial national*, p 63.
[243] Austrian explanatory report, ad § 9 (2).
[244] Ibid.
[245] § 10 (1) Austrian Outer Space Act; § 6 (2) of the Austrian Outer Space Ordinance.
[246] Austrian explanatory report, ad § 10 (1).
[247] § 6 (2) of the Austrian Outer Space Ordinance; Chassot et al., *Droit spatial national.*
[248] Belgian space bill, p. 9; Chassot et al., *Droit spatial national*, p 68.
[249] Art. 14 § 1 of the Belgian Space Law.
[250] Art. 14 § 2 2° of the Belgian Space Law.
[251] Art. 14 § 2 4° of the Belgian Space Law.
[252] Art. 14 § 2 6° of the Belgian Space Law.
[253] Art. 14 § 2 7° of the Belgian Space Law.

registration within thirty days.[254] The Register is public and it is edited, kept up to date and published in electronic form by the Minister and accessible on the internet.[255]

C. Denmark

The Danish Minister of Education and Research establishes and maintains a public register of space objects.[256] The information contained in the register is accessible to the public. The register must contain information on space objects launched into Earth orbit or beyond, and for which Denmark is the launching State.[257] If Denmark and one or more other States to which the Registration Convention applies are considered as launching States, the Danish Minister of Education and Research registers the object after consultation and agreement between the States concerned.[258] The law itself does not mention what information must be entered in the national register, but it is specified in the Danish Outer Space Ordinance[259] and corresponds essentially to the information which must be transmitted to the Secretary-General of the United Nations under the Registration Convention.[260]

D. France

In respect to article II of the Outer Space Treaty, launched space objects are entered in a registration register kept by CNES.[261] Any space operator provides CNES, no later than sixty days after launch, with the information necessary for the identification of the space object[262]. The register is public and can be freely consulted upon request to CNES. However, information relating to the identification of the owner or manufacturer of the space object and any real or personal security interests established thereon is only communicated after prior agreement of the interested parties.[263]

E. Luxemburg

The Minister of Communications and Media maintains a National Register of Space Objects,[264] where the space objects are registered for which the Grand Duchy of Luxembourg assumes a registration obligation by virtue of its international obligations,[265] which is open to the public.[266] The operator who takes the initiative to launch or cause to be launched a space object

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[254] Art. 14 § 2 8° of the Belgian Space Law.
[255] Art. 5 § 2 of the Belgian Royal Decree; Chassot et al., *Droit spatial national*.
[256] Danish Registry of Space Objects**.** Last modified May 25, 2021. Accessed July 14, 2024. https://ufm.dk/en/research-and-innovation/space-anddenmark/the-danish-registry-of-outer-space-objects; Chassot et al., *Droit spatial national*, p 73.
[257] § 10 S. 1 of the Danish Outer Space Act.
[258] § 10 S. 2 of the Danish Outer Space Act.
[259] § 8 of the Danish Outer Space Ordinance.
[260] Danish Explanatory Report, p. 24, ad § 10; Chassot et al., *Droit spatial national*.
[261] Art. 12 of the French law relating to space operations; Chassot et al., *Droit spatial national*, p 83.
[262] French Decree Relating to CNES**.** Art. 14-1 and 14-2. In *Journal officiel de la République française* (JORF), no. 0208, September 8, 2011. Order of August 12, 2011**.** Art. 1. Establishing the List of Information Necessary for the Identification of a Space Object in Application of Title III of Decree No. 2009-643 of June 9, 2009, Relating to Authorizations Issued in Application of French Law Relating to Space Operations. In *Journal officiel de la République française* (JORF), no. 0208, September 8, 2011; Chassot et al., *Droit spatial nationa*,.
[263] Art. 14-5 of the Decree relating to CNES; Chassot et al., *Droit spatial national*.
[264] Art. 15 of the Luxembourg Space Activities Law; Chassot et al., *Droit spatial national*, p 90.
[265] Art. VIII of the Space Treaty and art. II of the Registration Convention.
[266] Art. 15 (1) of the Luxembourg Space Activities Act.

into outer space must provide the Minister with all the information enabling the identification of the space object. The operator must immediately notify the Minister of any change or risk of change in the parameters of the space object, in particular the danger of unintentional deorbiting.[267] If the space object is marked with a designator or registration number, the operator informs the minister.[268] For clarification, the space object must be registered by a launching State. If a Luxembourg operator acquires a space object after its launch, this object will remain registered in the register of the original launching State, even if liability falls to Luxembourg under the Liability Convention providing for joint liability of the launching States. This applies in particular to launchers used to launch a Luxembourg space object, if the launcher is not from Luxembourg.[269]

F. Comparison of the Registration procedures of space objects between EU national space law

When the national registration regimes are compared, it is clear that Austria, Belgium, Denmark, France, and Luxembourg all comply with the Registration Convention by having their own registers of space objects, but they differ in their application of the concept of "launching State" and the management of registration. In Austria, there is public access to the register, and it adopts a strict policy of "once a launching State, always a launching State." This means that registration cannot be revoked even if there is a change of operator, but further entries can be made on the UN Register. In Belgium, there is a National Register of Space Objects, and registration extends the jurisdiction of the Belgian State to the space object and is the objective link with the victim of damage. There are strict rules that registration must be effective on launch and within thirty days. Similarly, Denmark has a public register, but it also regulates cases of multiple launching States with requirements of consultation and agreement before registration. In France, there is a register maintained by the CNES, and it is public, although there are limitations to access information on sensitive matters like ownership and security. Luxembourg's public register only includes space objects for which it assumes an international registration obligation, with continuous information requirements for the operator, including immediate notification of any change or risk of change in orbital parameters. Despite the fact that the same international law applies, these differences in logic, requirements, and treatment of multiple launching States show a fragmented EU, with a question of whether a single EU register of space objects would provide clearer legal certainty, transparency, and coordination, while avoiding any overlap or inconsistency with national registers.

[267] Chassot et al., *Droit Spatial National*.
[268] Art. 15 (4) of the Luxembourg Space Activities Law.
[269] Luxembourg space bill, p. 17-18, ad. art. 16 of the draft law (corresponds to art. 15 of the final act in force); Chassot et al., *Droit spatial national*.

5. Liability and Insurance Requirements under National Space Laws

A. Austria

If Austria must compensate for damage caused by space activity in accordance with international law, the government has a right of recourse against the operator. For damage caused to the surface of the Earth or to aircraft in flight, the right of recourse includes an amount up to the sum of the insured risk, but at least the minimum amount of insurance provided for by law. This limitation does not apply if the damage is due to a fault of the operator or its agents or if the operator has violated the provisions of the law relating to the authorization of space activities or their conditions. The law does not deal with the liability of the operator towards injured parties, but only with the recourse regime when the responsibility of the State is engaged under international law.[270]

In order to ensure against damage caused to people and property, the operator must take out insurance covering a minimum amount of 60 million euros per incident. Liability in the event of an accident cannot be excluded or limited. If the space activity is of public interest, the Federal Minister of Transport, Innovation and Technology may set a lower amount or exempt the operator from the insurance obligation by administrative decision, taking into account the risks linked to the activity and the financial capacity of the operator. Space activities are of public interest if they serve science, research or education. Taking out insurance is not necessary if the State itself is the operator. [271]

B. Belgium

When the liability is engaged, the Belgian State has recourse action against the operator from the moment it is recognized as debtor of compensation for the damage within the meaning of art. VII of the Outer Space Treaty.[272] The amount of damage, subject of the recourse action, may be limited by the King.[273] The operator who does not comply with the conditions attached to his authorization is forfeited from the aforementioned limit of liability.[274] In addition, if the operator is held liable for fault, the amount of damage may exceed the limit.[275] The assessment of the damage is done in accordance with articles 9 to 11 of the Royal Decree and article XII of the Liability Convention.[276] The operator is required to immediately inform the crisis center designated by the King of any maneuver, any malfunction, or any anomaly of the space object, likely to generate danger or cause damage. In the event of non-compliance with the information obligation, the operator will be required to guarantee the Belgian State for the entire compensation owed by it.[277]

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[270] § 11 of the Austrian Outer Space Act; Chassot et al., *Droit spatial national*, p 64.
[271] § 4 (4) of the Austrian Outer Space Act. Chassot et al., *Droit spatial national*,
[272] Art. 15 of the Belgian Space Law; Belgian space bill, p. 12 and 30, ad. art. 15. However, the fact of providing for recourse action cannot be interpreted as recognition by Belgium of the extension of international provisions on liability to private individuals (Belgian Space Law Bill, p. 11); Chassot et al., *Droit spatial national*, p 68.
[273] Art. 15 § 3 of the Belgian Space Law.
[274] Art. 15 § 4 of the Belgian Space Law.
[275] Belgian space bill, p. 12.
[276] Belgian space bill, p. 30, ad. art. 15.
[277] Art. 16 of the Belgian Space Law.

The Minister may require the conclusion of insurance for the benefit of third parties covering the damage that may result from authorized activities.[278] Taking out insurance by the operator is not a condition of authorization systematically required for any activity. The minister may impose it on the operator according to his discretion in the specific case.[279] Furthermore, the Belgian State has direct action against the operator's insurer.[280]

C. Denmark

The law governs not only the recourse of the State in the event that it is held responsible for damage caused by a space object in accordance with international treaties, but also the direct liability of the operator towards the injured parties.[281] The operator is automatically liable for any damage caused by a space object to people or property on Earth, as well as damage caused to aircraft in flight. With regard to other damages, the operator is liable according to the general rules of Danish liability law. If the victim contributed to the damage, whether intentionally or through gross negligence, compensation may be reduced or cancelled.[282] The operator's liability is limited to 450 million Danish crowns; nonetheless, other situations can make this amount vary.[283] If the Danish State has paid compensation for damage caused by a space object, it can take action against the operator to the extent that the latter is liable in accordance with the principles mentioned above.[284]

The Danish Minister of Education and Research may, as a condition of authorization of a space activity, require the operator to take out insurance or otherwise provide security to cover liability under the law.[285] If the operator has taken out insurance, the insurance company is directly liable to the applicant according to the law, and to the Danish state to the extent that the latter has the right to do so and the right to be compensated.[286] Apart from this, it is up to the Danish Agency for Science, Technology and Innovation to determine the requirements and extent of insurance that the operator must take out on the basis of the authorization application and of risk assessment.[287]

D. France

a. Liability towards third parties

The operator is solely liable for damage caused to third parties[288] as a result of the space operations it conducts under the following conditions: (1) it is automatically liable for damage caused to the ground and in the airspace; (2) in the event of damage caused elsewhere than on the ground or in airspace, liability can only be sought for fault. This liability can only be

[278] Art. 5 § 2 of the Belgian Space Law.
[279] Ibid.
[280] Art. 15 § 7 of the Belgian Space Law; Chassot et al., *Droit spatial national*.
[281] Danish Explanatory Report, p. 12-13, Section 3.6.2; Chassot et al., *Droit spatial national*, p 73.
[282] § 11 of the Danish Outer Space Act.
[283] § 12 of the Danish Outer Space Ordinance.
[284] § 12 of the Danish Outer Space Act.
[285] Chassot et al., *Droit spatial national*.
[286] § 13 of the Danish Outer Space Act.
[287] § 13 of the Danish Outer Space Ordinance; Chassot et al., *Droit spatial national*.
[288] Art. 13-18 of the French law relating to space operations; Chassot et al., *Droit spatial national*, p 83.

mitigated or removed by proof of the fault of the victim. Except in cases of intentional misconduct, the operator's liability ceases when all the obligations set by the authorization or license are fulfilled or, at the latest, one year after the date on which these obligations should have been fulfilled. The State replaces the operator for damages occurring after this period.[289] The law channels liability onto the operator and states its liability without fault for all damages caused to the third party during the launch phase.[290]

In Article 14 of the French Law relating to space operations specifies the conditions for a recourse action exercised by the State against the operator, when it has repaired damage. Recursive action can be taken against the operator, to the extent that the State has not already benefited from financial or insurance guarantees from the operator to the extent of the compensation. If the damage was caused by a space object used as part of an operation authorized in application of this law, the recourse action is exercised within the limit of the amount fixed in the authorization. In the event of intentional error by the operator, the aforementioned limits do not apply. The State does not take recourse action in the event of damage caused by a space object used as part of an operation authorized in application of the French Law relating to space operations and resulting from acts targeting State interests. In cases where an operator has been ordered to compensate a third party for damage caused by a space object used as part of an operation authorized under the French law relating to space operations, conducted from the territory or from from means or installations placed under the jurisdiction of France or another Member State of the European Union or party to the agreement on the European Economic Area, this operator benefits, except in the case of intentional misconduct and under certain conditions that the state guarantee.[291]

b. Liability towards persons participating in the space operation

In the event of damage caused by a space operation or the production of a space object to a person participating in this operation or this production, the liability of any other person participating in the space operation or in the production of the space object at the origin of the damage and linked to the previous one by a contract cannot be sought on account of this damage, unless expressly stipulated to the contrary relating to the damage caused during the production phase of a space object intended to be controlled in the outer space or during its control in orbit, or case of intentional misconduct.[292]

c. Insurance

Art. 6 of the French Law relating to space operations aims to ensure the solvency of operators holding an authorization, in the event of liability for damage. Any operator subject to authorization is required, throughout the duration of the operation, to have a financial guarantee or to be covered by insurance, "*up to the amount beyond which is, during or after the launch, granted the guarantee of the State, or below which the recourse action of the State is exercised, provided for in arts. 16 and 17*". This provision offers the operator the choice between insuring within the limit of the amount which remains his responsibility or demonstrating that he has

[289]Art. 13 of the French law relating to space operations.
[290] Report on the Space Operations Bill, p. 40, ad. art. 13; Chassot et al., *Droit spatial national*.
[291] Art. 15 of the French law relating to space operations; Chassot et al., *Droit spatial national*.
[292] Art. 20 of the French law relating to space operations; Chassot et al., *Droit spatial national*.

sufficient financial guarantees at his disposal to cover the risks himself. It therefore does not create a new insurance obligation.[293] A decree in the Council of State[294] specifies the insurance arrangements, the nature of the financial guarantees that may be approved by the competent authority and the conditions under which compliance with the aforementioned obligations is justified.[295] It further specifies the conditions under which the operator may be exempted by the administrative authority from the obligation provided for in the preceding paragraph.[296] The insurance or financial guarantee must cover the risk of having to compensate, within the limit of the aforementioned amount, the damage likely to be caused to third parties in the space operation. The insurance or financial guarantee must benefit, to the extent of the liability that may fall to them for damage caused by a space object, the following persons: the State and its public establishments, the European Space Agency and its Member States, the operator and the people who participated in the production of the space object or space operation.[297]

E. Luxembourg

The authorized operator may only carry out space activity in accordance with the conditions of its authorization and the international obligations of law,[298] this provision incorporates art. VI of the Outer Space Treaty also imposes respect for international commitments on all operators. This extension to private actors is part of the obligation imposed on the State to monitor operators under its jurisdiction. Furthermore, the extension is justified by taking into account the civil liability of the Luxembourg State within the meaning of the Liability Convention.[299]

The operator who has obtained an authorization for a space activity is fully liable for damage caused during its space activity, including during all work and preparation duties.[300] The Luxembourg Space Activities Law does not, however, provide for a specific liability regime for operators for space activities, contrary to the approach adopted in other legislation. When Luxembourg law is applicable, the legislator have ruled that the principles and rules of the common law of civil liability, as they appear in the civil code, are sufficient to regulate the conditions under which an operator can be held responsible for its space activities both towards third parties and, where applicable, where applicable, vis-à-vis the Luxembourg State. Consequently, in the event that the State sees its civil liability incurred under the Liability Convention, it is on the basis of common law that it will have a sub-rogatory remedy against the operator whose space activity is involved.[301]

As indicated above, the authorization request submitted by the operator must be accompanied by an assessment of the risks of space activity, which specifies the coverage of these risks by own financial means, by an insurance policy from an insurance company or by a guarantee

[293] Art. 6 I. of the French law relating to space operations; Report on the Space Operations Bill, p. 32, ad. art. 6.
[294] Art. 16-18 of the French Decree relating to space authorizations.
[295] Chassot et al., *Droit spatial national*.
[296] Art. 6 of the French law relating to space operations.
[297] Art. 6 of the French law relating to space operations; Chassot et al., *Droit spatial national*.
[298] Art. 3 of the Luxembourg Space Activities Law; Chassot et al., *Droit spatial national*, p 90.
[299] Luxembourg space bill, p. 12, ad. art. 3.
[300] Art. 4 of the Luxembourg Space Activities Law.
[301] Luxembourg space bill, p. 15, ad. art. 8; Opinion of the Council of State on the bill, p. 2.

from a credit institution. The authorization is subject to the existence of financial bases appropriate to the risks associated with space activity.[302]

F. *Comparison of liability and Insurance requirements*

Depending on the above we notice that Austria, Belgium, France, Denmark, and Luxembourg all apply the Liability Convention through national law, although they follow widely different approaches regarding operator liability and State responsibility. Austria and Belgium primarily frame liability through a State recourse mechanism, whereby the operator becomes financially exposed only after the State's international responsibility has been triggered. However, Belgium goes further than Austria by combining recourse with a partial domestic liability regime and allowing the State to impose liability caps that may be lifted in cases of fault or non-compliance. France differs substantially from both models in its direct attribution to the operator, as well as its automatic attribution of liability for damage on Earth and in airspace, which is then subject to a temporal limitation, such that after fulfilling obligations in authorization, liability falls on the State after a certain period. The temporal limitation does not feature in Austrian or Belgian law, where there is recourse to the operator without such a limitation.

Denmark takes a more insurance-based approach, with less emphasis on substantive liability rules and more on the financial coverage being in place, including direct liability of the insurer towards the victims and the State. This is in contrast to Luxembourg, which is the most minimalist approach. Luxembourg does not create a specific space law liability regime but relies on general civil liability rules for third-party actions and State subrogation, thus providing less predictability than the detailed statutory regimes in France or Belgium.

These differences show that similar international rules lead to different national liability regimes, thus creating different levels of legal certainty, financial risk, and victim protection within the EU. This fragmentation could lead to regulatory arbitrage and thus challenges the internal market's coherence, thus supporting the need for a unified EU space liability regime that can coordinate operator liability, insurance, and State recovery rights. These differences are not merely technical. They create a patchwork in which two operators conducting similar space activities might face completely different liability exposure, insurance requirements, and recourse risks depending on the State of authorization. A Belgian operator may face capped recourse and direct insurer liability, while a Luxembourg operator might be subject to ordinary civil law with no predetermined ceilings; a French operator's liability may end after a statutory period and shift to the State, while an Austrian operator's liability toward injured third parties is governed outside space law altogether. This creates a fragmented legal environment, which is characterized by uncertainty, complexities, as well as uneven regulatory burdens throughout the EU space sector.For operators conducting activities across Member States, it means dealing with various liability rules, including differing thresholds and financial protection levels. For States, it may result in varying definitions of insurance and recourse, potentially creating unequal protection of victims and uneven financial risk distribution. This implies that States need to consider a unified EU space liability regime that might harmonize operator liability

[302] Art. 6 (4) of the Luxembourg Space Activities Act; Chassot et al., *Droit spatial national*.

regimes, as well as insurance obligations and recourse rights of States, for greater coherence, fairness, and predictability throughout the internal market as well as international obligations.

6. Space debris and other covered issues

A. Austria

Like other states, Austria considers the limitation of space debris an important issue.[303] Under the Austrian Outer Space Act,[304] the operator must make arrangements for space debris mitigation, in accordance with good practice and taking into account internationally recognized guidelines for space debris mitigation. In particular, measures limiting debris released during normal operations must be taken. The obligation to reduce space debris also represents an ongoing obligation of the operator after obtaining authorization.[305]

To ensure compliance with the law and for general and special prevention reasons, the Austrian Outer Space Act provides for fines for violations, which should also enable Austria to comply with its monitoring obligations under the Outer Space Treaty.[306] Violations of the law or its implementing regulations are punishable by a fine of up to 100,000 euros. Conducting space activity without authorization is punishable by a minimum fine of 20,000 euros.[307]

B. Belgium

Given the nature of space activities, the Belgian State has deemed it essential to transpose the provisions required by European Community law concerning environmental protection.[308] Any activity covered by the legislation is subject to an assessment of the environmental impacts which may take place at different stages of the activity. An initial impact study is carried out before an authorization is granted.[309] The operator bears the costs of studies of the impact of the operation of the space object on the environment.[310]

Anyone who carries out activities referred to in Article 2, as well as anyone who, having submitted an application for authorization, intentionally communicates false or incomplete information regarding the activities concerned. In addition, the operator in violation is deprived of the benefit of the limit of liability provided for in Article 15 §3. [311]

C. Denmark

The Danish Science, Technology and Innovation Agency may require that space activities involving the launch of space objects into Earth orbit meet relevant standards and guidelines for the management of space debris. As a general rule, within twenty-five years of the end date of the space object's functional operating period, it must either be safely de-orbited or “parked”

[303] Austrian explanatory report, ad § 5; Chassot et al., *Droit spatial national*, p 64.
[304] § 5 of the Austrian Outer Space Act.
[305] Austrian explanatory report, ad § 5.
[306] Austrian explanatory report, ad § 14.
[307] § 14 of the Austrian Outer Space Act; Chassot et al., *Droit spatial national*.
[308] Belgian space bill, p. 12-13; Chassot et al., *Droit spatial national*, p 69.
[309] Art. 8 § 2 of the Belgian Space Law; art. 7 and 8 of the Royal Decree.
[310] Art. 8 § 1-8 of the Belgian Space Law.
[311] Art. 19 of the Belgian Space Law; Chassot et al., *Droit spatial national*.

in an orbit where it will not does not constitute a danger for other space activities.[312] Space activities must be carried out with due regard to the environment. The Danish Science, Technology and Innovation Agency may specify the requirements in this regard.[313]

Violations of the law are punishable by a fine or imprisonment of up to four months, unless a greater penalty is incurred under another law. In the event of intentional violation and in particularly aggravating circumstances, the penalty may be increased to imprisonment of up to two years. Particularly aggravating circumstances include situations exposing people to the risk of death or bodily harm and the systematic nature of violations.[314]

D. France

The arts. 5 to 8 of the French law relating to space operations regulate the obligations of authorization holders. In particular, authorizations may be accompanied by requirements in the interest of the safety of people and property and the protection of public health and the environment, in particular with a view to limiting the risks linked to space debris. These requirements may also aim to protect national defense interests or France's compliance with its international commitments.[315] The Inter-Agency Space Debris Coordination Committee(IADC), composed of the main national space agencies, of which CNES is a member, was set up in 1993 with the aim of developing codes of good conduct.[316] With regard to sanctions, authorizations issued pursuant to this law may be withdrawn or suspended in the event of failure by the holder to fulfil its obligations, or when its operations appear likely to compromise the interests of national defense or compliance by France of its international commitments. In the event of suspension or withdrawal of the authorization to control a launched space object, the administrative authority may order the operator to take, at its own expense, appropriate measures, in accordance with commonly accepted rules of good conduct, to limit the risks of damage linked to this object.[317] Failure to comply with authorizations for launch, control, or transfer, violation of a shutdown or suspension measure, or, in particular, obstructing supervisory controls is punishable by a fine of 200,000 euros.[318]

E. Luxembourg

The commentary on Article 4 of the Luxembourg law on space activities emphasized that operators and companies exploring space resources *must "adopt a responsible attitude towards the protection of the terrestrial environment and space in order, on the one hand, to avoid the risks of pollution and their repercussions on the health, well-being and property of people and generations future and, on the other hand, to enable healthy and sustainable use of the terrestrial environment and space by all*". Operators were required to take appropriate

[312] § 6 of the Danish Outer Space Ordinance; Chassot et al., *Droit spatial national*, p 74.
[313] § 7 of the Danish Outer Space Ordinance.
[314] § 21 of the Danish Outer Space Act; Chassot et al., *Droit spatial national*.
[315] Art. 5 of the French law relating to space operations; Chassot et al., *Droit spatial national*, p 85.
[316] Report on the Space Operations Bill, p. 31, ad. art. 5.
[317] Art. 9 of the French law relating to space operations; Provision specified by art. 15 of the Decree relating to space authorizations.
[318] Art. 11 of the French law relating to space operations; Chassot et al., *Droit spatial national*.

measures to limit risks, particularly from debris, but not to avoid them completely.[319] However, art. 4 was changed in the final act and the reference to space debris was removed.[320]

Violation of the provisions relating to the authorization or the Law is punishable by imprisonment of up to five years and/or a fine of up to 1,250,000 euros.[321] Order fines are complementary to administrative sanctions (suspension or withdrawal of authorization) and are part of the obligation of continuous surveillance under art. VI of the outer Space Treaty.[322]

A particularity of Luxembourg, exploration and use of space resources activities are subject to approval[323] according to the Law on Exploration and Utilization of Space Resources (*lex specialis*),[324] and are not subject to the Space Activities Act (*lex generalis*).[325] Note that this last law is inspired by the first in the formulation and general concepts.[326] According to the Law on Exploration and Utilization of Space Resources, space resources are subject to appropriation.[327] The legislator maintains that this provision is consistent with Article II of the outer Space Treaty, since it does not authorize the appropriation of asteroids and celestial bodies in themselves and does not intend to establish any element of sovereignty over a celestial body or space.[328] Any person who explores or uses space resources without approval is punishable by imprisonment and/or a fine.[329]

F. Comparing the framework of space debris in EU national space law

From a comparative viewpoint, different Member States acknowledge the need to address the importance of protecting the environment and the issue of space debris; however, they have different approaches. Austria requires operators, in accordance with the Austrian Outer Space Act, to make provision for space debris mitigation in accordance with good practice and internationally recognized guidelines; failing this, a fine will be imposed. Belgium, in accordance with European Community law on environmental protection, requires an initial impact study prior to authorization. Denmark imposes standards for the management of space debris for activities involving launches into Earth orbit, requiring that within twenty-five years after the end of a space object's functional period, it must be safely de-orbited or “parked” in a safe orbit, with violations punishable by fines or imprisonment of up to four months. France attaches requirements to authorizations to protect people, property, public health, the environment, and national defense, including compliance with international commitments, with fines for violations, and actively participates in the IADC, as mentioned above, to develop

[319] Luxembourg space bill, p. 13, ad. art. 4 of the bill.
[320] Chassot et al., *Droit Spatial National* p 91.
[321] Art. 14 of the Luxembourg Space Activities Law.
[322] Luxembourg space bill, p. 17, ad. art. 14.
[323] Art. 2 (1) of the Law on Exploration and Utilization of Space Resources.
[324] With the exception of Articles 15 (registration) and 16, paragraph 2.
[325] Luxembourg space bill, p. 11.
[326] Blazej Gladysz Lehmann, Bob Calmes, Geoffroy Leclercq, and Laurent Schummer, “In Review: Space Law, Regulation and Policy in Luxembourg,”; Chassot et al., *Droit spatial national*.
[327] Art. 1 of the Law on Exploration and Utilization of Space Resources.
[328] Draft law on the exploration and use of space resources, The Government of the Grand Duchy of Luxembourg, Ministry of the Economy, p. 9.
[329] Art. 2 (1) and 18 of the Law on Exploration and Utilization of Space Resources; Chassot et al., *Droit spatial national*.

codes of good conduct. Luxembourg requires operators to take appropriate measures to limit risks, particularly from debris, though the final act removed specific references to space debris; violations of authorization or the law are punishable by imprisonment of up to five years and/or a fine, and uniquely, exploration and use of space resources are subject to approval. While all States address debris mitigation, the divergences in regulatory approach, penalties, and scope highlight the potential benefits of a unified EU space law, raising the question of whether a common standard for debris mitigation could be established across Member States. Although all States address the issue of debris mitigation, the differences in regulatory approaches, penalties, and scope demonstrate the advantages of a unified EU space law. Without a unified set of rules, operators will have different obligations, and this will lead to confusion and inconsistencies, especially for operators of businesses that launch satellites in multiple countries or operate mega-constellations. Since the EU is currently planning to launch large satellite constellations for communication or earth observation purposes, such IRIS², this will result in an increased number of satellites in orbit, making the risk of collisions and the generation of long-term debris a concern that will affect the EU and the international community. The inconsistencies in punishments, such as fines and imprisonment, will also make it difficult to ensure a unified approach in enforcing EU rules, and this will allow operators in some Member States to take advantage of these inconsistencies. This is why there is an urgent need for the imposition of a unified and binding law on debris mitigation to ensure that all EU operators conform to the same standards.

Conclusion of the chapter

In comparing national space laws in Austria, Belgium, Denmark, France, and Luxembourg, one will observe that despite the common international commitments, EU Member States have developed distinct legal approaches to space regulation. The differences are anything but methodological; even if they reflect underlying national strategic and priority orientations, they burden the cross-national cooperation, creating distinct regimes, largely contradictory. This could be demonstrated on different levels of space activities: the authorization regimes of Austria, Belgium, Denmark, France, and Luxembourg show important divergences in scope, procedure, and control, despite addressing the same obligation of national authorization of space activities. All these aspects show that, despite the fact that all five States require the authorization of space activities and the regulation of the transfer of control, the scope of the authorization, the role of public authorities, the level of supervision, and the conditions for the transfer differ from one Member State to another. This, in turn, reveals the disadvantages of the current system and the need for a unified European space law, which could ensure the consistency of the rules on authorization, the rules on the transfer of control, and the legal certainty in the European Union. On the level of registration, all EU member states comply with the Registration Convention by having their own registers of space objects, but they differ in their application of the concept of "launching State" and the management of registration. Despite the fact that the same international law applies, these differences in logic, requirements, and treatment of multiple launching States show a fragmented EU, with a question of whether a single EU register of space objects would provide clearer legal certainty, transparency, and coordination, while avoiding any overlap or inconsistency with national registers. As well as the Liability and Insurance, Austria, Belgium, France, Denmark, and Luxembourg

all apply the Liability Convention through national law, although they follow widely different approaches regarding operator liability and State responsibility. These differences are not merely technical. They create a patchwork in which two operators conducting similar space activities might face completely different liability exposure, insurance requirements, and recourse risks depending on the State of authorization. This results in a fragmented legal environment, and it is characterized by uncertainty, complexities, and uneven regulatory burdens in the EU space sector. For operators conducting activities across Member States, it means dealing with various liability rules, including differing thresholds and financial protection levels. This implies that States need to consider a unified EU space liability regime that might harmonize operator liability regimes, as well as insurance obligations and recourse rights of States, for greater coherence, fairness, and predictability throughout the internal market, as well as international obligations. From a comparative viewpoint, different Member States acknowledge the need to address the importance of protecting the environment and the issue of space debris; however, they have different approaches. The variations in regulations, sanctions, and jurisdiction highlight the benefits of having a uniform EU space legislation. In the absence of a common legislation, the duties of the operators would vary, causing chaos and discrepancies, particularly for operators who have launched satellites in various nations or who have mega constellations. The inconsistencies in punishments, such as fines and imprisonment, will also make it difficult to ensure a unified approach in enforcing EU rules, and this will allow operators in some Member States to take advantage of these inconsistencies. This is why there is an urgent need for the imposition of a unified and binding law on debris mitigation to ensure that all EU operators conform to the same standards.

These fragmentations are not limited to these levels; they also translate into the broader picture of European space governance. As a researcher, I observe that these differences pose an extremely serious structural problem. The lack of legal consistency among EU Member States is creating a patchwork European space governance landscape. It makes it more challenging for the regulatory framework for operators, especially those that operate between borders, and hinders Europe’s capability to provide a unified approach in the increasingly developing and more competitive global space economy.

What emerges from this analysis is a need to rethink the way in which national specificities can co-exist side by side under a shared European vision. Instead of calling for a shared legal code immediately, efforts should be concentrated on building mechanisms that promote interoperability, legal predictability, and mutual recognition between national regimes. Fostering convergence, through guidelines, model provisions, or enhanced cooperation, could lay the groundwork for a more unified and robust European space governance model, one that could meet the demands of the decades ahead; a long-term strategy.

Country	Authorization & Scope	Liability & Insurance	Environmental / Debris Obligations	Particularities
Austria	Applies to governmental & non-governmental activities; registration per Registration Convention	State has recourse against operator; insurance not required if State is operator	Must limit space debris; fines for violations	Unlimited personal scope; TUGSAT-1 & UniBRITE triggers
Belgium	Required for activities under national control; personal & non-transferable	Operator liable; State recourse; insurance required; environmental impact study mandatory	Must conduct impact study before authorization	Authorization directory public; transfer requires Minister's approval
Denmark	Permission from Minister; applies to national operators & vessels	Operator liable; insurance or financial guarantee may be required	Must manage space debris; safe de-orbit or parking orbit within 25 years	Transfer to another state requires agreement and liability coverage
France	Authorization covers design, construction, launch; detailed procedure	Operator liable; State subsidiary liability; insurance or guarantee required	Must limit space debris; consider public safety & defense	Transfer of control requires prior authorization; compliance checks by authorities
Luxembourg	Authorization required if State may be internationally responsible	Operator fully liable; no recourse by State; financial guarantee required	Must limit risks; specific exploration/use of space resources approval	Exploration & use of space resources governed by lex specialis; transfer requires prior authorization

Chapter 2: EU Regional Legislation Related to the Space Sector

Fragmentation beyond the national boundaries

After the analysis mentioned in the first chapter of this thesis, we can say that fragmentation does not confine itself to the national legal order; it also manifests at the regional level, within the EU itself. At the moment of writing this chapter, there is no single unified legal corpus that governs space activities at the EU level, yet. Rather, legislation is designed along a number of dispersed instruments, reflecting the historical evolution and political compromises as well. These differences are indicative of a deeper malaise. In other words, fragmentation does not stop with the national legal orders; it is also witnessed in regional terms, that is, within the European Union itself; There is no single codified law, yet governing space activity at the EU level; rather, the legislation is spread across a number of instruments. Without a consolidated legal framework, there is increased uncertainty concerning regulation, overlaps concerning institutional responsibility, and inefficiencies in its implementation.

In this context, this chapter examines the key regional legislative instruments shaping the EU's role in the space sector, focusing on their legal bases and assessing their effects through a step-by-step analysis. In this first part, we present the following laws: the foundational legal frameworks, namely, the Treaty on the Functioning of the European Union and EU Regulation 2021/696. These laws take their means from the establishment of the EU competencies and the result of the concept of space governance. **(I)** It will be very important to examine, among others, in section **(II)**, the legislative frameworks that assign modalities for the functioning of the major EU space bodies: the European Union Agency for the Space Programme and the European Space Agency in its relations with the Union. Section **(III)** deals with the rest of the regional laws of the European Union that handle a number of space-related activities, mainly on points about security, sustainability, and data governance. That section serves as a collection of how Regulations apply to distinct domains and often creates legal fragmentation within the EU space sector.

It should be noted that due to the limited scope of analysis of space law at the EU regional level, information included in the final part of this chapter relies on the author's own study and critical evaluation of the relevant legal documents available.

I. Foundational Legal Frameworks

We will begin by providing information on the foundational frameworks for EU Space activities. The first part examines the relevant TFEU provisions, as introduced by the Lisbon Treaty, which confer upon the EU the legal competence to act in the space domain through legislative measures**(1).** The second part will discuss the EU Regulation (2021/696), which

formally specifies and creates the overall legal, financial, and operational provisions needed for the Union's space activities with European designs. Together, these steps will support the legal development of the EU's space strategy and governance. **(2)**

1. Treaty on the Functioning of the European Union

As stated in the introduction of this thesis, the Lisbon Treaty was signed in 2007 and came into force on 1 December 2009. As a result of this reform, the former Treaty establishing the European Community was amended and renamed as the Treaty on the Functioning of the European Union (TFEU), thus opening a new chapter in the evolution of the European Union. By establishing a specific legal basis for space activities at the level of the founding treaties of the EU, the Lisbon Treaty represented a major step forward in European space governance. For the first time in the history of the Union, Article 4 of the TFEU identifies space as a shared competence of the EU and its Member States, while Article 189 TFEU lays down a specific legal basis for a European space policy. Although these articles do not lay down a complete regulatory framework for space activities, they formally integrate space activities within the EU legal system and provide a legal basis for the adoption of legislative and non-legislative acts in favor of the EU's objectives in this area. [330]

The TFEU identifies different categories of competence exercised by the European Union, namely exclusive competence, shared competence, and competence to support, coordinate or supplement the actions of the Member States. In this context, it should be noted that the space sector has been referred to under Article 4(3) of the TFEU as an area where competence is shared. This classification, therefore, reflects that action can be taken by the EU as well as its Member States, while at the same time establishing limits for EU action. In contrast with other areas where competence is shared, action by the EU in the space sector has been subject to limits, as it does not involve the harmonization of national laws, which has significant implications regarding national space legislation. In more detail, the legal picture is more nuanced than simple words; Space sits within the framework of shared Union competence, meaning that both the Union and the Member States may act, subject to the allocation of powers under the Treaties.[331] Article 189 TFEU gives the Union an explicit role to develop a European space policy and to promote joint initiatives, research and coordination. But it also contains important limits; notably, a provision that excludes harmonization of national laws under that specific Article. At the same time, Article 189 operates without prejudice to other Treaty provisions; consequently, where the objective and legal conditions are satisfied, the Union may rely on alternative legal bases (for example, Article 114 TFEU, the internal-market harmonization clause) to adopt measures that may lead to a degree of approximation among national frameworks. It follows that if the objective and scope of an act are primarily aimed at achieving other competences of the Union, such as the internal market, legislative harmonization is possible on the basis of alternative legal bases. This explains the complexity of the doctrine on the correct classification of the competence of the EU on space and the

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[330] EUR-Lex, *Consolidated Versions of the Treaty on European Union and the Treaty on the Functioning of the European Union.* 2016. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A12016ME%2FTXT.
[331] See Alberto Miglio et al., *Space and Defence: A Hybridisation of EU Space Policy and CSDP* (Turin: Centro Studi sul Federalismo, 2024), 9–12, https://www.fondazionecsf.it/images/2024/Research-paper/CSF-RP_EU-Space-Policy_Miglio_Grossio_Civitella_Nota_Penna_Dec2024.pdf

sensitivity of the choice of a legal basis for new Union space policies. In this context, and continuing with the discussion of the previous paragraph, Article 189 TFEU grants the Union an express mandate for developing a European space policy, promoting joint initiatives, supporting research and technological development, and coordinating activities in the exploration and use of outer space. Yet, in contrast with other shared competences listed under Article 4(2) TFEU (Consumer Protection, Transport, Energy, and Area of freedom, security and justice…), this competence is structurally restricted by the express exclusion of harmonization under Article 189(2) TFEU. As a result, even where the Union acts, Member States keep a broad regulatory autonomy, producing a distinctive model of shared competence characterized more by coordination and support than legislative approximation.[332] This specific configuration has led several scholars to question whether EU space competence[333] should be understood as a conventional shared competence or as a *sui generis* form of Union action, a doctrinal debate that will be examined in greater detail in the second part of this thesis.

2. EU Regulation (2021/696): Establishing the European Union Space Programme

In the process of development of EU Space Law, an important milestone was reached through the adoption of Regulation (EU) 2021/696,[334] wherein, for the first time, the competence of the Union in the space area, pursuant to Article 189 TFEU, found practical application. It is not about the implementation of yet another program; this Regulation should rather be seen as part of an overall effort by the European Union concerning its space legislation. In this respect, it may be regarded as a normative and institutional turning point. Firstly, the Regulation provided for the establishment of the European Union Space Programme for the entire period of the 2021-2027 Multiannual Financial Framework, setting up a single legal and financial base for all the activities of the Union related to space matters. Its budget amounting to EUR 14.880 billion is the biggest financial resource ever invested in the space field by the Union.[335] In terms of institution building, the creation of the European Union Agency for the Space

[332] Utko-Maslyanyk, Yuliia, Anastasiia Zubareva, Viktoriia Gutnyk, Iryna Bratsuk, and Viktoriia Kuzma. *"Legal Framework of the European Space Policy." Evropský politický a právní diskurz* 11, no. 5 (2024): 5–14. https://doi.org/10.46340/eppd.2024.11.5.1.

[333] Sánchez Aranzamendi, Macarena. *Economic and Policy Aspects of Space Regulations in Europe: The Case of National Space Legislation – Finding the Way Between Common and Coordinated Action.* Vienna: ESPI, 2009. https://www.espi.or.at/wp-content/uploads/espidocs/Public%20ESPI%20Reports/espi_report_21.pdf; Mazurelle, Florent, Walter Thiebaut, and Jan Wouters. *"The Evolution of European Space Governance: Policy, Legal and Institutional Implications." International Organizations Law Review* 6, no. 1 (2009): 155–189. https://doi.org/10.1163/157237409X464233, cited in Utko-Maslyanyk et al., *"Legal Framework of the European Space Policy."*, .

[334] European Union, *Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 Establishing the Union Space Programme and the European Union Agency for the Space Programme and Repealing Regulations (EU) No 912/2010, (EU) No 1285/2013 and (EU) No 377/2014 and Decision No 541/2014/EU.* 28 April 2021. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32021R0696.

[335] Article 11, Regulation establishing the Programme and EUSPA.

Programme is a crucial turning point from the limited sphere of activity of the European GNSS Agency into a wider sphere that covers the entire Space Programme.[336]

Lastly, from the temporal perspective, the entry into force of the Regulation is linked with 12 May 2021;[337] nevertheless, due to retroactivity, which applies the regulation to the beginning of the year when the Multiannual Financial Framework started, it is possible to see an example of functional legal continuity. Notably, the introduction of Regulation (EU) 2021/696 should be viewed against the backdrop of a more extensive process that originated from the Space Strategy for Europe.[338] In this regard, the European Commission highlighted the strategic significance of the space industry, considering the growing competition and the technological shift worldwide. The continued backing from the European Parliament[339] and the Council[340] of the European Union further underscored the need for enhanced cooperation and synergy between the space efforts undertaken by the EU,[341] leading to the enactment of the legislative proposal in 2018.[342]

Apart from its practical importance, the Regulation also holds great legal importance for resolving the long-standing problem of fragmentation in EU space law. Before the implementation of the Regulation, there was no comprehensive legal framework regulating space activities within the EU; rather, space-related actions were managed using legal bases other than Article 42(3) TEU, such as Article 172 TFEU, especially in terms of heritage programs like Galileo and EGNOS,[343] which existed before the EU's recognized competencies in space activities. Through Regulation (EU) 2021/696, space law can be viewed as an autonomous legal field within the EU legal system.[344] In light of this, it's worth mentioning that this autonomy is not only evident in the availability of its own legal foundation but also in the rising degree of coherence within the legal regime that oversees space activities. The consolidation of formerly fragmented laws into one coherent law regime results in better systematization and functionalization of the regulation process. This also helps to minimize norm overlap and makes it possible for the EU to define its regulatory goals precisely, taking

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[336] Hajdúk, Roman, "*The European Union as an Actor of International Space Law*." Diploma thesis, Charles University, 2023, p 11, https://dspace.cuni.cz/bitstream/handle/20.500.11956/184149/120451204.pdf?sequence=1&isAllowed=y

[337] Article 111, Regulation establishing the Programme and EUSPA.

[338] European Commission. *COM (2016) 705 Final.* 26 October 2016. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2016%3A705%3AFIN.

[339] Council of the European Union, *Council Conclusions on "A Space Strategy for Europe."* 30 May 2017. https://data.consilium.europa.eu/doc/document/ST-9817-2017-INIT/en/pdf.

[340] European Parliament, *Resolution on a Space Strategy for Europe.* 12 September 2017. https://www.europarl.europa.eu/doceo/document/TA-8-2017-0323_EN.html.

[341] European Commission. "EU Space Strategy for Security and Defence." Accessed February 27, 2025. https://defence-industry-space.ec.europa.eu/eu-space/eu-space-strategy-security-and-defence_en

[342] European Commission, *COM (2018) 447 Final.* 6 June 2018. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2018%3A447%3AFIN.

[343] See, European Union. *Regulation (EU) No 1285/2013 of the European Parliament and of the Council on the Implementation and Exploitation of the European Satellite Navigation Systems, Galileo and EGNOS.* 11 December 2013. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013R1285,
European Union. *Regulation (EU) No 912/2010 of the European Parliament and of the Council Setting Up the European GNSS Agency.* 22 September 2010. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32010R0912; Hajdúk, "*The European Union as an Actor of International Space Law*."

[344] Hajdúk, "*The European Union as an Actor of International Space Law*." p 12.

into consideration the unique nature of space activities. On the other hand, the emergence of such a phenomenon is also one of the indicators showing how the legal system of EU space law evolves in the direction of increasing its importance in the legal order of the EU. It provides greater legal consistency of application and increases the level of certainty of actions for institutions and stakeholders within the space community of the EU. Accordingly, here autonomy for the author does not mean full independence of space law from other branches of the legal order, but only their higher degree of consolidation and ability to function autonomously while still remaining a part of the general legal order of the EU. Nevertheless, at the present stage, the autonomy of space law is still developing rather than having been achieved. Indeed, the new initiative on a unified EU space law is likely to continue its trend, filling any regulatory lacunas that are left, which will be further discussed.

II. Institutional Legislation of Space Activities in the EU: A Dual-Agency Model

The activities of Europe's space sector are coordinated by two key organizations that have different mandates; The European Space Agency is an international organization that unites the Member States of the EU and states outside the EU, with its key mandate focusing on technical development, science, and space exploration, and is independent from EU regulation **(1)**. Concurrently, the European Union Agency for the Space Program operates under the institutional framework of the EU under Regulation (EU) 2021/696 and assists in the operational management, security, and services of EU space programs, such Galileo, Copernicus, GovSatcom, SST, Iris^2, and other space-related activities to support the Union's space policy and security **(2)**. This shows that despite their legal status and different mandates for their activities, they work hand in hand through an agreement to promote space activities within Europe. However, this has led to a dual governance structure, which, unfortunately, presents an institutional fragmentation **(3).**

1. Framework Agreement Between ESA and the EU (2004)

The European Space Agency is an independent intergovernmental organization. It functions separately from the European Union, though it is associated through specific agreements. These are very important in the context of the legislative framework of European Space Governance.[345] ESA's legal basis is set out in a Convention for the Establishment of a European Space Agency, signed in 1975 and entered into force in 1980. This Convention provides autonomy to ESA, outlining its mission: "*Fostering cooperation among its members, particularly among non-EU countries such as the UK, Norway, and Switzerland, in space research, technology, and applications*."[346]

[345] European Space Agency. "ESA and the EU." *ESA*, February 26, 2024. https://www.esa.int/About_Us/Corporate_news/ESA_and_the_EU.

[346] European Space Agency. "ESA Convention." *ESA*, accessed February 4, 2025. https://www.esa.int/About_Us/Law_at_ESA/ESA_Convention.

In 2004, the signing of the Framework Agreement between ESA and EU became an important landmark in strengthening their relationship. This agreement is a key basis for cooperation whereby the partnership is framed, and projects, among others, are initiated.[347] For example, the Galileo satellite navigation project has received technical input from ESA while overall political direction and funding are from the EU; Copernicus, on the other hand, brings ESA technical delivery into EU policy goals on climate monitoring and environmental objectives.[348] Practically, ESA is the technical authority for setting up space programs while the EU is the political layer assuring such programs are strategically decided on.[349] The ever-growing cooperation between the EU and ESA which became more pronounced at the turn of the century has emphasized the need for a solidified relationship. The 2004 Framework Agreement was drafted to regulate fundamental issues of cooperation, such as purpose, principles, and areas of common space activity. For each initiative, the implementation of specific programmes or initiatives requires separate implementing or ad hoc arrangements concluded between the parties.[350]

As noted, the Agreement regulates fundamental aspects of EU-ESA cooperation such as purpose, principles, and the fields of common space activities, and it provides for various forms of cooperation (i.e., (i) ESA managing projects for the EU, (ii) the EU participating in ESA optional programmes, (iii) joint coordination and funding of initiatives, (iv) the creation of joint subsidiary bodies, and (v) promotion of education, exchange, and support of scientific and technical personnel or equipment)[351] . As a result, cooperation under the EU-ESA framework extends across all fields of space activities; including science, technology, earth observation, navigation, satellite communications, human space flight, micro-gravity research, launcher development, and spectrum policy issues, and may be structured through various arrangements, whether by ESA managing projects for the Union, the Union participating in ESA optional programmes, jointly coordinated and funded activities, or the creation of joint subsidiary bodies.[352] The Agreement also created the Space Council; a joint ministerial-level body dedicated to facilitating political dialogue and aligning the objectives of both bodies, which held annual meetings between 2004 and 2011.[353] After an eight-year pause,[354] the next formal meeting took place in 2019, with the latest held in 2020; while no official explanation has been provided, this gap is likely linked to the sometimes unharmonious relationship between the two organizations.

Notably, The principle of 'geographical return' (Juste retour or fair return)[355] aims to ensure that industrial contracts awarded within ESA Programmes broadly reflect Member States'

[347] Frans G. von der Dunk, *The European Union and the Outer Space Treaty: Will the Twain Ever Meet?* (Publisher, 2017), 80.
[348] Ibid.
[349] von der Dunk, ed. *Handbook of Space Law*.
[350] Ibid.
[351] Article 5, Framework Agreement of 2004; von der Dunk, ed. *Handbook of Space Law*, .
[352] See Arts. 3 & 5(1) respectively, Framework Agreement, *supra* n. 222.
[353] Article 8, Framework Agreement of 2004.
[354] SpaceNews, *"EU, ESA Revive Joint Space Council After Eight-Year Pause."* Accessed February 11, 2025. https://spacenews.com/eu-esa-revive-joint-space-council-after-eight-year-pause/.
[355] Article 5, Framework Agreement of 2004.

financial contributions.[356] This principle has been criticized in policy and academic debates for potentially limiting industrial efficiency and competitiveness.[357] Recent European competitiveness analyses, including the Draghi Report, have highlighted how fragmented procurement structures may affect the global competitiveness of the European space industry.

Therefore, ESA intends to resolve this problem and make the policy simpler as part of its plans under the new approach called "fair contribution". The model stipulates that the member states will contribute according to the outcome of competitions held for projects and not in the strict allocation to projects. While writing this thesis, ESA Director General Josef Aschbacher announced that the agency aims to refine geographical return policies in 2025, before the ministerial meeting due to be held in November. The new facility will first be tested in the European Launcher Challenge, intended to promote the development of new European launch vehicles.[358]

Although ESA is not directly subject to EU law, the EU Space Regulation (2021/696) explicitly names ESA as a key partner in the operationalization of the EU Space Programme. The Regulation provides a basis for ESA to exercise its responsibilities in terms of the implementation of technology, while at the same time acknowledging the EU's priorities, which include sustainability, security, and economic competitiveness, as it incorporates the expertise of ESA in the initiatives led by the EU without infringing its autonomy. This is expressed in Article 31 of the Treaty, Cooperation of the European Commission with ESA and the European Union Agency for the Space Programme, which stipulates that the ESA is tasked with carrying out certain aspects of the Programme on behalf of the Union.[359]

2. The Legal Framework Governing EUSPA And the Layered Institutional Structure

In 2021, in accordance with the previously outlined EU Space Regulation 2021/696, in response to space playing an increasingly growing role in fulfilling the EU's strategic objectives, competitiveness, sustainability, and security. The European Union transformed the former European GNSS Agency (GSA) into EUSPA, which became operational on 12 May 2021. While the GSA had primarily supported the operational exploitation, security accreditation, and market uptake of Galileo and EGNOS.[360] The new framework expanded its mandate to cover a broader range of EU space programme components. EUSPA, as established as an EU Agency having its legal personality and the widest legal capacity under national laws.[361]

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[356] See, Hobe Stephan, Martina Hofmannová, and Jan Wouters. *A Coherent European Procurement Law and Policy for the Space Sector: Towards a Third Way*. Münster: LIT Verlag, 2011. https://www.researchgate.net/publication/272725524_A_Coherent_European_Procurement_Law_and_Policy_for_the_Space_Sector.

[357] Masson-Zwaan, Tanja, and Mahulena Hofmann. *Introduction to Space Law.* 4th ed. Leiden: Wolters Kluwer, 2019, p. 64.

[358] Jeff Foust, "ESA to Use Launch Competition to Test Georeturn Reforms," *SpaceNews*, January 8, 2024, https://spacenews.com/esa-to-use-launch-competition-to-test-georeturn-reforms/.

[359] Article 31, *Regulation (EU) 2021/696.*

[360] European Union Agency for the Space Programme (EUSPA). 2025. "About EUSPA." Accessed February 12, 2025. https://www.euspa.europa.eu/about/about-euspa.

[361] Hajdúk, "The European Union as an Actor of International Space Law." .

Apart from the enlarged mandate, EUSPA plays a very important role in ensuring that the Programme is working together with the EU's strategic priorities of sustainability, security, and economic growth.[362] The European Commission shall supervise the overall Programme, while EUSPA shall manage specific Programme components, particularly satellite navigation and secure communications.[363] Then, to maintain this balance between technical expertise and EU supervision, cooperation with ESA is formalized in a manner that assures innovations serve strategic goals rather than develop in isolation.[364] Finally, the Agency is tasked with procurement and service continuity, thereby ensuring Europe has independent and reliable access to space-based services.[365] By merging operational management with wider policy objectives, EUSPA enhances the international profile of the EU in the field of space and makes its space sector more efficient and competitive. In light of this, in addition to regulatory fragmentation at the treaty and legislative levels, the existing space governance framework in Europe is also shaped by deeper institutional fragmentation; The coexistence of the intergovernmental and the Union legal instrument produced a dual governance architecture, if we may say, embodied respectively by ESA and the EU institutional framework, which comprises EUSPA. While the 2004 Framework Agreement has established mechanisms of cooperation rather than integration, Article 189 TFEU granted the Union an explicit policy role, without decisively harmonizing national or intergovernmental competencies. Moreover, the previously mentioned Regulation (EU) 2021/696 reinforced the operational role of Union institutions through program implementation and the creation of EUSPA, without replacing ESA’s technical and programmatic authority. This situation has given rise to a layered institutional structure in which responsibilities are distributed across parallel entities, creating overlapping mandates, complex coordination requirements, and legal ambiguity for operators navigating between intergovernmental and Union frameworks.

At the same time, notwithstanding the diversity of the regulatory landscape, there are some cross-cutting regulatory logics identified across the wider landscape of the regulation of space in Europe, including authorization and supervisory obligations under Article VI of the OST, as mentioned in the previous chapter, and the increasing concern for dual-use technologies. The specific constellation of the dual agency ESA/EUSPA is reminiscent of the governance patterns found in other highly fragmented regulatory regimes: a fragmenting effect that parallels the wider patterns of divergence found across the regional landscape. Focusing on some of these topics rejuvenates the analytical relevance of institutional fragmentation and demonstrates how regulatory issues are not limited to legal diversity but also involve structural complexity, which is highly relevant to the feasibility of the development of a unified form of EU space law that might hope to capture the complex interplay between the institutional, the regulatory, and the operational. This will be answered in the last chapter of this thesis.

[362] Article 2, *Regulation (EU) 2021/696.*
[363] Article 30, *Regulation (EU) 2021/696.*
[364] Article 31, *Regulation (EU) 2021/696.*
[365] Article 35, *Regulation (EU) 2021/696.*

3. Agencification and the Institutional Design of EU Space Governance

At this point it is important to mention that the evolution of EU governance has, accordingly, featured a process of "Agencification" not mainly in the space sector (such as The European Environmental Agency (EEA) established in 1993, The European Aviation Safety Authority (EASA) established in 2002, The European Union Agency for Railways..) that captures the broader trend of decentralized and networked forms of regulatory administration, as opposed to centralized and institutional forms of governance, they could be also considered as "*inbetweener*".[366] From the standpoint of the broader EU model, the EU agencies thus operate as intermediary actors located between the European institutions, national governments, and sectoral stakeholders.[367] Instead of a hierarchical administrative system comparable to national ministerial systems, a composite framework of EU governance exists where responsibilities remain essentially shared in the EU and national contexts. The implications of the EU governance model are thus for the governance of the European space sector where a proliferation of agencies and intergovernmental bodies exists. The theoretical framework for the role of EU agencies clearly describes the hybrid role of the agencies as being at the center of a triangular structure of governance with the EU, national governments, and the market.[368] This framework provides insight into how that trend can be found with space governance, at the current level between EU agencies, intergovernmental organizations like the European Space Agency, national space authorities, and the European Commission itself. Instead of an instance of pure institutional fragmentation, this setup reflects a deeper EU administrative rationale in which agencies assume their role as nodes of coordination in a complex ecosystem of regulation. In most cases, their tasks would include the development of technical standards, operational support, risk assessment, and assistance in policy implementation, leaving strategic decision-making powers distributed across levels.[369]

Moreover, the development of EU agencies has shown that competencies are doled out via sectoral mandates subject to political compromise and Member State sensitivities related to sovereignty and regulatory oversight. Agencies may be given monitoring or inspection responsibilities, but they seldom possess direct enforcement powers, which further reinforces shared governance qualities in the EU. All these contribute to flexibility and complexity within the EU space regulatory environment, while the presence of several specialized bodies fosters technical expertise and shared governance, but may also produce coordination difficulties and overlapping mandates.[370]

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[366] László Szegedi, "The Role of EU Agencies – Autonomous or 'Inbetweener' Bodies in Light of Agencies' Inspection Power over National Authorities?" *Annales Universitatis Scientiarum Budapestinensis de Rolando Eötvös Nominatae, Sectio Iuridica* 56 (2017): 161–172, https://www.ajk.elte.hu/dstore/document/164678/11%20ELTE_AJK_Annales_2017%20Szegedi.pdf (accessed February 12, 2026).

[367] Ibid.

[368] See, Kaeding and E. Versluis, "EU Agencies as Solution to Pan-European Implementation Problems," in *European Agencies in between Institutions and Member States*, ed. M. Everson, C. Monda, and E. Vos (The Netherlands: Wolters Kluwer International BV, 2014), 73–87.

[369] Szegedi, "The Role of EU Agencies – Autonomous or 'Inbetweener' Bodies in Light of Agencies', .

[370] Ibid.

In consequence, the institutional landscape of EU space governance is best conceptualized not in terms of fragmentation but, rather, as an example of the networked and composite forms of administration that are characteristic of the EU regulatory practice more generally. The coexistence of plural agencies and actors represents conscious governance choices under conditions of limited competencies, shared sovereignty, and imperatives toward technical specialization. It may slow down decision-making in comparison with more centralized models, but often allows for cross-sector coordination and the incorporation of expertise from across the European space ecosystem. However, the question remains whether the EU will make another space agency along with ESA and EUSPA? And what if the space sector could not be governed under the "Agencification" method?

III. Other EU regional legislation governing different activities related to the space sector

This section attempts to illustrate other significant regional norms that are pertinent to the activities of the space industry within the European Union. However, we need to keep in mind that as many of these legislations are "*Not technically speaking in space perhaps, but certainly with respect to, and having a great impact upon, relevant activities in outer space.*"[371] In other words, these are not "space law instruments" strictly speaking, they are sectoral internal-market and data governance measures indirectly regulating space-enabled services. We shall do so by focusing on the legislative frameworks applying to space technology plus telecommunication **(1).** We will move on to delve into the environmentally friendly policies and regimes **(2)**, which the orbiting industry follows, and eventually to export and dual-use products, stringent regime limitations as imposed by the Union **(3)**. Furthermore, the additional question of how data protection and cybersecurity are ensured in the space context **(4).** Finally, the aim for reinforcing the research and innovation of the space sector **(5)** within the EU could be criticized for not only being into one unified policy but also not directly covering the space sector in some cases.

1. Space Technology and Telecommunications

A. Telecommunications Framework Directive

In 2009, the European Union reconciled its telecommunications regulatory framework through Directive 2009/140/EC,[372] which elaborated on and refined the existing rules set by the 2002 directives (Directives 2002/21/EC, 2002/19/EC, and 2002/20/EC) aiming at an improved spectrum allocation, market access, interconnection and authorisation of electronic

[371] von der Dunk, ed. *Handbook of Space Law*.
[372] *Directive 2009/140/EC of the European Parliament and of the Council of 25 November 2009 Amending Directives 2002/21/EC on a Common Regulatory Framework for Electronic Communications Networks and Services, 2002/19/EC on Access to, and Interconnection of, Electronic Communications Networks and Associated Facilities, and 2002/20/EC on the Authorisation of Electronic Communications Networks and Services.* Official Journal of the European Union L 337/37, December 18, 2009. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0140.

communications networks and services.[373] Authorizations, unlike the others, were to be technology and service neutral, and radio frequencies were to be allocated efficiently and fairly to support cross-border competition in enhanced consumer benefits like better service quality and lower costs. With fast-moving technology, growing broadband, new 5G replacing old services, and more digital services, much regulation soon demanded a complete overhaul. The European Electronic Communications Code (EECC) was adopted on 11 December 2018 by the Directive (EU) 2018/1972[374] as an answer to these important and overhauling developments in the field within a single legislative instrument amending the Directive 2009/140/EC. The original intention of the EECC was to propel and promote a unified, competitive, and secure internal market for electronic communications.

Nevertheless, some of the Directive (EU) 2018/1972 critical provisions are of significant importance to space technology and telecommunications: Article 2 defines "*electronic communications networks*"[375] from a technology-neutral perspective, which, along with fixed and mobile infrastructure, applies to satellite networks. This means that space services will also work under the same regulatory framework along with terrestrial networks, thus facilitating the development under harmonized rules of access and interconnection. Article 9 regarding spectrum management requires Member States to allocate and manage the frequencies in an objective, transparent, and non-discriminatory manner, which is a primary condition of satellite communications that require internationally coordinated spectrum bands. Harmonized spectrum policies would ensure cross-border complementarity and help interoperability with space-based services.[376]

Under the same directive, a technology-neutral market entry and authorization is created[377], thus treating terrestrial and satellite networks equally. By preventing specification of preference, the "EECC" will stimulate investment in innovative systems for satellites. National regulatory authorities would also establish explicit and proportionate conditions for rights of use, especially on the spectrum assigned to space services, thus ensuring an efficient provision of space technology. It extends another dimension to regulatory harmonization through strengthening the distance of independence of national regulatory authorities and enhancing the role of the Body of European Regulators for Electronic Communications (BEREC).[378] This coordination is particularly important for satellite networks, which operate naturally in different jurisdictions due to their geographic coverage. Consistency in regulation across the EU facilitates investment and improves international cooperation in space telecommunication.[379]

[373] Tsatsou, Panayiota. 2011. "EU Regulations on Telecommunications: The Role of Subsidiarity and Mediation." *First Monday* 16 (1). https://doi.org/10.5210/fm.v16i1.3150.
[374] *Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 Establishing the European Electronic Communications Code (Recast).* Official Journal of the European Union L 321/36, December 17, 2018. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=legissum:4379983.
[375] Article 2, *Directive (EU) 2018/1972.*
[376] Article 9, *Directive (EU) 2018/1972.*
[377] Parts II & III, *Directive (EU) 2018/1972.*
[378] See, Parcu, Pier Luigi, and Elda Brogi, eds. *Research Handbook on EU Media Law and Policy*. Cheltenham, UK: Edward Elgar Publishing, 2021. https://www.elgaronline.com/edcollchap/edcoll/9781786439321/9781786439321.00013.xml
[379] Articles 5-7, *Directive (EU) 2018/1972.*

Furthermore, Articles 12 to 14 also cover consumer rights and network security. Although the consumer rights discussed in those articles apply principally to users, they also indeed concern space-based services. The directive requires and enforces a rigorous set of security standards along with clear rules about service quality to ensure that satellite communications, which are often critical for infrastructure, emergency response, and remote connectivity, maintain a very high reliability and resilience to cyber threats. In this context, the EECC not only provides a foundation for laying down clear regulatory principles but also promotes fair allocation of spectra as well as technological neutrality, by which space-based telecommunications are expected to further their continued development in a stable, competitive environment.[380]

However, the critics for the EECC note that this technology-neutral approach, as in Article 2, and Article 9 for harmonized spectrum management rules, indeed has the intention of developing a truly internal market, but such broad measures often caricature the uniqueness of the technical problems posed by space-based networks. For instance, they insist, orbital dynamics, latency, and the requirement for internationally coordinated spectrum allocations present unique problems for satellite communications that need to be met with particular regulatory solutions rather than a generic framework.

B. Radio Spectrum Policy Programme

While this study in question is not a legally binding framework like a directive or regulation. It is intended to guide policymakers by providing an in-depth assessment of the current Radio Spectrum Policy Programme (RSPP), identifying challenges and proposing future scenarios for spectrum management within the EU.[381] While it offers recommendations based on the principles set out in existing legal instruments such as the EECC, it does not itself have the force of law. The study on the Radio Spectrum Policy Programme investigates the EU's management of the radio spectrum as an important resource, either terrestrial or space, in view of providing an exhaustive scientific basis to policymakers for decision-making. It demonstrates the present RSPP Decision, decided in 2012, is an old one; its objectives, for instance, the Digital Agenda for Europe, have failed, and then there are doubts as to whether it can support the EU's digital transformation and internal market development as well as answer its geopolitical challenges.[382] This shows that the RSPP Decision is in sore need of revision in order to strengthen the EU's sovereignty in the management of spectrum from one common market perspective while assuring an efficient spectrum also from both present and future perspectives, including those of space-based communication. The assessment comprises an in-depth analysis describing the current state of application of the RSPP Decision.[383] The analysis finally concludes with a need for EU-level coordination to put in perspective updating obsolete objectives and achieving in-time delivery of the ambitious targets specified in the Digital Decade policy programme (2030) with an aim to lifting national constraints, minimizing market fragmentation (especially in satellite licensing), and fostering a concerted approach to

[380] Articles 12-14, *Directive (EU) 2018/1972.*
[381] European Commission. *Radio Spectrum Policy Programme: Executive Summary*. April 22, 2024. https://digital-strategy.ec.europa.eu/en/library/study-radio-spectrum-policy-programme-taking-stock-and-discussing-future-scenarios.
[382] Ibid.
[383] Ibid.

spectrum management in support of emerging technologies such as 6G and consolidating the overall governance umbrella for terrestrial and space-based telecommunications.[384]

2. Environmental and Sustainability Frameworks

Taking into consideration the need for environmental sustainability in space law, Article IX of the Outer Space Treaty makes it clear that due regard must be given to other states, and harmful interference must be avoided. While the EU Green Deal **(A)**, Environmental Impact Assessments (EIAs) **(B)**, and the EU Taxonomy Regulation **(C)** outline broader environmental policies, their principles have increasingly begun to be applied to sustainability efforts relating to outer space and the Zero Debris Charter **(D)**. Such developments indicate the growing systematic relationship between land-based environmental governance and sustainable space activity.

A. EU Green Deal

The European Green Deal[385], which aligns with the aim of climate neutrality by 2050,[386] turns attention to constraints on the economy, emphasizing the requirement for a clean, circular, and low-carbon economy. It further identifies the requirement to have greenhouse gas emissions cut down significantly across all sectors, including aerospace. In doing so, the space industry will promote cleaner propulsion technologies, increase fuel efficiency, and lower the carbon footprint of launching activities. These actions thus support the Green Deal objective of sustainable transformation of transport systems and reduce emission impact to the environment. The circular economy, which is provided by the Green Deal, might not directly address the issue of space debris; however, its advocacy is quite pertinent to activities in space. It emphasizes minimized waste and maximized resource use and end-of-life product management. The underlying principles apply through designing satellites and spacecraft with end-of-life recovery and reuse capabilities, which move toward considerable loss prevention in debris overhead. Such practices further take a proactive step toward addressing the ever-increasing challenge of space debris and equipping a cleaner orbital environment.[387] In that sense, the Green Deal pushes for green innovation, which particularly targets the aerospace sector. Development and embedding of technologies which nurture not only the growth of economic activities but also cut down pollution will be encouraged under the Green Deal.[388] Among the guidelines, the space sector could invest in recyclable satellite materials, energy-efficient systems, and sustainable launch technologies. Thus, although the European Green Deal does not speak in particular terms about space activity, its sustainable objectives entail an

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[384] Ibid.

[385] European Commission. *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: The European Green Deal*. COM/2019/640 final. Brussels, 2019. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2019%3A640%3AFIN.

[386] European Commission. *Going Climate-Neutral by 2050: A Strategic Long-Term Vision for a Prosperous, Modern, Competitive and Climate-Neutral EU Economy*. Luxembourg: Publications Office of the European Union, 2019. https://op.europa.eu/en/publication-detail/-/publication/92f6d5bc-76bc-11e9-9f05-01aa75ed71a1.

[387] Section 2.1.3, *The European Green Deal.*

[388] Section 2.1.4, *The European Green Deal*.

integrating framework to embed environmentally responsible practice within the space sector. Such practice includes debris management, as well as promotion of sustainable technologies.

B. Environmental Impact Assessments

The Directive 2014/52/EU[389] on Environmental Impact Assessments (EIAs) set out a broad framework for undertaking detailed assessments for projects with likely significant adverse effects for the environment, and one may say that, though it did not work solely for space activities, its provisions can certainly be applied in cases like the construction and operation of launch sites and other relevant space infrastructures. In our case, an EIA has to be done for any project having the potential to drastically affect the environment.[390] From the perspective of space, this means that land use-related investigations and evaluations regarding construction, hazardous propellant use, noise, and emissions must consider any potential effects to local biological ecosystems and the environment from facilities such as spaceports and launch sites. The evaluations consider both land-based impacts as well as impacts that could possibly occur upon the near-Earth space environment issues pertaining to emissions during launches that may contribute to atmospheric pollution or generate space debris indirectly in particular.[391] When applied in practice to activities in relation to space, the Directive induces the design and operation of launch sites, such as the spaceport, with the least harm in mind. A reflection here could be whether the upcoming space law will insist on applying EIA for space activities.

C. EU Taxonomy Regulation

Developed as a comprehensive framework regarding the consideration of economic activity as environmentally sustainable, the EU Taxonomy Regulation (EU) 2020/852[392] primarily targets sectors that relate directly to Earth environments; its technology-neutral design means, in theory, that the same criteria can be equally applied to innovative activities in space-satellite technologies, space exploration, and Earth observation systems, which fall under the environmental objectives of the EU. In the interpretation of Article 3 of the Regulation,[393] one might consider an economic activity to be environmentally sustainable if it (a) contributes to a considerable degree towards one or more environmental objectives (listed in Article 9) or (b) does no significant harm (DNSH) to any of those other objectives, and (c) meets minimum social safeguards, and (d) meets the technical screening criteria evolved by the Commission. Though not expressly mentioned in the text of the Regulation, these criteria under this provision are broad and technology-neutral enough to accommodate any activity that could demonstrate a considerable contribution to environmental goals, such as climate change mitigation and adaptation.[394] Earth observation systems and satellite technologies play a key role in

[389] European Union. *Directive 2014/52/EU of the European Parliament and of the Council of 13 October 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment*. OJ L 268/15, 2014. https://eur-lex.europa.eu/eli/dir/2014/52/oj/eng.

[390] Article 1, *Directive 2014/52/EU.*

[391] Article 3, *Directive 2014/52/EU.*

[392] European Union. *Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088*. Official Journal L 198/13, 22 June 2020. https://eur-lex.europa.eu/eli/reg/2020/852/oj/eng.

[393] *Regulation (EU) 2020/852.*

[394] *Ibid*.

monitoring environmental change and supporting measures for climate adaptation. They serve as a means to gather data required in assessing climate risks and informing resource-efficient policies. These technologies support climate change mitigation, another one of the six environmental objectives stipulated under Article 9, because they provide timely and accurate real-time environmental information.[395] Additionally, by upholding the DNSH principle, these activities must also not create harmful impacts, such as high greenhouse gas emissions during satellite launch or excessive space debris incorporation. The technical screening criteria are being further specified by the drafting of delegated acts (as described in Articles 10 to 15)[396], and will thereby provide a mechanism for setting objective performance thresholds. If space activities can therefore show compliance with the threshold, they can be in line with the sustainability objectives of the EU. In practical terms, this may mean determining special criteria that will accommodate the particular environmental concerns of outer space operations, thus broadening the scope of the Taxonomy Regulation to include those operations outside traditional terrestrial sectors.

D. The zero debris charter

The growing worry about debris in outer space, which threatens both operational satellites and human spaceflight, fueled the creation of this Zero Debris Charter.[397] The more space-specific activities take place, the more debris they generate, consisting of defunct satellites and their fragments caused by collisions or disintegration.[398] Such an accumulation leads to collisions that tend to cause cascading trends, or in other words, Kessler syndrome; current missions become endangered, while long-term sustainability of space operations is jeopardized. The Zero Debris Charter was initiated by ESA under the Clean Space initiative in response to that challenge. It was developed through a consultation process among key players in the space industry, including national space agencies, operators in the commercial sector, academics, and international organizations. More important is how such multi-stakeholder dialogue captures a common commitment to even better best practices in the terms of debris mitigation and removal with regard to one coordinated approach throughout Europe.[399]

The Zero Debris Charter constitutes a clear example of a voluntary, cooperative attempt to address rising concern regarding the problem of space debris. Among the objectives of the Charter is fixing common principles and best practices on debris mitigation and management and thereby harmonizing efforts that will be translated into actions by its signatories. It enhances collaboration among space agencies, commercial operators, and national authorities, forming part of ESA's larger Clean Space initiative. [400] On the other hand, since the Charter is not legally binding, it is mainly an issue of the commitment of individual stakeholders. This non-binding aspect, however, reflects the current division regarding EU space law, whereby binding legal instruments are still not very common, compared to rules other sectors are putting

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[395] *Ibid*.
[396] *Ibid*.
[397] European Space Agency. *The Zero Debris Charter*. Accessed 18 February 2025. https://www.esa.int/Space_Safety/Clean_Space/The_Zero_Debris_Charter.
[398] *Ibid*.
[399] *Ibid*.
[400] European Space Agency. *Zero Debris Charter*. Accessed 18 February 2025. https://esoc.esa.int/sites/default/files/Zero_Debris_Charter_EN.pdf.

in place under the initiative of the European Green Deal. While the Green Deal is setting a firm sustainability agenda for activities on Earth, there remain voluntary frameworks that predominantly regulate space activities on debris mitigation issues.

Critics of this *status quo* argue that voluntary measures might lead to varying degrees of implementation across different Member States, as national regulations may differ in how they incorporate the Charter's recommendations. In the absence of a legally binding framework, there will be the danger that what emerges is a patchwork standard, sabotaging the very international effort to control space debris. Furthermore, on the international stage where space is treated as a global commons, voluntary agreements would fail to provide the enforcement needed to ensure uniform compliance and coordinated action among space-faring nations. In the future, a lot of experts suggest, the principles of the Zero Debris Charter have to be used as a stepping stone to more robust and binding regulations to be issued for space sustainability. With the incorporation of these voluntary standards into national laws and eventually into international treaties, a more coherent and effective regulatory regime would evolve. Such evolution would tie space activities into the EUs wider environmental and sustainable goals further providing for greater international cooperation in countering the existential crisis of space debris.

3. Export and Dual-Use Regulations

Regulation (EU) 2021/821[401] forms an important element of the EU's regulatory framework on controlling dual-use items-goods, technologies, and software that can be used for any civilian or military end-use. Although broad in scope with respect to dual-use technologies, it does include certain space-related technologies that could potentially support military missions with applications that are specific to satellite components, propulsion systems, and advanced communications technologies.

Article 2 of the regulation states, "Dual-use items" shall mean goods, software or technologies having legitimate civil applications, but which could also be used for military purposes.[402] This shall explicitly include space technologies, which might have strategic dimensions. As a result, any space technology having dual-use potential will be captured within the export control regime and undergo rigorous assessment prior to being exported. Dual-use technologies have stringent licensing used for both civilian space programs and military systems. Article 5 requires the exporters of controlled dual-use items, more importantly, space-related technologies, to procure a licensing agreement for their transfer. The licensing procedure involves an in-depth examination of the technical characteristics of the item, possible military applications for that item, and the end-use or end-user intended for that item to comply with international law obligations of the EU and to prevent the transfer of sensitive technologies in

[401] European Parliament and Council of the European Union. *Regulation (EU) 2021/821 of the European Parliament and of the Council of 20 May 2021 Setting Up a Union Regime for the Control of Exports, Brokering, Technical Assistance, Transit and Transfer of Dual-Use Items (Recast)*. Official Journal of the European Union, L 206, 11 June 2021, 1–68. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02021R0821-20241108

[402] Article 2, *Regulation (EU) 2021/821.*

unauthorized hands.[403] Article 6 provides that an exporter will first carry out a risk assessment to check that the technology will not be misused for military purposes violating the principles of the international non-proliferation and arms control agreements, keep records, and collaborate with regulatory authorities to resolve any discrepancies or indications of diversion risks.[404]
Annex I of Regulation (EU) 2021/821 provides a comprehensive list of controlled dual-use items which incorporates internationally agreed export controls. Within Annex I is Part XI - Category 9 related to "Aerospace and Propulsion"; The latter specifically includes launch vehicle components, propulsion systems, and telecommunications infrastructure in the context of space-related technologies.[405] For these reasons, those technologies need stringent export licensing and oversight because of their military end-use potentials.

Therefore, by including space-related technologies in its controlled lists and instituting the whole licensing process, Regulation (EU) 2021/821 serves as an effective tool through which the EU manages the export of sensitive space technologies in an international framework of non-proliferation and arms control.

4. Data Protection and Cybersecurity

A. General Data Protection Regulation (GDPR)

Regulation (EU) 2016/679,[406] the General Data Protection Regulation, applies in all territories of the EU, and is notably prescriptive for the space sector- for companies and organizations involved in satellite operations and remote sensing processing of personal data. According to Article 3 entitled "Territorial Scope", the unique aspect of this regulation is that it applies not solely to entities operating within the realm of the imposed GDPR but also to organizations located beyond the confines of the EU processing data belonging to individuals residing within the EU. This means, with far-reaching extraterritorial scope, that any satellite operator anywhere in the world will have to comply with the stipulations of the GDPR if it acquires geolocation data or high-resolution images capable of identifying persons.[407]

In this light, Article 4 "Definitions" provides a crucial definition of "personal data," which states that "*personal data means information relating to an identified or identifiable natural person.*" [408] High-resolution satellite images may capture faces or other identifiable features without the operator's knowledge, and such data will have to be processed in accordance with the fundamental principles on data processing laid down in Article 5 "Principles Relating to Processing of Personal Data", such as minimization, purpose limitation, and accuracy. Data collection will be limited to that which is necessary for designated purposes, such as

[403] Article 5, *Regulation (EU) 2021/821.*
[404] Article 6, *Regulation (EU) 2021/821.*
[405] Annex I, Part XI - Category 9, *Regulation (EU) 2021/821.*
[406] European Union. *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data (General Data Protection Regulation)*. Official Journal of the European Union, L 119, 4 May 2016, pp. 1–88. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016R0679.
[407] Article 3, *Regulation (EU) 2016/679.*
[408] Article 4, *Regulation (EU) 2016/679.*

environmental monitoring or navigation assistance, according to this approach.[409] Article 6 entitled "Lawfulness of Processing" provides the legal bases for the processing of personal data, and this will be from case to case, including when individuals give explicit consent for the space-based service provider when collecting data does not otherwise benefit from a legal basis in terms of contract performance or compliance with a legal obligation.[410] Article 32 (Security of Processing) further imposes a duty on controllers and processors to put into effect appropriate technical and organizational measures for protecting personal data. This is a matter of paramount importance to space-based systems as the long-distance and international transfer of these data would bring multiple angles to attack.[411] Robust protection in respect of data subjects' rights is assured through the GDPR by way of Articles 15-22, which confer rights of access, rectification, erasure, and restriction of processing. This should thus be made available for individuals at satellite operators through which these rights would be exercised, even when data were obtained through remote sensing.[412]

To summarize, even if the GDPR was not designed with the space sector specifically in mind, its omnipresent regime would have a direct impact on activities in space by creating heavy obligations upon any operator that processes personal data, given that such data may come from satellite imagery, geolocation, or any other space-based systems. Therefore, the Regulation acts in a way so that it ensures working with a very high data-protective standard, being appropriate with EU privacy ideals as space technologies advance and broaden their applications.

B. Cybersecurity Act

Regulation (EU) 2019/881[413] or the EU Cybersecurity Act is a legislation that can significantly improve the security of Information and Communication Technology (ICT) systems, especially for the space sector. ICT technologies include everything applied in processing, storing, or transmitting data, and this includes satellites, communication systems, and digital networks, which define the modern space operations. Since space systems are becoming more and more digitally oriented, safeguarding these complex systems against all kinds of threats emanating from cyberspace has taken centre stage. Thus, protecting space systems from the threats posed by cyber techniques is now the primary concern in view of the greater reliance of such systems on digital technologies.

As Article 8 establishes the framework for cybersecurity certification of ICT products, services, and processes, it presents an immediate purpose for the space sector, that being to oblige satellite operators and space organizations to ensure their ICT systems, such as satellite communication networks and ground stations, to meet EU cybersecurity certification standards. In other words, space operators must show that their digital infrastructure is secure

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[409] Article 5, *Regulation (EU) 2016/679.*
[410] Article 6, *Regulation (EU) 2016/679.*
[411] Article 32, *Regulation (EU) 2016/679.*
[412] Article 15-22, *Regulation (EU) 2016/679.*
[413] European Union. *Regulation (EU) 2019/881 of the European Parliament and of the Council of 17 April 2019 on ENISA (the European Union Agency for Cybersecurity) and on Information and Communications Technology Cybersecurity Certification*. Official Journal of the European Union, L 102, 26 April 2019, pp. 1–76. Available at: https://eur-lex.europa.eu/eli/reg/2019/881/oj/eng.

because its vulnerabilities could present gateways to cyberattacks on space operations that may interfere with providing satellite navigation, Earth observation, and communication services.[414] Article 3 goes a step further to establish the EU Agency for Cybersecurity (ENISA) as the agency that promotes coordination of cybersecurity among all sectors, including space.[415] By this coordination, ENISA is able to help space organizations with the necessary implementation of countermeasures on cybersecurity and share best practices throughout the industry. This enhanced role clarifies to the space operators about why they should comply with cybersecurity standards, as well as making it easier for them to adopt those practices in the space sector.[416]

Add to this, recently, the European Union adopted two most critical legislative instruments: Directive (EU) 2022/2555 on cybersecurity (NIS2)[417] and the CER Directive on the Resilience of Critical Entities[418]. The NIS2 Directive boosts cybersecurity standards in key sectors such as energy, transport, and space, while the CER Directive enhances the resilience of critical infrastructure, such as satellites, launch sites, and spaceports, to hazards like sabotage and natural disasters. Together, these regulations impose new obligations on space infrastructure operators, such as risk assessment, accident reporting, and service continuity but it also reinforce the fragmentation.

Conclusion of the chapter

While working on this chapter, it has become apparent that the fragmentation in European space law goes far beyond the above-mentioned differences on a national level. Of course, the above-mentioned fragmentation of space law on a level of Member States has attracted significant attention, yet another aspect of fragmentation has gone less often examined: this is the regional EU level of fragmentation in space law, which results from the co-existence of various actors and legal instruments such as the ESA, which is an intergovernmental organization in nature and includes both EU and non-EU Member States on the one hand, and the EUSPA, which is an EU institution strictly focused on the EU legal framework and responsible for the EU's operational programs such as Galileo, Copernicus, GovSatCom, and Iris^2. This dual system of agency creates a layered system of governance architecture that often leads to confusion and complexity for operators operating between intergovernmental and EU approaches. This duality echoes the horizontal fragmentation between the Member States and the vertical fragmentation between national and EU regulations.

This dual fragmentation has significant practical implications within European space activities, as regulatory needs must be met at national and EU levels, with some specific to space activities (such as Regulation (EU) 2021/696, EUSPA mandates) and others using general framework (such as NIS2, CER Directive, EU Green Deal, EU Taxonomy, Zero Debris Charter, data protection regulations). Although these generalist regulations play a crucial role in

[414] Article 8, *Regulation (EU) 2019/881.*
[415] Article 3, *Regulation (EU) 2019/881.*
[416] Article4, *Regulation (EU) 2019/881.*
[417] European Union, *Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 (NIS2 Directive)*, Official Journal of the European Union L 333, December 27, 2022, 80–152, https://eur-lex.europa.eu/eli/dir/2022/2555/oj.
[418] European Union, *Directive (EU) 2022/2557 of the European Parliament and of the Council of 14 December 2022 on the resilience of critical entities and repealing Council Directive 2008/114/EC*, Official Journal of the European Union L 333/164, December 27, 2022, 164–198, https://eur-lex.europa.eu/eli/dir/2022/2557/oj.

sustainability, cybersecurity, and critical infrastructure security and resilience, their application is particularly unspecific regarding space, contributing to legal uncertainty, increased complexity, and administrative burdens. In addition, there are issues regarding dual governance structures, a split regulatory base, that could hinder cross-border projects, hinder licensing, and challenge the EU's capability to speak with one voice when acting within international space governance, particularly when strategic flexibility is required, such as with mega-constellation deployments.

Yet, at the same time, this double challenge also opens up an opportunity. This is where a well thought out EU space law may move beyond simple regulation and lay down precise sector specific principles that integrate ESA's intergovernmental powers with EUSPA's operational role in the European Union. It may address issues of harmonization between authorization and supervision, sector-specific and general EU law, favoring mutual recognition of permits and including cross-cutting issues such as cybersecurity, environmental sustainability, dual-use technologies, and space debris. In all this, Europe may turn its obviously complex institutional structure into one that is at the same time coherent and also competitive and innovative in its character. In essence, it is not about simply overcoming coincidental legal complexities through incremental reform strategies. It is about fundamentally transforming European space law from one focusing on managing fragmentation into one that is unified, strategic, and most importantly, sector specific.

Chapter 3: Structured Space Law Governance in the U.S. and China: A Comparative Legal Analysis

The United States, the European Union, and the People's Republic of China are three of the main models that have significantly contributed to to the evolution of the contemporary space governance structures, and their approaches are significantly distinguished because of different legal, structural, and economic philosophies that have defined their practice on matters of regulation, state control, and risks. . The U.S. model, characterized by market liberalism and flexible regulation, favors commercial superiority and innovation. China, irrespective of the absence of a comprehensive and unified national outer space law, has followed a pragmatic and highly state-centric outer space regulatory system. Such a system, which features high levels of governmental regulation in outer space activities and strategic levels of industrial development and implementation plans, has allowed for high levels of technological advancement.

With the multi-level and structurally fragmented governance system of the EU for the space sector, the discussion turns to the comparison with the United States and China, offering a window of insight to new models for space regulation and the implications for a coherent approach, innovation, and positional strategy. A comparative approach thus creates greater awareness of how legal regimes both affect and are affected by the incremental development of the global space economy.

In setting the stage for this comparative analysis, this chapter will start by justifying the validity of such a comparison, as some may be against it **(I).** Then, it will proceed to study the fundamental legal frameworks in the U.S. **(II)**, China **(III)**, analyzing the differences in space governance regarding the EU. To conclude lastly, by suggesting policymakers for better global space governance **(IV).**

I. Justifying the comparison

Some people have argued that such a comparison underestimates the unique legal and institutional character of the European Union, a supranational and multi-level governance institution. The EU has persistently been described as "*sui generis*", a Latin term that means "*of its kind*", to underline the point that it does not neatly fit into traditional typologies such as international organizations or federal states.[419] But such a label has been criticized for failing to be explanatory. Legal scholars remind us that calling the EU *sui generis* is the risk of concealing rather than explaining its nature, since labeling something *"sui generis"* leaves a gap of understanding; none of the known systems do fit entirely.[420]

[419] Bard, Petra and Carrera, Sergio and Guild, Elspeth and Kochenov, Dimitry and Kochenov, Dimitry, An EU Mechanism on Democracy, the Rule of Law and Fundamental Rights (April 21, 2016). CEPS Paper in Liberty and Security in Europe, Available at SSRN: https://ssrn.com/abstract=2782340. See also,

[420] See, William Phelan, "What Is Sui Generis About the European Union? Costly International Cooperation in a Self-Contained Regime," *International Studies Review* 14, no. 3 (September 2012): 367–85, https://doi.org/10.1111/j.1468-2486.2012.01136.x.

Nevertheless, such analogies are a usual practice and analytically reasonable. Despite not being a state, the EU has developed a coherent space policy framework by virtue of Article 189 of the TFEU; As previously mentioned, it enables the EU to formulate space programmes like Galileo and Copernicus, enact binding legislation, and pursue strategic autonomy in space. The institution-making, such as the creation of EUSPA, improves the ability of the EU to act on an equal footing with national space agencies.[421]

Further, the comparative public policy and law analysis always places the EU in a comparative position to state actors. Indeed, as President of the CJEU, Koen Lenaerts states that a comparison between the EU's constitutional structure and federal structures such as the US authorities can help in the more complete comprehension of the EU's developing legal nature.[422] In light of this, the comparison of the EU's space policy and legal framework with those of the U.S. and China is therefore not only methodologically justified but also required to understand its diversified roles as a global space actor.

Another Important note is that the EU's new EU Space Act will also have major implications outside of Europe because it will not only apply to European operators but to any company offering satellite services in the EU market, including large U.S. providers, China and others. The extraterritorial application of the law will mean that foreign satellite companies will have to comply with EU standards or be locked out of one of the world's most profitable markets. By seeking to address issues like crowding in orbit and the proliferation of Mega constellations in low Earth orbit (LEO), the EU is signaling a dramatic regulatory shift with the potential to establish new global standards.[423]

II. U.S space framework

1. Institutions for Space activities in the United States

ESA was created as an intergovernmental organization to coordinate and execute cooperative European space programs, principally in scientific, technological, and industrial fields. In contrast to NASA, which was founded under conditions directly linked to Cold War geopolitical competition with the Soviet Union, NASA was specifically designed as a civilian agency focused on peaceful exploration and scientific progress, while U.S. space governance developed a parallel national security space system under the Department of Defense (DOD).[424] This led to the emergence of a twin institutional structure that combined civilian exploration with military and strategic space capabilities, one marked less by strict separation than by persistent civil-military coordination and technological interdependence.

[421] See chapter II of this thesis.

[422] Justin Lindeboom, "The Prospects and Perils of US–EU Comparative Constitutional Law: An Interview with President of the Court of Justice of the European Union Koen Lenaerts," *Columbia Journal of European Law* 30, no. 1 (2024): 157–181, https://doi.org/10.2139/ssrn.3782272.

[423] Michael P. Gleason and Catrina A. Melograna, "Anticipating the New European Union Space Law," *Space Agenda 2025*, Center for Space Policy and Strategy, The Aerospace Corporation, October 2024, https://csps.aerospace.org/papers/anticipating-new-european-union-space-law.

[424] Brandenburg, Matthea, and Sarah Lieberman. "Critical Spaces: European and U.S. Institutions for Outer Space." *Astropolitics* 20, no. 1 (2022): 93–111. https://doi.org/10.1080/14777622.2022.2098014 .

We may further note that this arrangement makes NASA somewhat different from the European space regime: NASA is an autonomous federal agency located in the United States, with a workforce of just under 18,000 as of 2022[425]; as an independent agency, NASA's budget and missions are administered by the President of the United States. The position of the administrator of NASA, the top executive in the organization, is appointed by the President and then confirmed by the U.S. Senate. On the other hand, ESA, its leader, the Director-General, gets elected by a vote of the member states on the ESA Council. Because of presidential nominations, the turnover of NASA's administration is sensitive to shifts in U.S. administrations, and every time a U.S. President takes office. Such a predictable transition poses perennial problems for the organization and budget in terms of stability, as well as for the long-range goals and objectives.[426]

The National Aeronautics and Space Act of 1958 is the very base on which NASA stands.[427] It states that NASA shall be concerned with research and technology for peaceful purposes. Indeed, the very first section of the Act states that, "*The Congress hereby declares that it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind.*"[428] This, the Act notes, "*shall be the responsibility of, and shall be directed by, a civilian agency exercising control over aeronautical and space activities sponsored by the United States*".[429] NASA does, therefore, share ESA's founding principle of the peaceful use of space governed through a civilian institutional structure. However, the NASA Act makes it quite clear that the U.S. must use space primarily for defence purposes and lays down in clear terms how NASA and DOD should be working together in space. Thus, the two components, security and defense, that are maintained by two different institutions, namely, the DOD and NASA, respectively indicate the very foundations of the current U.S. space program.

It is not only NASA that is involved in the national space enterprise in the United States. There are eight other government agencies with space budgets. These could include the National Reconnaissance Office (NRO), the National Oceanographic and Atmospheric Administrations (NOAA), the Department of Energy (DOE), the Federal Aeronautics Administration (FAA), the National Science Foundation (NSF), the Federal Communications Commission and the United States Geological Survey (USGS).[430] This illustrates that there is a much broader, larger space enterprise than is assumed when one looks only at NASA and DOD. It, thereby, shows the manifold nature of policy-making against the backdrop of space that NASA's hegemony and DOD's military space remit would suggest. The variety of US federal agencies active in the space field demonstrates not institutional fragmentation, similar to the EU model, but a functionally differentiated system of governance operating within a unified federal legal

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[425] NASA. "About NASA." Last modified February 11, 2022. https://www.nasa.gov/about/index.html.

[426] Brandenburg, Matthea, and Sarah Lieberman. "Critical Spaces: European and U.S. Institutions for Outer Space." .

[427] NASA**.** *National Aeronautics and Space Act of 1958 (Unamended).* Last modified July 29, 1958. https://www.nasa.gov/history/national-aeronautics-and-space-act-of-1958-unamended/.

[428] U.S. Congress. *National Aeronautics and Space Act of 1958, as Amended.* Published for the use of the National Aeronautics and Space Administration, 1958. https://history.nasa.gov/spaceact-legishistory.pdf.

[429] Ibid.

[430] Amadeo, Kimberly, and Ernesto Estevez. "NASA Budget, Current Funding, History, and Economic Impact." *The Balance*, 2020. Available at https://www.thebalance.com/nasa-budget-current-funding-and-history-3306321.

regime. In contrast to the EU/ESA dual regime, in which the separate institutional mandates result from the different legal frameworks and the concurrent political authorities involved, the US space enterprise is coordinated via unified national policy mechanisms and constitutional competence structurally arranged hierarchically.

Within the framework of our analysis, we observe that ESA and NASA have developed strong institutional foundations and consequently set up in various Acts which delineated expected institutional behavior and limits to the choices of each of the institutions. In particular, this relates to the intergovernmental, nonmilitary nature of ESA and the interinstitutional federal nature of NASA, both of which concur clearly with the "*exploration for all humankind*" agenda of each of the institutions.

As instances, both agencies underwent a series of transformations through the years, adapting to the evolution of technology and to the evolving needs of the ones they set out to serve; ESA undertook the development of Galileo and Copernicus, whereas NASA reallocated interest from Moon missions to other projects with perceived hegemony in contrast-presently shifting momentum back to Moon with Artemis, aiming to return human-crewed launch missions by 2025.[431] Neither case is impeded by the architectural constructs inherent in the institutional foundations. Yet, distinguishing the two institutions and the ways they do stuff takes one into major institutional factors. NASA was established as soft power projection during the Cold War and remains one set of hegemonic space agents. ESA was founded by sloughing space institutions for development and exploration collectively agreed upon by cooperating states seeking the same end-police, collaboration, peace, economic and political union through the EU. While the other institutional foundation has provided a navigating structure for the space exploration development of each space agency, politics impinge. This debate will prove to be more timely in the years to come as we begin subsequently observing the new space powers setting up their agencies, missions and measuring their success versus the contemporary ones mentioned here.[432]

2. The Genesis of U.S. Space Law and Its Codification

Exceptionally, the United States has determinedly coped and long held its position as a leading authority on space exploration. Just as hastily, the legal framework slowly establishes and solidifies to sustain an ever-growing industry involving both governmental and private initiatives. Rooted in the National Aeronautics and Space Act of 1958, this Act underwent several amendments through the passage of time as space operations became more complex and gradually and has gradually been codified under Title 51 of the U.S. Code[433] but supplemented by a collection of legislation. Unlike the EU still trying to establish a unified Space Law, U.S. law is profoundly consolidated, flexible, and relatively responsive to new challenges. However, they answer both in terms of strengths and weaknesses, particularly in

[431] Brandenburg, Matthea, and Sarah Lieberman. "Critical Spaces: European and U.S. Institutions for Outer Space." .
[432] Ibid.
[433] U.S. Code Title 51, *National and Commercial Space Programs*, Legal Information Institute, Cornell Law School, accessed June 26, 2025, https://www.law.cornell.edu/uscode/text/51.

how this shapes regulatory efficiency and the degree of private-sector involvement in international governance of space.

A. The Evolution of Commercial Space Law and Government Regulation

Commercial space activities have been approached very early and proactively by the U.S. space law. This is deeply rooted in the spirit of delegating regulatory powers over commercial space launches to the Department of Transportation (DOT) by the Commercial Space Launch Act of 1984, a role later assigned to the FAA's Office of Commercial Space Transportation. This liberalization was reinforced through two subsequent amendments in 1988 and 2004, which established the government indemnification program for commercial launches and provided a regulatory framework for commercial human spaceflight.[434]

The major turning point happened in 2015 when U.S private sector entitlements were expanded in that companies had property rights to resources from asteroids under the Commercial Space Launch Competitiveness Act, also known as the SPACE Act.[435] Undoubtedly, that legislative mechanism brought the U.S. ahead of many other nations in space mining taking, but raised concerns about whether non-appropriation under the Outer Space Treaty would be compromised. The Act also extended the period wherein FAA could not write new rules involving commercial human spaceflight to promote industry growth with less government intervention. Further involvement of the US in the commercial sector and especially having a global impact, is the Artemis Accords. The Accords, which were introduced in 2020, are a political and normative tool that aims to influence the behavior of states and non-state actors in lunar and deep space activities, most notably on the use of resources. They establish guidelines for peaceful, open, and cooperative endeavors on the moon and in outer space, in which Bangladesh became the 54th by April 2025.[436] Another concept emphasized in the Artemis guidelines that we have to highlight is the "safety zones" to protect ongoing mining activities and prevent interference from other entities. Thus, it may raise concerns about the right to property in outer space as a territorial claim and potential conflicts in space governance, as the characteristics of these zones, such as the size and scope, are not explicitly fixed, giving them flexibility depending on the "*nature of the operation*," which could be a risk to interfere with the OST requirements.[437] As critics, China has expressed doubts about the concept of the safety zones delineated in the accords, and the head of Russia's space program has stated that the accords are now too "*U.S.-centric*" to be approved.[438]

[434] Federal Aviation Administration (FAA). "Office of Commercial Space Transportation." U.S. Department of Transportation. Accessed March 13, 2025. https://www.faa.gov/about/office_org/headquarters_offices/ast.

[435] U.S. Congress, "H.R.2262 - Space Exploration and Development Act of 2015." 114th Congress, 1st Session. Accessed March 13, 2025. https://www.congress.gov/bill/114th-congress/house-bill/2262.

[436] NASA, "NASA Welcomes Bangladesh as Newest Artemis Accords Signatory," *NASA News Release*, April 8, 2025, updated April 10, 2025, https://www.nasa.gov/news-release/nasa-welcomes-bangladesh-as-newest-artemis-accords-signatory/.

[437] Balázs Bartóki-Gönczy and Boldizsár Nagy, "The Artemis Accords," *International Legal Materials* 62, no. 5 (2023): 888–898, https://doi.org/10.1017/ilm.2023.17.

[438] Jan Osburg and Mary Lee, "Governance in Space: Mining the Moon and Beyond," *RAND Corporation*, September 12, 2023, https://www.rand.org/pubs/commentary/2022/11/governance-in-space-mining-the-moon-and-beyond.html.

The overall tone of US commercial space law is business-friendly, but risk-sharing provisions are included, especially with regard to liability towards third parties with a significant amount of indemnification by the government. This way, private actors are encouraged to look into investment and innovation without compromising on risk management. As against this, sustainability and regulation feature as an immediate priority under EU regulations, ahead of issues of commercialization.

B. Legislation Supporting National Security, Scientific Research, and Human Spaceflight

It also serves a purpose beyond commercial concerns in the national security, scientific exploration, and future human space flight program contexts. For example, the 1992 Land Remote Sensing Policy Act[439] subjected commercial remote sensing to NOAA jurisdiction although it provided some governmental oversight for satellite imaging capabilities. The 1998 Commercial Space Act mentioned spacecraft reentry to highlight the end-to-end oversight of commercial activities whereby DOT is responsible for that aspect.

NASA Authorization Acts, passed every so often, are instrumental in shaping US space policy. The 2005 NASA Authorization Act[440] not only endorsed President George W. Bush's Vision for Space Exploration, that is, sending man to the Moon by the year 2020, but also reiterated the need for a balanced portfolio of space science, human spaceflight, and aeronautical research. The law set up a transparency mechanism similar to the Nunn-McCurdy[441] provisions in the defense contracts to require NASA to report cost-overrun and schedule-delay data to Congress. Later laws, those of 2008, 2010, and 2017, continued to hone the policy directions even as priorities shifted with new presidents, and the 2022 NASA Authorization Act, which was part of the CHIPS and Science Act[442], reaffirmed the United States commitment to Artemis, the program to put humans back on the moon and sustain them there. The broad legislative portfolio means that the U.S. can write checks for leadership in space exploration, although this decentralized nature of policy sometimes results in policy swings with changes in administration.

C. The U.S. Space Force and the Militarization of Space

The establishment of the United States Space Force through the National Defense Authorization Act[443] for Fiscal Year 2020 is part of a larger effort to consolidate and institutionalize U.S. space governance in this security domain. This development continues and extends a system of differentiated roles rather than contributing to fragmentation among

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[439] United States Statutes at Large. Vol. 106, 4163. Government Publishing Office. Accessed March 13, 2025. https://www.govinfo.gov/content/pkg/STATUTE-106/pdf/STATUTE-106-Pg4163.pdf.

[440] U.S. Congress. "Public Law 109-155: National Aeronautics and Space Administration Authorization Act of 2005." 109th Congress, 1st Session. Accessed March 13, 2025. https://www.congress.gov/109/plaws/publ155/PLAW-109publ155.pdf.

[441] U.S. Army Program Executive Office for Aircraft. "Nunn-McCurdy Act." U.S. Department of Defense. Accessed March 13, 2025. https://www.peoacwa.army.mil/wp-content/uploads/Nunn-McCurdy_Act.pdf.

[442] U.S. Congress. "Public Law 117-167: An Act to Amend the Title 10, United States Code, to Provide for the Effective and Efficient Operation of the Department of Defense." 117th Congress, 2nd Session. Accessed March 13, 2025. https://www.congress.gov/117/plaws/publ167/PLAW-117publ167.pdf.

[443] U.S. Congress. "S.1790 - National Defense Authorization Act for Fiscal Year 2020." 116th Congress, 2nd Session. Accessed March 13, 2025. https://www.congress.gov/bill/116th-congress/senate-bill/1790.

civilian, such as NASA, regulators of commercial activities, and military institutions. This decision, among others, indicates the increasing militarization of space and acknowledgment of space as a strategic warfare domain. Although the European Union has historically focused primarily on the peaceful use of space, sustainability, and civilian uses, recent policy developments indicate an acceptance of security and defense issues as part of the EU's broader set of policy points related to the governance of space. Meanwhile, the United States, as might be expected, has taken an even more specific and integrated strategic approach to its civil, commercial, and military presence in space, with a focus on deterrence, operations, and security.

The establishment of the Space Force directly impacts the international space security perspectives. The EU pursues the multilateral track, seeking harmonization in its space governance regime, while the U.S. largely pursues a unilateral approach, resulting in a defense-driven policy that raises concerns about a possible arms race in space. Hence, the disparity in the priorities sets a very fundamental difference: while the U.S. considers military and commercial activities as integrated within its space strategy, the EU still remains focused on civil, cooperative, and sustainability-governed policies.[444]

3. Comparing U.S. and EU Legal Frameworks: Implications for Space Activities and the Impact of Future EU Policies on the U.S.

The U.S.-EU separation in space legislation has far-reaching implications for space governance, commercial operations, and international regulatory cooperation. The U.S system is characterized by a high degree of legal adaptability, strong government support for private sector activity, and an emphasis on national security. This environment has nurtured the development of a dynamic commercial space sector, generating private space companies of global importance, promoting advances in technology at a rapid pace, while concerns are raised about the sustainability of the industry, liability concerns, and disputes relating to international law due to regulatory loopholes or insufficient check on commercialization within the existing U.S. framework. Conversely, the EU organized framework is more heterogeneous in methodology but pursues an increased harmonization target as far as the proposed EU Space act is concerned. The approaches differ in that whereas the EU provides for greater regulation, sustainability, the U.S. approach upholds private contract rights. This framework increases legal certainty but, on the other hand, slows the speed of decision-making; therefore, making the EU less competitive in the global space economy. Concerns have also been raised that higher sustainability requirements and stricter licensing procedures could discourage private companies and thus limit Europe as an attractive commercial space center.

The EU's space ambitions intersect with some of the key U.S interests that form the content of the Artemis Accords; The Accords help define the transatlantic competition and cooperation. The harmonization of EU regulatory standards aims to ensure streamlined activities in space and foster innovation; however, regulatory issues will arise for U.S companies. The EU's earmarking of reduced dependence on the non-EU suppliers is likely to define new, different

[444] SpacePolicyOnline.com. "Space Law." Accessed March 13, 2025. https://spacepolicyonline.com/topics/space-law/.

standards, which will incur compliance costs and create fewer procurement options for the likes of SpaceX, Lockheed Martin, Northrop Grumman, and Boeing. A more protectionist regulatory environment favors European space companies such as Airbus Defense and Space, Thales Alenia Space, and OHB SE, hence strengthening their global market position.[445]

From the U.S. strategic perspective, the emerging EU assertiveness in space governance will bring both collaboration opportunities and regulatory challenges. While increasing engagement in joint space security initiatives, data-sharing, and interoperability could strengthen the transatlantic relationship, diverging regulations and procurement practices will create tensions mirroring old transatlantic disputes, such as those around the General Data Protection Regulation. Just as the GDPR recalibrated similar global data privacy standards and compliance challenges for U.S tech firms, the coming EU Space Act stands to affect the U.S. space industry in significant ways, particularly with regard to market access, competition, and strategic position.[446] This point will be discussed more in the last chapter of this thesis.

In an increasingly dynamic global space race, EU-U.S relations become chiefly important in order to balance the rivalry in competition, ensure regulatory alignment, and respond to threats from rival powers such as China and Russia in the fields of space and military. Although the EU's regulatory framework is meant to put responsible norms of behavior into place in outer space, it may also reconfigure power relations within the international space economy and, therefore, have serious consequences for U.S commercial, military, and geopolitical interests. A sensitive and balanced approach in collaboration will also need to be adopted in competition for future space governance and innovation design, as well as for long-term security of the entire world and space domains.[447]

III. China's Space Legislation: A Functional Framework in Development

1. General Framework and Structure

China's space law is comparatively underdeveloped in relation to its expansive space activities and space legislation of other leading space nations. In other words, while the United States has broadly applied legal frameworks and clearly defined national space policies, China lacks a single comprehensive space law and a coherent regulatory framework. Space activities in China are governed by a patchwork of ministerial regulations and regulatory documents dispersed between various state agencies and military bodies. [448]

Yet, this does not lend itself completely to criticism; It represents a governance model: the Chinese State-led development approach that emphasizes centralized planning rather than codification. In more detail, we can say that while the Chinese regulatory framework appears to be widely distributed, with space activities being regulated through numerous ministerial

[445] Boon, Felecia. "How Will EU Space Law Impact US National Strategic and Commercial Interests?" *Modern Diplomacy*, May 18, 2024. Accessed March 13, 2025. https://moderndiplomacy.eu/2024/05/18/how-will-eu-space-law-impact-us-national-strategic-and-commercial-interests/.
[446] Ibid.
[447] Ibid.
[448] Wu, Xiaodan. "China: Space Law." In *Elgar Concise Encyclopedia of Space Law*, 29–32. Cheltenham, UK: Edward Elgar Publishing, 2025. https://doi.org/10.4337/9781802207361.00014.

regulations and institutional actors, the Chinese experience can hardly be compared to the experience of the EU because of the nature and significance of the EU's fragmentation, which are quite different from those of the Chinese case. Indeed, institutional multiplicity in the EU stems from the constitutional limitations imposed by the non-concurrence clause, shared competence under Article 4 TFEU, and the limited competence of EU agencies from the executive branch, which leads to a complex multi-level approach to the EU's system of governance. By contrast, China's distribution of responsibilities reflects a centrally orchestrated state-led development model rather than a decentralized constitutional order. Agencies, military bodies, and state-owned enterprises operate in a vertically integrated party-state hierarchy under the guidance of national strategies and central political oversight. As a result, there are no issues of competence conflict and the absence of governance. On the contrary, regulatory fragmentation promotes the specialization of functions under a single strategic framework. As such, there is hierarchical coordination that promotes the implementation and planning of policies. In essence, the "fragmentation" observed from the use of various legal instruments is not a hindrance to developmental implementation because the instruments operationalize national priorities. The above analysis highlights that, unlike the EU fragmentation, the fragmentation observed in China is a function of governance design that is informed by a centralized system. This offers several advantages to China, namely the benefits gleaned from this governance model that have helped her win many successes in space, even if these successes were achieved without employing a single legal instrument, like in the case of the U.S. or EU.[449]

2. Evaluation of the Current System

In recent years, apart from becoming one of the top space powers, China has built arguably the most ambitious and technologically advanced space programs in the world. The key is that China hasn't enacted a similarly single and codified national space law like that of the United States or those European countries that instituted very detailed national frameworks. But China has proceeded in a pragmatic, state-driven way to promote regulation of its space activities; the centralized, state-led governance model under which rapid progress has been made allowed for a more organic legal development fueled by operational needs.

With reference to the United States as an example, it has enacted several space-related laws, such as the Commercial Space Launch Act and the Space Resource Exploration and Utilization Act, while China's space-law structure has evolved through ministerial regulations and policy guidance touching on the country's strategic priorities and the state-led development model.[450] These include the Licensing Measures for Civil Space Launch Projects and the Registration Measures for Space Objects: both have indeed governed a number of civil and commercial activities whilst complying with international obligations under the UN Registration Convention and Outer Space Treaty.[451]

[449] Ibid.

[450] Zhong Lun Law Firm. "A General Introduction to Space Law in China." *Lexology*, December 3, 2024. https://www.lexology.com/library/detail.aspx?g=57881328-e01f-4eab-8026-8f5e5aa36cbf.

[451] Ibid.

This evolution then is phased and iterative with respect to the different levels of functionalities of the Chinese space program, from launching satellites to future interplanetary missions and manned flights into space. Examples of this are the operational success of the Tiangong Space Station[452], the Chang'e lunar missions[453], and the Mars Tianwen-1 mission[454], all of which have attested to the strength of China's governance structure even in the absence of a single codified law. The existing regulatory framework matches with the original scope of China's space sector, facilitating its expansion in a stable, centralized manner.

The Licensing Measures were directly arising from an increased interest from such academic institutions as Tsinghua University, which has initiated microsatellite launch programs with the Harbin Institute of Technology from the early 2000s. This kind of regulatory culture demonstrates how China adapts its legal instruments very incrementally regarding the realities emerging in the country. Originally covering state-sponsored launches, under these measures, results are now a framework to include expanding oversight and, indeed, a continuous trend moving towards addressing private participation.[455]

3. Recent Developments and Legislative Challenges in China

The importance of China in taking concrete measures toward codifying a comprehensive national space law should be emphasized. Ever since its first proposal in the National People's Congress (NPC) in 1993, it has journeyed forward steadily. In the NPC's Five-Year Legislative Plans of 2013, 2018, and the most recent in 2023,[456] the proposal was promoted through the stages of being: "*needs further study*" to "*could be deliberated*," signaling increasing political will and legislative maturity.[457]

The new law is expected to carve out an adoption space for international space law's fundamental principles: authorization and supervision, registration, liability and compensation, and environmental protection, in mutual exclusivity with the Chinese context.[458] This integrative method reflects the way international space law has been harmonized with domestic legislation in the U.S. and the EU; however, China's method is marked by legal reason, strategic foresight, and sync between its legal ponderation and institutional coordination aligned with its governance model.

In emerging areas where legal frameworks have not been finalized, such as the rescue and return of astronauts or third-party liability for space damage, China, by ratifying core UN

[452] Gregersen, Erik, "Tiangong." *Encyclopaedia Britannica*. Last modified March 14, 2025. https://www.britannica.com/technology/Tiangong.
[453] China National Space Administration. "About China's Lunar Mission: Timeline of Chang'e-6 Mission." *China National Space Administration*, June 26, 2024. https://www.cnsa.gov.cn/english/n6465652/n6465653/c10573102/content.html.
[454] The Planetary Society. "Tianwen-1 and Zhurong, China's Mars Orbiter and Rover." *The Planetary Society*. Last modified December 3, 2024. https://www.planetary.org/space-missions/tianwen-1.
[455] See Yang, Chao, and Gao Ge. "Overview of the Current Situation and Improvement of Chinese Space Legislation." *Annals of Air and Space Law* 38 (2013): 385; Xiaodan. "China: Space Law."
[456] Standing Committee of the National People's Congress, *Legislative Plans for the 14th National People's Congress Standing Committee*, (Sept. 8, 2023), http://www.npc.gov.cn/npc/c2/c30834/202309/t20230908_431613.html; Xiaodan. "China: Space Law."
[457] Xiaodan. "China: Space Law."
[458] Ibid.

treaties, has been applying these treaties to the nation. With respect to the development of the national legal framework once the space law comes into effect, China is expected to incorporate these obligations into it.[459] The existence of non-public regulatory documents would help in maintaining a flexible and confidential framework for handling high-stakes national programs. A similar paradigm operates for military-adjacent activations in other space-faring nations.

From another perspective, by viewing the absence of this codified space law as a true gap, one is actually observing the existence of a discerning and intervening legal culture existing for the purpose of keeping pace with the ever-evolving complexity of space governance without falling prey to overregulation. The commercialized and international nature of space activities will witness China's legislative evolution as an exhibit to its ambition to converge with global norms while prioritizing national concerns. [460]

Ultimately, while the U.S. and EU have traversed different pathways, characterized by liberal economic orientation and legal pluralism, China is now building up a coherent and comprehensive legal framework to strengthen its unique space development trajectory and build international legitimacy.

IV. Suggestions to policymakers for better global space governance

As space ventures become increasingly competitive and complex, policymakers around the world are facing a hard challenge: how to promote national innovation and competitiveness without sacrificing international cooperation principles of space law, and especially those of the OST. The treaty, which has been signed by most of the space- faring countries, creates fundamental legal and ethical obligations, for instance, that outer space must be used for the benefit of all countries (Article I), that no state may claim sovereignty over any part of it (Article II), and that any activity is to be for peaceful purposes and respectful of others (Articles III, IV, and IX).[461] Although national space laws are different in the tradition of law and purpose, international norms increasingly demand that domestic policy to adhere to such international rules. For example, states must make sure that national legislation does not encourage unilateral control over space resources. Instead, there should be provision for openness, cooperation, and ethics in national law. It is especially necessary with the increasing commercial interest in exploiting celestial bodies or building stationary space facilities.

Along with this, legal frameworks need to be supported by an ethical evaluation system. When new space technology like satellite mega constellations, autonomous AI in orbit, or private lunar missions emerges, it is no longer enough to ask whether such practices are legal but whether they are fair, sustainable, and good for humanity in the broadest sense. Ethical impact analyses must be included in the national space agency and international institution approval

[459] Ibid.

[460] See Zhao, Hong. "The Status Quo and the Future of Chinese Space Legislation." *Zeitschrift für Luft- und Weltraumrecht* 58, no. 1 (2009): 94.

[461] *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, 1967.

processes. This would not cause any harm to the environment, be less risky, and also ensure that future generations would be able to venture into space.

The second important aspect is to ensure that the benefits of space are distributed more evenly, such that currently are captured by a privileged group of countries and private companies, such as Earth Observation, communications technology, and commercial revenues. To balance this, countries must support technology-transfer programs, data-sharing programs, and collaborative endeavors with developing nations in accordance with both Article I of the OST and the UN Sustainable Development Goals[462]. At the global level, there is an equally urgent necessity to improve how we manage the exploitation of space resources. There is no binding international framework yet to govern space mining or the installation of infrastructure on celestial bodies. Currently under the auspices of UNOOSA, a "working Group of experts on legal aspects of space resources activities" is drafting principles with intensive global dialogue to come to terms on open rules and benefit-sharing schemes that apply to all, public or private actors.

Finally, the future space governance should not be exclusively decided by powerful states but by shared values and broad participation, including emerging space nations and civil society. Overall, the path to better space governance is not so much about tougher laws; it is also about building trustworthiness, fairness, and accountability. If legislation is considered in relation to ethical examination and if international agreements such as the OST are placed at the center, then space can truly be a field of peace and collaboration that serves all mankind.

Conclusion of the chapter

The EU, US, and China's respective space governance regimes demonstrate distinct variations of legal and institutional logics that guide the evolution of these states' respective space sectors. The EU, as an important player in the international space economy, nevertheless still evidences a complex regulatory environment marked by dispersion across EU institutions, intergovernmental organizations like the European Space Agency (ESA), and various national players. While such an observation appears, in part, to be suggestive of a less than functioning system, it is submitted that it also speaks to constitutional competence constraints, as well as the incrementalist evolutions of EU agencification and harmonization initiatives, such as those encapsulated by the EU Space Programme and proposed regulatory initiatives.

Contrariwise, the United States space program is conducted within a relatively consolidated body of statute law, largely based upon the National Aeronautics and Space Act and other statutory enactments, codified within Title 51 of the United States Code. While its structure is organizationally pluralistic, having statutory mandates for the National Aeronautics and Space Administration, the U.S. Department of Defense, the U.S. Space Force, and several civilian regulatory bodies, it continues to be supported by a well-defined body of statute, a well-defined system of licensing, and a well-defined system of risk-sharing, which has enabled sustained leadership in innovation, defense, and commercial related space efforts.

[462] See, United Nations Office for Outer Space Affairs, "Space Supporting the Sustainable Development Goals," *UNOOSA*, https://www.unoosa.org/oosa/en/ourwork/space4sdgs/index.html.

China also offers an alternative third approach to discussing and understanding the governance of outer space, with emphasis on top leadership and strategic administrative coordination in the absence of a central and unified space law. Space activities lend themselves to ministerial regulations, industrial policies, and civil-military integration mechanisms within the context of its centralized political setup. Contrary to the EU's multi-level governance setup, which is subject to the constraints of its constituent laws, the decentralized nature of China's regulatory framework is positioned within a hierarchical system that lends itself to efficient programmatic execution and strategic planning.

These three models, taken together, suggest the different routes taken in the governance of space: the graduated form of constitutional administration with the aim of harmonization in the EU; legislatively consolidated but institutionally specialized administration in the United States; and centrally directed administration in China. These models demonstrate different constitutional structures, strategic orientations, and governance styles rather than different degrees of institutional fragmentation.

Part II. A Unified Approach: Toward A Common EU Space Law for A Competitive Position in Space

In the direction of "One Captain on the European Spaceship"[463] *(EU acting instead of its member states?)*

A proper legal regime can not just govern but actually enable expansion and innovation. For the EU, upon whose foundation a free and fair market is based, this tool is necessary in the context of space.[464] By the day of writing this part of the thesis, there is still no unified space law in Europe at the supranational level; in other words, the EU Space Act proposal has not been revealed. This fact poses grave impediments to competitiveness, investor confidence, and political cohesion. **Part II** of this thesis explains how EU common space law would contribute to bridging this gap and turn Europe into a shaping global power in space. Key to this argument is the concept of strategic autonomy.

Chapter 4, "The Need for an EU Strategic Autonomy in Outer Space; Using Law as a Tool," analyzes what strategic autonomy would mean in terms of space policy: a legal framework to allow European players to move independently of any one country, to get into space in a stable manner, and to protect critical infrastructure. We discuss institutional dynamics, for instance, the roles of ESA, EUSPA, and Member States, divergence in civilian and military space regulation, and European systems' ability to emulate success, such as Galileo and launch capabilities.

Moving further into legal foundations, ***Chapter 5***, "Assessing the Legal Basis for EU Action in Space Law: Competence, Procedures, and Expectations," explores whether there is sufficient power under current EU treaties to give a binding space law. With Articles 114, 115, 189, and 352 TFEU as our focus, we analyze both the scope of law as well as procedural steps needed, and such acknowledged political hurdles as national divergences as well as institutional inertia. Lastly, ***Chapter 6***, titled "The EU Space Act Proposal: A Legal Analysis of Its Scope, Implications, and Possible Future Enforcement", provides an insight into the content of the draft legislation itself. Here we explore what is proposed to be done regarding the harmonization of differences in regulations, the consideration of commercial and security needs, and enforcement approaches. This chapter discusses anticipated impacts on funding, licensing, liability insurance, debris mitigation, and the creation of a real internal space market.

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[463] von der Dunk, Frans G. "Towards One Captain on the European Spaceship— Why the EU Should Join ESA" (2003). *Space, Cyber, and Telecommunications Law Program Faculty Publications*. 56. https://digitalcommons.unl.edu/spacelaw/55/

[464] European Space Policy Institute, *National Space Legislation in Europe* (ESPI Report No. 21, June 2011) .

Chapter 4: The need for an EU strategic autonomy in outer space; using law as a tool

Independence in outer space is not about being independent for the sake of being independent; it's about being independent to defend its interests, protect its assets, and be a constructive global space governance player without excessive reliance on the non-European players. A coherent legal approach can increase competitiveness and safeguard European values. This chapter analyzes what Strategic autonomy in outer space **(I)**. It then turns to the main challenges that are hindering it, such as patchy legal responses among members, limited technological capabilities in some aspects, and the risks of falling behind more capable space actors **(II),** and finely highlighting the Role of Law in Strengthening EU Space Strategic Autonomy: Objectives and Rationale Behind the Establishment of EU Space Law **(III).**

I. Clarifying the Concept of Strategic Autonomy

Diving into this part, we have to keep in mind that strategic autonomy is not about isolationism but about ensuring that the European Union can make decisions independently and act in its own interests **(1).** Developing strategic autonomy is essential for the EU to be a credible global actor, capable of defending its values and interests in an increasingly competitive and unpredictable world **(2)**.

1. Strategic Autonomy: A Conceptual Clarification

The concept of strategic autonomy has been introduced for the first time in a sector related to security and defense,[465] much more recently complemented by extending its application to other areas of EU action,[466] Later evolving into what is now referred to as "EU Open Strategic Autonomy." [467] This meaning was only recently broadened and applied to additional areas of EU action.[468]

The concept of strategic autonomy itself is not overly complicated, but the necessary steps for breaking it down into understandable components involve examining the terms "autonomy" and "strategic" independently. On one hand, it is essential to determine whether a specific area

[465] See, Borrell, Josep. "Why European Strategic Autonomy Matters." *A Window on the World* (blog), European Union External Action, December 3, 2020. https://www.eeas.europa.eu/eeas/why-european-strategic-autonomy-matters_en

[466] European Council. *Conclusions – 1 and 2 October 2020*. EUCO 13/20. Brussels: European Council, 2020.

[467] the European Economic and Social Committee and the Committee of the Regions Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery. According to this document, "open strategic autonomy" means the ability to shape the new system of global economic governance and develop mutually beneficial bilateral relations, while protecting the EU from unfair and abusive practices, including diversification and consolidation of global supply chains (p. 7).

[468] Perotto, Gabriella. "The Legal Framework of the EU Defence Industry and the Pursuit of Strategic Autonomy." *European Papers – European Forum*, Insight of 27 July 2023, 475–486.

of political and economic life is strategic, as it is not always the case. Intuitively, the adjective "*strategic*" refers to the interests of a political community at its most fundamental level. Secondly, if autonomy is roughly equivalent to freedom, we should consider a spectrum of autonomy rather than a simple either/or scenario between having or losing autonomy.[469] In other words, thinking in terms of a spectrum of autonomy prompts us to consider three interrelated questions that guide any discussion concerning the notion of strategic autonomy: for what ends, by what means, and in what respects? [470] It can be asserted, therefore, that combining the terms "*autonomy*" and "strategic" implies that the aspiration of a political community for greater autonomy is largely conditioned by the degree of strategic significance of the political or economic matter at hand. [471]

It is important to explain that the term "strategic autonomy" was first brought in by the defense sector, but has now become a generic propellant for Common Foreign and Security Policy (CFSP) since it was conceived in Global 2016 Strategy.[472] Today, it has grown beyond its original scope of application, as it typically describes the EU attitude in shaping its own several policies, in addressing increasingly complex challenges of the geopolitics world, such as their fast development of technologies, transformation of powers, contestation of international law and governance models, increased usage of economic means for goals that are geopolitical, growing conflictuality in international relations, etc.[473] From a sociological perspective, it probably helps "brand" the process in which the EU might shift its global role in the future: from a normative power acting purely according to its values and principles (including market principles) toward being a geopolitical actor, more geared toward a "realistic" approach in international relations.[474] Although the concept is already marred by a certain degree of ambiguity,[475] it is almost universally known not to confuse "autonomy" with isolation, full independence, unilateralism, or self-sufficiency,[476] but it speaks of continuity in the EU setting

[469] Fiott, Daniel. "Strategic Autonomy: Towards 'European Sovereignty' in Defence?" *EUISS Brief* no. 12 (November 2018). https://www.iss.europa.eu/sites/default/files/EUISSFiles/Brief%2012__Strategic%20Autonomy.pdf .
[470] Ibid.
[471] European Parliament, Directorate-General for External Policies of the Union, *European Space Policy: Strategic Autonomy and the Global Space Economy*, EXPO/IDA/2020/653620 (Brussels: European Parliament, 2020), https://www.europarl.europa.eu/RegData/etudes/IDAN/2020/653620/EXPO_IDA(2020)653620_EN.pdf
[472] European External Action Service. *Shared Vision, Common Action: A Stronger Europe – A Global Strategy for the European Union's Foreign and Security Policy*. Brussels: EEAS, June 2016. https://www.eeas.europa.eu/eeas/global-strategy-european-unions-foreign-and-security-policy_en.
[473] Helwig, Niklas, and Ville Sinkkonen. "Strategic Autonomy and the EU as a Global Actor: The Evolution, Debate and Theory of a Contested Term." *European Foreign Affairs Review* 27, Special Issue (2022): 1–20. https://kluwerlawonline.com/journalarticle/European%2BForeign%2BAffairs%2BReview/27.Special%20Issue/EERR2022009.
[474] Helwig, Niklas. "The Ambiguity of the EU's Global Role: A Social Explanation of the Term 'Strategic Autonomy'." *European Foreign Affairs Review* 27, Special Issue (2022): 21–38. https://kluwerlawonline.com/journalarticle/European%2BForeign%2BAffairs%2BReview/27.SI/EERR2022010
[475] Cellerino, Chiara. "EU Space Policy and Strategic Autonomy: Tackling Legal Complexities in the Enhancement of the 'Security and Defence Dimension of the Union in Space'." *European Papers* 8, no. 2 (2023): 487–501.
https://www.europeanpapers.eu/en/system/files/pdf_version/EP_EF_2023_I_017_Chiara_Cellerino_00669.pdf
This article presented a solid understanding of the EU Strategic Autonomy in outer space and its challenges, which has supported the analysis in this part of the chapter, worth seeing for a deeper understanding.
[476] Tocci, Nathalie. *European Strategic Autonomy: What It Is, Why We Need It, How to Achieve It*. Rome: Istituto Affari Internazionali, February 26, 2021. https://www.iai.it/sites/default/files/9788893681780.pdf .

its priorities and defining its core (such specifically strategic) interests and being prepared to pursue them, if necessary, on its own.[477] Here again, the adjective "strategic", borrowed from warfare language, serves to cover all issues affecting or concerning the "*core interests of the political community*".[478]

In general terms, strategic autonomy in policymaking should at least emphasize setting a priority on things we need the most, that is, regulatory and political actions that incorporate or further a strategic interest of our society, and managing dependencies in areas where interference or dependency is seen as a looming threat to the EU's ability to defend its values, interests, and citizens.[479] Such a focus does not merely tackle strategic deficiencies within the EU economy and society but also seeks to develop autonomous EU capacities in certain sectors against any threats to society, infrastructure, and industry. Indications would also very much depend on contingencies and political assessments, while, in legal terms, an attempt to better define the assets that are regarded as essential to the EU and Member States in terms of security and public order has been made by virtue of Regulation (EU) 2019/452, which establishes a framework for the screening of foreign direct investments into the Union.[480] Article 4 of the Regulation articulates that a foreign direct investment threatens security or public order on account of its effect on an asset that falls under one of the following categories: critical infrastructures (such as energy, transport, water, health, communications, aerospace, defense, etc.); critical technologies and dual-use items (for instance: artificial intelligence, robotics, energy, aerospace, defense, etc.); supply of critical inputs (such as energy, raw materials, and food); access to sensitive information; and freedom and pluralism of media. Further, Article 8 of the same Regulation[481] provides that "programmes of Union interest," listed in the Annex to this Regulation, are critical for matters of security and public order. The aerospace industry often finds itself in a circle as a critical infrastructure and technology for Member States, while some components of the EU space programme have been listed as "*programmes of Union interest*" under Article 8 of the regulation. A space service operator is also considered as a critical entity under the Directive[482] (EU) 2022/2557 with respect to the resilience of critical entities.[483]

2. Positioning the EU as an Autonomous Space actor

We will begin by discussing the emerging concept of strategic autonomy and whether it reflects a broader European desire or has its roots in Union-specific institutional and legal frameworks

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[477] Council of the European Union. *Strategic Autonomy, Strategic Choices*. Issues Paper, 5 February 2021. https://www.consilium.europa.eu/media/49404/strategic-autonomy-issues-paper-5-february-2021-web.pdf.

[478] European Parliament, Directorate-General for External Policies of the Union, *European Space Policy: Strategic Autonomy and the Global Space Economy* ; Cellerino, "EU Space Policy and Strategic Autonomy,".

[479] Tocci, Nathalie. *European Strategic Autonomy: What It Is, Why We Need It, How to Achieve It*; Cellerino, "EU Space Policy and Strategic Autonomy," .

[480] European Union. *Regulation (EU) 2019/452 of the European Parliament and of the Council of 19 March 2019 Establishing a Framework for the Screening of Foreign Direct Investments into the Union*. Official Journal of the European Union L 79I, March 21, 2019, 1–14. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0452.

[481] See Annex to the regulation, programmes n. 1, 2, 3, 4; Cellerino, "EU Space Policy and Strategic Autonomy,".

[482] Directive 2022/2557/EU of the European Parliament and of the Council of 14 December 2022 on the resilience of critical entities and repealing Council Directive 2008/114/EC.

[483] Cellerino, "EU Space Policy and Strategic Autonomy,"

(A). It then uses Galileo, the EU's global navigation satellite system, as a case study on how space infrastructure can support strategic autonomy through the provision of independent, civilian-controlled services essential to security, economy, and governance **(B).**

A. Strategic Autonomy in Outer Space: European or Union-Based?

In any debate about strategic autonomy, it is important to distinguish between "European" efforts on the one hand and the specific capabilities and programs of the "European Union" on the other.[484] On a technical level, the Union's core space capabilities, namely Galileo, European Geostationary Navigation Overlay Service (EGNOS), and Copernicus, are European programs because they rely on Union and Member State funding and the technical expertise of non-EU bodies, such as ESA and the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT). This invites reflection regarding the true meaning of "strategic autonomy" and "Europe" in the space context.[485] So, for example, while it is true that the Union is among the main public institutions financing the space sector, it relies on the technical expertise of bodies such as national space agencies, ESA, and EUMETSAT for the technical design of launchers and satellites, and these bodies, in turn, collaborate with industrial and research partners across Europe. Space cooperation in Europe is therefore based on an association of supranational and intergovernmental actors and structures[486]. Combined, Galileo, EGNOS, and Copernicus offer the Union a high degree of strategic autonomy, as they enable Earth observation, the protection of transport networks, the operation of digital networks, and the security of trade routes.[487] This clearly shows that the strategic autonomy of Europe in space is not generated by a single source but by a complex architecture of governance, which is a combination of supranational financing, intergovernmental technical capabilities, and a distributed expertise base. Therefore, autonomy in the European space framework needs to be defined as operational independence in a network environment and not as a centralized institution. The notion of autonomy thus represents a constitutional balance between EU competencies and European cooperation frameworks, in which autonomy is generated through coordination and interdependence.

B. Galileo as a Pillar of the EU's Strategic Autonomy in Outer Space

Galileo has emerged as a principal sign of the Union's capacity to balance its political aspirations in space with the quest for strategic autonomy.[488] A player with strategic autonomy can create, develop, launch, and manage space systems independently. Hence, Galileo serves

[484] European Parliament, Directorate-General for External Policies of the Union, *European Space Policy: Strategic Autonomy and the Global Space Economy*.
[485] Ibid.
[486] Marta, Lucia, and Paul Stephenson. "Role of the European Commission in Framing European Space Policy." In *European Space Policy: European Integration and the Final Frontier*, edited by Thomas Hörber and Paul Stephenson, 98–113. London/New York: Routledge, 2016; European Parliament, Directorate-General for External Policies of the Union, *European Space Policy: Strategic Autonomy and the Global Space Economy.*
[487] European Parliament, Directorate-General for External Policies of the Union, *European Space Policy: Strategic Autonomy and the Global Space Economy*.
[488] Jean-Pierre Darnis, "European Technological Sovereignty, a Response to the Covid-19 Crisis?," *FRS Note*, no. 45 (May 29, 2020), https://www.frstrategie.org/publications/notes/souverainete-technologique-europeenne-une-reponse-crise-covid-19-2020; European Parliament, Directorate-General for External Policies of the Union, *European Space Policy: Strategic Autonomy and the Global Space Economy*

four specific purposes: 1) the Galileo Open Service (GOS), which offers free and accessible positioning and timing; 2) the High Precision Commercial Service (HAS), providing enhanced navigation services, which can be encrypted based on customer requirements; 3) a search and rescue (SAR) service, aiding in responding to distress calls; and 4) the regulated public service (PRS) designed for approved public users in sensitive applications. With about 150 institutional and industrial partners, Galileo is distinctive among global positioning systems; unlike the U.S GPS and Russia's Glonass, it is a civilian initiative rather than a military-focused program. Furthermore, although the main task of the European GNSS Agency is to improve the services and infrastructure of the Galileo system, the agency also ensures the security accreditations and the secure operation of the system, thereby providing a further level of security. The global adoption of Galileo, despite being just over 20 years old, is truly remarkable.[489]

Moreover, Galileo promises future services that will be crucial for security and defense. Indeed, thanks to the combination of the regulated public service (PRS) and the high precision of the Galileo positioning, navigation, and synchronization system, many bodies and public authorities of the Union will be able to use an encrypted public service with high precision.[490] Galileo has significant potential in terms of security and defense, due to the fact that accurate position and navigation systems are very important in military operations, where an error in time of just half a second could cause vehicles and weapons to miss their targets by several kilometers. Without precise PNS capabilities, for example, tasks such as mid-air refueling can be extremely difficult because the refueling aircraft and the fighter may be in different timing sequences. Similarly, timing accuracy is a prerequisite for maintenance and repair, and on-board computers in fighters and transport aircraft cannot be properly calibrated if the PNS system is not accurate.[491] Finally, the most advantageous feature of Galileo is that it is an independent Union capability capable of providing European armed forces with the necessary freedom of movement during their operations and missions, which allows us not to be dependent on the global positioning and navigation systems of another State. As such, it is vital to ensure the security of Galileo components, technologies, and systems and the resilience of the industrial supply chain.[492] In light of this, along with its operational reliability, Galileo makes a direct contribution to the strategic autonomy of the Union by lessening reliance on third-country global navigation satellite systems, especially in security-relevant and critical infrastructure areas. The Union's autonomy in managing positioning, navigation, and timing functions increases its ability to securely handle communications, crisis response, transport and energy infrastructure security, and defense-related activities without being dependent on externally regulated global navigation satellite systems that could be limited, reduced, or denied access to during times of geopolitical tension. In this regard, Galileo is more than a technological system; it is also a strategic governance tool that increases the Union's autonomy to act independently while simultaneously ensuring the integrity and resilience of its digital

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[489] See, European GNSS Agency. "Accuracy Matters." *UseGalileo.eu*. Accessed Feb 27, 2025. https://www.usegalileo.eu/accuracy-matters/EN ; European Parliament, Directorate-General for External Policies of the Union; European Parliament, Directorate-General for External Policies of the Union, *European Space Policy: Strategic Autonomy and the Global Space Economy*

[490] European Parliament, Directorate-General for External Policies of the Union, *European Space Policy: Strategic Autonomy and the Global Space Economy*.

[491] Ibid.

[492] Ibid.

and security environments. This autonomy is part of the overall strategic autonomy of the Union in outer space, which is not a concept of isolation but rather the capacity to guarantee the continuity of operation, decision-making autonomy, and security of critical space-based services under European control.

II. Challenges to the Realization of Strategic Autonomy in Outer Space

To achieve strategic autonomy in space, the EU faces a range of institutional and material hurdles. However, space presents a dual challenge as it is both essential for autonomy, since Europe's increasing dependence on space technologies heightens vulnerability, and a critical area where avoiding new dependencies is crucial **(1)**. But many governance complexities exist with regard to decision-making and policy implementation, because of overlapping competencies of the EU, its Member States, and ESA **(2)**. Not to add, space activities have a legal dual-use nature as more different frameworks exist between civilian and security-related initiatives **(3)**. All of these pave the way for the necessity of a much more harmonized and coherent legal framework.

1. Securing Strategic Autonomy Through Space

The reason that the EU space policy is shaped by the current geopolitical landscape is likely due to several factors.[493] First of all, space has become a necessity for the EU and its people for their social and economic activities; the rationale behind it is that space applications and technologies have become a part and parcel of our lives. Programs such as Copernicus, Galileo, and EGNOS of the EU offer geolocation and earth observation services, which enable the EU to act independently. On the other hand, there are key aspects of life and policy for the EU, making it more vulnerable to the irresponsible acts of others in the space domain. It becomes necessary for the EU to protect its space assets, which are now exposed to attacks, especially.[494] Furthermore, space is an arena of cutting-edge technology where development will boost the EU's economic growth, digital transition, connectivity, resilience, and independence. With the emergence of the private sector engaging in space-related activities and services, new commercial opportunities are arising in a globally competitive environment. In fact, the EU should take steps to consolidate its supply chain for space-related goods and services and enhance its launch capacity.[495] Lastly, on this note, the geopolitical landscape in space is

[493] Cellerino, "EU Space Policy and Strategic Autonomy,"

[494] European Commission and High Representative of the Union for Foreign Affairs and Security Policy. *Joint Communication JOIN(2022) 49 final from the Commission and the High Representative of the Union for Foreign Affairs and Security Policy of 10 November 2022 on Policy on Cyber Defence*. Brussels, November 10, 2022. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022JC0049; Cellerino, "EU Space Policy and Strategic Autonomy,"

[495] Cellerino, "EU Space Policy and Strategic Autonomy,"

rapidly transforming into a conflict arena.[496] It is not only a potential theatre of operations[497] but also a strategic enabler for executing various security and defense endeavors on Earth.[498] For instance, crisis management, whether civil or military, largely depends on space-based services (such as precise positioning, communication, meteorological, geospatial, and imaging support services), and any disruption would severely hinder our ability to respond to security threats. In this regard, space security should be rigorously pursued in relation to other powers involved in the race to militarize space.[499] The instruments developed under the EU's research, industrial, and commercial policies can indeed be useful to tackle issues pertaining to industry; however, it would be more appropriate for the EU space policy to modify itself towards CFSP like objectives in security and defense. Yet, achieving this has always been easier said than done, considering how this policy has traditionally been governed.[500]

2. Navigating EU Space Governance: Institutional Challenges and the Role of ESA and Member States

This part is mainly about the institutional challenges; in order to understand the strategic implications of the role of ESA and the Member States in the governance of EU space policy, it is useful to provide some background information on the origin of European cooperation in space and its current functioning.

A. The Role of ESA in Facilitating European Space Cooperation

As we tackled this in more detail in Chapter II of this thesis, it should be reminded here that originally, the Treaties lacked any rules related to the issue of competencies of space for the European Union institutions. The topic of space policy belonged to the Member States which would work together at an international level in various organizations. [501] Policies, programs, and funds for ESA are determined by the Council of the Ministries of ESA, as stated in Article XI of the Convention establishing ESA.[502] Heavy compulsory programmes are financed by all members according to their GDP, while optional programmes are financed "*à la carte*"[503] by interested members.[504] Interestingly, the ESA Convention provides for the so-called "fair return" rule: the percentage of funds invested by a country in a given programme would

[496] European Commission. *Communication COM(2022) 60 final from the Commission of 15 February 2022 Commission Contribution to European Defence 10*. Brussels, February 15, 2022. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022DC0060.

[497] See Mauri, D. "Conflitti Armati e Spazio Extra-Atmosferico: Il Caso delle Armi Anti-satellite (ASAT)." In *Sicurezza e Difesa Comune dell'Unione Europea*, edited by M. Vellano and A. Miglio, 293–312. Wolters Kluwer, 2022; Cellerino, "EU Space Policy and Strategic Autonomy,".

[498] Council of the European Union. *A Strategic Compass for Security and Defence – For a European Union That Protects Its Citizens, Values, and Interests and Contributes to International Peace and Security*, Doc. 7371/22, March 21, 2022.

[499] Ibid. 23

[500] Cellerino, "EU Space Policy and Strategic Autonomy,", p 492.

[501] European Space Agency. *Convention for the Establishment of a European Space Agency*, signed in Paris in 1975 and entered into force on 30 October 1980. The European Space Agency. Accessed April 29, 2025. https://www.esa.int/About_Us/Legal/ESA_Convention.

[502] European Space Agency. "Member States & Cooperating States." The European Space Agency. Accessed April 29, 2025. https://www.esa.int/About_Us/Corporate_news/Member_States_Cooperating_States.

[503] Cellerino, "EU Space Policy and Strategic Autonomy,".

[504] Article V ESA Convention.

redistribute those funds in contracts back to its industries.[505] Thus, it is clear that ESA is a flexible tool for national (and European) industrial policy, ensuring steady public investments in space. ESA provides its members with acquired, qualified human resources necessary to carry out in-the-ground operational phases for space programmes developed in the organization. Such programmes can serve scientific purposes or result in using space to improve life on Earth. In both situations, however, the nature of cooperation within ESA is constrained to be "*exclusively peaceful purposes*"[506], and this clause has been interpreted restrictively by ESA members so as to prevent, for nearly two decades from its establishment, any security (not to mention military) aspects of the involvement of the organization with space.[507]

B. The Strategic Implications of the EU-ESA Association

The issue of space policy became one of the priorities of EU integration in the late 1980s even though the EU did not have explicit competence in this field. At that moment, it had already become obvious that having its own and reliable access to outer space should be considered one of the objectives to be achieved at least partly through the efforts of the EU.[508] Changes in geopolitics following the collapse of the USSR, which then led to a reduction in funding for space programs worldwide, and the forthcoming advent of an information age, pushed the EU to pay special attention to promoting the development of new commercial applications in space technologies, especially those related to satellite communications, media, and so on.[509]

In this context, recognizing that the EU lacked the necessary technical expertise to design and implement its own space programs, it became a natural partner for ESA in executing the two flagship space initiatives. The EU entrusted ESA with the development of Galileo and EGNOS to provide a satellite navigation space infrastructure to the EU and Copernicus (formerly the Global Monitoring for Environment and Security, GMES),[510] designed to deliver to the EU Earth observation data.[511] Following this, the conclusion of the 2003 Framework Agreement, cited in chapter II, established a strategic partnership between the suppliers of space systems and the demand side.[512] This agreement was set for a period of four years, automatically renewable for further four-year terms. Cooperation even today occurs through joint institutions like the Space Council, involving representatives of both ESA and the EC, a joint Secretariat, and a high-level space policy group. In recent times, however, the specific details of

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[505] Article VII, ESA Convention, See, Hansen, R., and J. Wouters. "Towards an EU Industrial Policy for the Space Sector." *KU Leuven Working Paper* 149-2015; Cellerino, "EU Space Policy and Strategic Autonomy,".
[506] Article II ESA Convention.
[507] Cellerino, "EU Space Policy and Strategic Autonomy," p 493.
[508] European Commission. *Communication from the Commission: The Community and Space – A Coherent Approach*, COM(88) 417 final, 26 July 1988. See von der Dunk, Frans G. "European Space Law." In *Handbook of Space Law*; Cellerino, "EU Space Policy and Strategic Autonomy,".
[509] See, Reillon, Vincent. "European Space Policy: Historical Perspective, Specific Aspects and Key Challenges." European Parliamentary Research Service, January 30, 2017. https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2017)598626; Cellerino, "EU Space Policy and Strategic Autonomy,".
[510] Regulation (EU) 2021/696. .
[511] See Munari, Francesco. "Il Programma GMES. Un Laboratory Case per Testare le Nuove Frontiere (Spaziali) del Diritto dell'Unione Europea." *Diritto dell'Unione Europea* (2009): 563, cited in Cellerino, "EU Space Policy and Strategic Autonomy,".
[512] Decision 578/2004/EC of the Council of 29th April 2004

collaboration, such as ESA taking control of a project for the EU, participation of the EU in the optional programs of ESA, and creation of joint subsidiary bodies, were negotiated on a case-by-case basis. Thus, there is no way that the same agreement can be used to give the EU a leadership position in shaping European space policy, considering that ESA would retain its technological superiority in space-related matters.[513] A further illustration of this situation is reflected in the fact that the two largest EU space programs, Galileo and Copernicus, while fully owned, managed, and mostly funded by the EU, are operationally run by ESA due to its technical capacity to execute the task. From this perspective, ESA remains the gateway to space for the EU in terms of scientific and technical capacities. Nonetheless, EU-ESA cooperation has not been without challenges. In particular, the disparity between membership in ESA and the EU, in which member states that do not belong to the EU are part of ESA, has been an issue concerning the handling of classified data regarding the vital interests of the EU or its member states.[514] Building on this, this institutional imbalance is characteristic of the hybrid nature of European space governance, where political control and financial responsibility rest with the Union, while the technical implementation is firmly rooted in an intergovernmental organization, ESA, with a wider and partly overlapping membership. Consequently, the operational control of core infrastructure has to be reconciled with Union law on security classification, procedures, and the pursuit of strategic autonomy. The implication of non-EU members in the ESA, for example, Switzerland and Canada, requires additional legal guarantees. At the same time, the resort to ESA's technical competence betrays the functional interdependence that is implicit in the composite administrative structure of Europe; instead of institutional inadequacy, it betrays a governance architecture that integrates supranational policy guidance with the intergovernmental implementation capacity.

C. The Influence of Member States in Shaping EU Strategic Autonomy in Space

The Member States are key actors in determining the strategic autonomy of the Union in outer space because outer space is a competence that is still shared and politically sensitive, and it is closely tied to national security, industrial policy, and technological sovereignty. The Member States exercise their influence in a number of ways: through their role in the legislative process in the Council, through their control over their national budgets and industrial capacities in outer space, and through their strong role in ESA and their national space agencies, which form the backbone of the Union's programs in outer space. So, it is understood that the National Space Agencies of the respective member states maintain their specific space programs and activities within ESA. It is worth noting that, based on 2022 statistics, approximately 4% of the ESA budget was derived from EU income, with over 64% coming from individual ESA member states. The three main major ESA funders are said to be Italy, Germany, and France.[515] The budget for ESA in 2025, as per the released data, is estimated at €7.68 billion. The main source of finance will be the contribution of member states while another major source will be

[513] von der Dunk, "European Space Law,".
[514] Cellerino, "EU Space Policy and Strategic Autonomy," p 494.
[515] European Space Agency. *ESA Budget 2022*. Accessed April 29, 2025. https://www.esa.int/About_Us/Corporate_news/ESA_budget_2022.

the European Union. As per preliminary budget estimates, roughly €1.7 billion of the budget will be from the EU while the rest will be from member states' contributions and others.[516]

These factors demonstrate that the interaction between the institutions and programs of the EU and ESA, as well as the establishment of the European space program, functions on the basis of maintaining the residual competence of the Member States in the area of space activities. Instead of restricting the autonomy of Member States, the actions of the EU in the sphere of space are combined with national competences according to the condition posed by the principle of sincere cooperation provided by Article 4 TFEU. This implies a structurally complicated division of competences, where the EU plays the role of coordination in the field of space policy on the basis of Article 189 TFEU, and the Member States remain competent for their independent space policies. In this case, the Lisbon Treaty introduces no exclusivity of EU powers in space, but only builds a multilayered system of interaction based on functional overlap and parallel actions.

3. The Civil-Military Coordination in EU Space Governance: Divergent Legal Frameworks

These could be classified as material challenges;[517] Traditionally, for far-off space-faring nations, civil and defense aspects of space have always been considered jointly.[518] Nevertheless, according to the Treaties, the placement of EU space policy is among the competences that the TFEU provides, and as a matter of fact, EU space assets are under civil control.[519] In all circumstances, national security remains an exclusive competence of the Member States.[520] Following the Maastricht Treaty, Member States are free to coordinate certain aspects of their national security and defense policies within the ambit of the Common Foreign and Security Policy (CFSP). However, the adoption of CFSP decisions[521] must be unanimously adopted to prevent encroachment on Member States' domestic competences. The non-interference clause in art. 40 TEU further insults the encroachment of EU competences under Articles 3 to 6 TFEU into CFSP operations and, in doing so, protects national security competence against unnecessary connections. Most likely, it is to exclude any possible involvement of the former Community in sensitive affairs of national security that the Treaties originally avoided granting any competence on space policy to the EU. One could thus suggest that the inescapable connection between space activity and issues of security and defense is being "*artificially*"[522] excluded from these international cooperation frameworks in the frame

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[516] European Space Agency, "ESA Facts," *ESA* (corporate news), accessed Mars 7, 2026, https://www.esa.int/About_Us/Corporate_news/ESA_facts

[517] Cellerino, "EU Space Policy and Strategic Autonomy,"

[518] See, Reillon, Vincent. "European Space Policy: Historical Perspective, Specific Aspects and Key Challenges."

[519] European Commission. *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Space Strategy for Europe*, COM(2016) 705 final, 26 October 2016. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016DC0705.

[520] Article 4(2) TEU.

[521] Article 24 TEU.

[522] Cellerino, "EU Space Policy and Strategic Autonomy,"

of the EU and correspondingly ESA. Such legal fiction is not beneficial to realizing a pivotal security and defense dimension of EU space policy for strategic autonomy. [523]

In theory, distinct legal bases underpin both the civil and the security or defense aspects of space policy. Through the Commission's competence regarding the development and financing of new infrastructure in space as set forth by art. 189 TFEU, military and security space assets can be coordinated through the use of CFSP competence if there is a need to respond to any security threat. In case no coordination takes place, the Member States will have the final say regarding the deployment of such capabilities.[524] It would, however, be astonishing to find this particular scenario relevant to the security threats posed to, or derived from, the use of the different components that constitute the EU Space Programme, the first ever, so far, owned critical infrastructure by the EU.[525] Taking this view into account, it would seem logical for the Council Decision (CFSP) 2021/698 regarding the role of the Council and the High Representative should any information be made available to them about possible security risks via the security monitoring body as it may be pertinent to or affect the components of the EU Space Programme that will be established. This decision is made by the Council, in its unanimous capacity, following a recommendation by the High Representative.[526] To allow for actions to be taken immediately, should the urgency of the situation demand it, the High Representative is empowered to issue the required provisional instructions. The Council and the Commission shall be notified without delay, and the Council is to modify or revoke such instructions at the earliest possible time.[527] The said method allows procedures under CFSP concerning the exercise of security competences to be respected, while at the same time recognizing the role played by EU space infrastructure developed under art. 189 TFEU in responding to security threats. Such an example clearly demonstrates a particular case of security competence subject, to a certain extent, to the control of EU institutions: power provision of such actions to EU institutions for decision-making in accordance with intergovernmental decision making procedures, yet they possess a certain degree of autonomy with respect to emergency situations.[528]

III. The Role of Law in Strengthening EU Space Strategic Autonomy: Objectives and Rationale Behind the Establishment of EU Space Law

Strategic space autonomy means the European Union is to be autonomous, with the aim of limiting reliance on external actors and ensuring full control of its space infrastructure, assets,

[523] Cellerino, "EU Space Policy and Strategic Autonomy," p 469
[524] European Commission. *Communication from the Commission to the European Parliament.*
[525] Cellerino, Chiara. "EU Space Policy and Strategic Autonomy",
[526] Ibid.
[527] Ibid.
[528] Ibid.

and policies. The justification behind developing EU space law is complicated. One of the basic driving forces is the creation of a single market in space, and for that purpose, there must be a harmonized legal framework to deal with regulatory fragmentation and establish cohesion among Member States. However, other basic objectives are also significant. They are the provision of independent access to space through independent launching capabilities **(1)**, enhancing space security **(2)**, improving the resilience of space systems **(3)**, and ensuring long-term sustainability of outer space **(4)**. Together, these objectives serve the broader rationale for establishing a shared EU space law to further the Union's strategic autonomy in an increasingly contested and competitive space environment.

1. Autonomous Access to Space Through European Launch Capabilities

In order to maintain its autonomous decision-making in outer space, the European Union also attempts to minimize its dependency upon third parties, especially concerning programs such as Galileo and Copernicus, as well as space-related research funded by the European Union.

Yet, guaranteeing the cost effectiveness and sustainability of European space activities is impossible without depending on the global market of launches considering the rather low institutional demand for launches within the European region. What is the optimal solution to this challenge? "*In support of this goal of having independent and guaranteed access to space, the EU seeks, in coordination with European Space Agency (ESA), to foster and ensure the availability of European space transportation capabilities that are reliable, efficient, affordable, innovative and competitive*."[529] In this context, which governance instruments would be the most beneficial for achieving the mentioned aim? The European Union acts as an informed consumer of European launch services, innovating and investing in innovation, infrastructure, and advanced technological solutions like reusable rockets, satellite servicing, and micro-launchers.[530] Also, we may ask to what degree the above actions are conducive to increasing European launch autonomy? As many as 30 satellites will need to be launched for Galileo and Copernicus in the next decade, Ariane 6 and Vega C being instrumental in their delivery.[531] But most importantly, is this strategy sufficiently autonomous and resilient?

As of April 2025, the moment of writing this part of the thesis chapter, Europe's expansion of space launching capabilities has been really significant in terms of ensuring the strategic autonomy of the continent in launching access to space. There were several major developments in the month of March 2025 that would serve to highlight progress with regard to the challenges that have faced Europe's efforts toward independent launches. The test flight of the Spectrum rocket by Isar Aerospace from Andoya Spaceport in Norway on March 30, 2025, was a major milestone for private launch capabilities in Europe. The rocket lifted off, but 18 seconds into the flight, there was an anomaly that caused the vehicle to crash into the Norwegian Sea. It provided important data, especially in the validation of key systems such as

[529] European Commission, Directorate-General for Defence Industry and Space, "Access to Space," https://defence-industry-space.ec.europa.eu/access-space_en
[530] Ibid.
[531] Ibid.

the Flight Termination System, which contributes to the future development of launches[532]. Earlier in the month, on March 6, 2025, Ariane 6 undertook its first commercial flight from Europe's Spaceport in French Guiana.[533] The flight delivered the CSO-3 reconnaissance satellite for the French military, demonstrating once again Europe's ability to independently launch extremely sensitive national security payloads. This flight came after a successful maiden launch of Ariane 6 on July 9, 2024, further showing the rocket's operational reliability.[534] Nonetheless, becoming autonomous in access to space in Europe still poses some problems, mainly due to the high cost involved in the process and the increased level of competition globally. Another point worth mentioning is that the European launcher industry is facing constant threats coming from extremely competitive operators that have an advantage of operating in larger domestic markets and less rigid and, most importantly, less fragmented regulation regimes, as analyzed in Chapter III of this study. Autonomy here needs to be considered as a relative and complex notion determined by the combination of internal industrial capabilities and external market conditions. However, as concerns of security come to play an ever-larger role in today's international political landscape, an essential contradiction arises; the EU must decide whether it is better served by strengthening its domestic market for strategic reasons, despite any competitive disadvantages, in pursuit of wider security interests?

2. Integrating Space Safety/Security

The "security" aspect of the EU's space policy has gradually evolved to be focused around the concept of space traffic management (STM), which emerges as a solution to the increasing congestion of space and resulting collisions. In this regard, it could be argued that the Union has moved from a predominantly technical/coordination approach to the issue to a more structured, regulatory one. The most recent evidence of this trend can be found in the 2021 action plan[535] for synergy between civil and defense space activities. Importantly, this approach represents a major ideological change in the sense that STM has now been recognized not only as a technical but a security-related topic. The approach was further supported and underlined by the conclusions of the Council of the European Union,[536] which took into account the necessity to improve coordination at the Union level, but at the same time maintained the core importance of the role played by the Member States. Specifically, the Council highlighted the role of the European Commission in promoting harmonization and standardization processes

[532] European Space Agency. *Spectrum First Flight*. Released April 11, 2025. https://www.esa.int/ESA_Multimedia/Videos/2025/04/Spectrum_first_flight.

[533] European Space Agency**.** "*Ariane 6 Takes Flight for the Second Time*." ESA, March 6, 2025. https://www.esa.int/Enabling_Support/Space_Transportation/Ariane/Ariane_6_takes_flight_for_the_second_time.

[534] Euronews. "Ariane 6's Inaugural Flight Was Deemed a Success. What's Next for Europe in Space?" *Euronews*, July 14, 2024. https://www.euronews.com/next/2024/07/14/ariane-6-inaugural-flight-was-deemed-a-success-what-next-for-europe-in-space.

[535] European Commission. *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Action Plan on Synergies between Civil, Defence and Space Industries*. COM(2021) 70 final, February 22, 2021. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0070.

[536] European Commission. "Targeted Consultation on EU Space Law." *Defence Industry and Space*, accessed May 1, 2025. https://defence-industry-space.ec.europa.eu/newsroom/consultations/targeted-consultation-eu-space-law_en.

within the Union.[537] This highlights a rather delicate balance between institutions, as on the one hand, the EU aims to increase harmonization and coherence among member states, but on the other hand, it should be taken into account that each of them may have different levels of capability and interests. The security component is further detailed in the 2022 joint communication entitled "*An EU approach to space traffic management*," [538] which outlines a number of practical steps for creating an EU-wide STM system. The measures proposed include developing common standards, enhancing data exchange, improving the capabilities of space situational awareness systems, and gradually introducing regulation. It should be noted that the communication emphasizes the importance of STM by defining it as a cross-cutting aspect of civil, commercial, and military policy. In addition to the development of the policy, the consultation held at the end of 2023 provided a clear picture of the way in which the "safety" component is interpreted within the new EU space strategy. According to the interpretation, safety means all actions taken to protect astronauts, spacecraft, and orbital space from immediate and delayed threats. The process of consultation was important in forming perceptions of risks arising due to the growing number of space missions and space debris.[539] One of the main results of this consultation is the suggestion of structuring space-based risks by means of a hierarchical risk paradigm.[540] This paradigm implies that there will be an introduction of an analytical framework that allows for distinguishing among different degrees of danger. For example, operational space risks may comprise accidental collisions in orbit and uncontrollable descents into Earth's atmosphere, which may lead to destructive effects. Systemic risks may include the development of the Kessler syndrome, implying that there would be a chain reaction of space debris collisions that make some orbital zones unsuitable for further use. Apart from these risks, there is also a need to account for critical space service risks and risks to humans and objects in outer space and on Earth. Moreover, the consultation highlighted the need for risk management and accident prevention, especially in situations with a high impact but low probability. Moreover, there were also concerns regarding the adequacy of the existing legal framework. The national and international laws present have not proven to be sufficient for handling the nature and complexities of contemporary space missions.[541] This concern is similar to the problem of the fragmented legal framework because there are several laws that exist without an enforcement mechanism.

In this respect, the management of space debris reduction serves as an example of the problem of regulatory fragmentation. The current existence of different levels of norms includes international regulations formulated in 2007 within the UN context,[542] regional initiatives exemplified by the Zero Debris Charter established by the European Space Agency,[543] and

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[537] Cesari, Laetitia. *Developing an EU Space Law: The Process of Harmonising National Regulations*, Commentary, McGill, Faculty of Law, Institute of Air and Space Law, 2024. https://www.mcgill.ca/iasl/article/developing-eu-space-law-process-harmonising-national-regulations .

[538] European Commission. "Space Traffic Management." *Defence Industry and Space*. Accessed May 1, 2025. https://defence-industry-space.ec.europa.eu/eu-space/space-traffic-management_en.

[539] Cesari, *Developing an EU Space Law.*

[540] Ibid.

[541] Ibid.

[542] United Nations Office for Outer Space Affairs. *Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space*. ST/SPACE/49, 2010. https://www.unoosa.org/pdf/publications/st_space_49E.pdf; Cesari, *Developing an EU Space Law.*

[543] European Space Agency. *Zero Debris Charter.*

technical standards including ISO 24113.[544] In addition to that, there are national legal provisions that differ considerably in terms of their coverage, commitment, and implementation strategies.[545]

Nevertheless, the above-mentioned examples also show that there still exists a fundamental structural problem within the framework of EU space law, namely the fragmented nature of the legal architecture and the lack of universal and binding regulations. In sum, these recent trends demonstrate that the EU's strategy in terms of space security and safety tends towards an increasingly structured and risk-based policy. Indeed, the presence of several different levels of norms, from international guidelines and regional actions down to technical standards and varied national laws, indicates that the system is partly integrated, although not entirely so. While all these instruments help reduce risks together, due to their dissimilarities in terms of juridical status, scope and binding force, they fall short of creating a full-fledged regulatory system. In that respect, the state of matters regarding EU space law within the realm of security and safety could be considered managed or organized fragmentation rather than full harmonization. In other words, we can say that this diversity of norms gives rise to a complex environment of compliance, in which the operators have to operate in a context of soft law rules, technical norms, and national laws that differ from one jurisdiction to another. Although this is a reflection of the progressive attempts to address the sustainability of the orbital environment, it also reveals the lack of a comprehensive and binding regime at the global level. This raises questions not only about the effectiveness of the existing instruments, but also about the potential role of the EU in achieving a greater degree of regulatory coherence, either through harmonization policies within the internal market or through the influence on the international standardization processes.

3. Enhancing the resilience of space Infrastructure

Here, "Resilience" as a feature of EU space policy is meant to guarantee uninterrupted operation and protection of terrestrial and orbital infrastructure from various kinds of threats, especially cyber attacks and malicious operations. Unlike "security," which is primarily concerned about collision hazards, "resilience" takes a more general approach. It does not just concentrate on preventing any disruptions, but rather considers the ability to resist and cope with them as well. Therefore, resilience also comprises risks posed to space infrastructures by digital/ICT means, as well as physical threats, which can be inflicted on satellites and terrestrial infrastructures. One of the key issues associated with this aspect is connected with the concept of critical infrastructure, since, from a legal and policy point of view, not all infrastructures qualify as critical; only those considered important for social life and economic operations. In this regard, its application to space activities is necessarily limited through categorization and prioritization processes rather than a universal designation. Despite this, there may be cases where some parts of the European Union space mission would come under this heading. One such example would be the system called Galileo, which offers positioning, navigation, and

[544] International Organization for Standardization. *ISO 24113:2023 – Space Systems – Space Debris Mitigation Requirements*. Geneva: ISO, 2023. https://www.iso.org/standard/83494.html.
[545] Cesari, *Developing an EU Space Law.*

timing capabilities that enable certain functions. In addition, IRIS² is a multi-orbit satellite communications system intended for the support of governmental activities.[546] In view of their contribution to guaranteeing the continuity, reliability, and security of services provided through satellite technologies, it appears that they will be considered, both from a legal and operational point of view, more and more often as part of the critical infrastructure of the Union. In the case of the regulation dimensions, the resilience approach used by the European Commission is based on a lifecycle reasoning model. This is achieved by ensuring that any form of disruption is prevented by addressing weak points in digital and physical infrastructures and, at the same time, being able to react to, resist, recover from, and mitigate disruptions when they occur. The above proposal is taken further in the 2023 consultation process, whereby the complexity of the threat environment and the weaknesses present in the space domain are brought into consideration. The challenge that arises from the inability to counter the disruptions after the space assets are attacked is noted in this case. Unlike terrestrial infrastructure, satellites cannot easily be repaired or replaced after any attack. Risk mitigation actions before launching become more crucial in this scenario through the design, testing, and monitoring of the satellite. Another crucial component that emerged during the consultation process was the fact that the space supply chain was diverse and global.[547] Space assets depend on various parts manufactured by several companies in different countries. There might be cases when these manufacturers would lack proper cybersecurity measures in place.[548] The use of commercial products also carries certain risks, particularly if the products have not been upgraded. While the already available horizontal tools, such as the NIS2 Directive and the Critical Entities Resilience Directive[549] can be used as a starting point to address problems related to cybersecurity and resilience, they do not take into account the specific features of the space sector.[550] Such instruments are geared towards the protection of terrestrial infrastructure and lack adequate regard for the particularities of space activities. The inclusion of dedicated cybersecurity and resilience considerations within future regulatory frameworks, potentially including the upcoming EU Space Act, may contribute to a more consistent approach to governance. It would not only enhance existing horizontal principles but would also help to foster the development of strategic autonomy of the Union. From an analytical standpoint, the resilience factor provides another example of the persisting problems associated with the fragmentation of the EU space law system. In spite of noticeable tendencies towards the development of coordination and integration of the sectoral regulation through the identification of critical infrastructure and cybersecurity policies, the regulation remains fragmented due to its implementation by means of various instruments of different levels of government; This implies that sectoral requirements become increasingly evident.

[546] Ibid.

[547] European Parliament and Council. *Directive (EU) 2022/2555.*

[548] Ibid.

[549] European Parliament and Council. *Directive (EU) 2022/2557 of the European Parliament and of the Council of 14 December 2022 on the Resilience of Critical Entities and Repealing Council Directive 2008/114/EC*. Official Journal of the European Union L 333, 27 December 2022, pp. 164–198. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022L2557.

[550] Cesari, *Developing an EU Space Law*.

4. Promoting the Long-Term Sustainability of Space Activities

The sustainability aspect of EU space policy focuses on the conduct of space operations in such a way that ensures the future availability of orbital space and space infrastructure. There is a strong focus on the environmental consequences of space operations, which extend well beyond the initial impact to cover the whole lifecycle of space operations.[551] This not only involves the actual process of launch and operations in orbit, but also the design and manufacturing processes as well as the end-of-life disposal of space assets. In this regard, an environmentally sustainable approach based on eco-design is encouraged. On a parallel front, the Commission proposes a governance framework approach towards sustainability, based on better sharing of information among the various stakeholders. The satellite operators, for example, should be encouraged to share information regarding their operations and how they could avoid collisions and radio frequency interferences.[552] Although this is beneficial in achieving the overall aim of safety and sustainability, certain challenges arise from such information sharing requirements. First, some of the commercial entities may find it difficult to share their technical information with the rest of the operators due to competition issues. The sustainability concept is also used for supporting innovative in-orbit operations involving satellite servicing and repairs, including refueling of satellites, made possible by developing advanced capabilities of rendezvous and proximity operations. Such operations, partially developed as a result of implementing Horizon Europe programs, demonstrate not only a willingness to encourage innovations but also aim at reducing space debris and increasing the duration of satellites. However, it is necessary that the state ensures the fact that satellites cannot be used for any harm to other space objects, and the communications of companies operating these services are transparent.[553] It is, in legal terms, about assessing the implications from the point of view of an operative log, permission to damage and repair, which may involve considerations about joining or nesting between satellites, up to a realization requiring a rather bounded-knowledge time.[554] Thus, the sustainability concept provides another example when considering regulatory innovation and uncertainty from the legal perspective. On the one hand, the European Union actively promotes environmentally responsible activities, using advanced technologies in doing so. On the other hand, it should be noted that the corresponding regulations, which are to serve as a legal base for such activities, are still being developed.

Furthermore, for sustainability and the benefit of everyone, based on Dr. Cesari's commentary,[555] the Commission is presenting a number of options that implement this European space law.[556] The established guidelines must be adhered to in a nonbinding manner, whereas labels for those guidelines are set by some entities such as the leading committee and a nonbinding charter. Secondly, the creation of a binding framework granting national licenses subject to certain minimum requirements and harmonized minimum rules would apply

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[551] Ibid
[552] Ibid.
[553] See, Azcárate Ortega, Almudena. "Not a Rose by Any Other Name: Dual-Use and Dual-Purpose Space Systems." *Lawfare*, June 5, 2023. https://www.lawfaremedia.org/article/not-a-rose-by-any-other-name-dual-use-and-dual-purpose-space-systems; Cesari, *Developing an EU Space Law.*
[554] Cesari, *Developing an EU Space Law.*
[555] Ibid.
[556] Ibid.

indiscriminately to European and to non-European companies. Alternatively, a combination of the latter two would pursue a compromise between what is truly needed to be set in place and what would ideally, although without being obligatory, be able to be established at the level of the European. Hence, a few reference standards could turn into obligatory ones, others would still apply voluntarily, but could require compliance by way of contractual arrangements, for example, as regards institutional public procurement. Through regulations, the EU institutions seek to promote the competitiveness of the space sector by rendering standards a guarantee of quality and reliability, thus deserving recognition and access to certain public contracts.[557] This approach embodies a balance between harmonization and competitiveness. Through the conversion of technical and sustainability norms into regulatory standards, the Union would be able to mitigate fragmentation in the licensing systems of Member States while establishing a level playing field in the internal market. The tie between regulatory compliance and public procurement or institutional funding would also encourage excellence without necessarily pursuing centralization. If properly tuned, this hybrid approach, which balances binding minimum rules with voluntary best practices, may enhance the coherence of regulations and, at the same time, maintain a degree of flexibility for Member States and industry players while upholding the Union's strategic autonomy goal.

Conclusion of the chapter:

This chapter has discussed why the European Union needs to create strategic autonomy in outer space, and how law can help make this a reality. We began by explaining what form of strategic autonomy appears for the EU here. It's not so much a matter of ownership of advanced technologies or space missions; it's having the ability to act on its own, make choices based on its own interests, and reduce dependency on non-Europeans. The Galileo case shows the way in which Europe is already moving towards this path by establishing its own world navigation system on the basis of both autonomy and cooperation. At the same time, achieving this autonomy is not a simple task. There are a number of challenges that face the EU, more so in coordinating space activities among its institutions and member states. The relationship between ESA and the EU is complex, and national interests pull in different directions. In addition, separating those space activities that are civil and military, each subject to different divergent legal regimes, adds a further layer of complexity. It is for this reason the law is such a crucial tool. A structured EU space law could be able to bring more clarity, better coordination, and support for the objectives of the EU, ranging from acquiring independent access to space, to protecting strategic infrastructure, and to enforcing long-term sustainability. It would also make Europe a more assertive player in international space matters. In other words, if the EU is to gain complete independence in space, it needs more than satellites and rockets. It needs one vision of law that brings its institutions together, protects its industries, and articulates its values globally.

As proof of what has been said above, on April 28, 2025, Josef Aschbacher, the ESA Director General, clearly stated strategically that Europe must drastically increase its investment in the space sector if it is to achieve complete independence from the United States in key space

[557] Ibid.

domains.[558] He argued that a U.S dominated global space environment is driven by supremely large governmental funding and a highly vibrant commercial sector spearheaded by the likes of SpaceX; Europe, meanwhile, has been relying heavily on American capability for launch services and some form of space-based data infrastructure. Aschbacher said that this dependence becomes a growing geopolitical and technological risk with the growing world competition and instability in supply chains. As a consequence, strategic autonomy is not merely another economic argument; it is a political and security imperative. He told the audience that establishing European sovereign launch capabilities, secure satellite constellations, and independent communications and observation networks is an absolute necessity-the technological foundation at the heart of national and continental sovereignty in the space age. Without that, he warned, Europe would lose not only its competitive edge but its place as an independent actor on the world stage.[559]

[558] Wall, Mike. "Europe Must Boost Space Investment to Secure Autonomy from US, Says ESA Boss." *The Guardian*, April 28, 2025. https://www.theguardian.com/science/2025/apr/28/europe-must-boost-space-investment-to-secure-autonomy-from-us-says-esa-boss.
[559] Ibid.

Chapter 5: Assessing the Legal Basis for EU Action in Space Law: Competence, Procedures, and Expectations

Since the long-awaited EU Space Act draft has not seen the light yet (at the moment of writing this chapter), questions are not only being asked regarding the structure of law and institutional procedure, but even regarding the broader strategic vision of the EU. At the center of this evolving framework lies an imperative question: Can and must the EU be the one, unifying power? In other words, "*one captain in the European spaceship.*" [560] On regulating space activities, or will it need to remain as a coordinator of sovereign Member States? The legal basis is complex. Under Article 4(3) of the TFEU, the EU has a concurrent competence in matters of space; both the EU and its Member States have the ability to act in the same area of policy. The Member States retain their national sovereignty even in the case of taking measures by the EU, and Article 189(2) expressly excludes any harmonization of Member States' space laws. The overlapping competences between the EU and its Member States have come to be seen more and more as an institutional obstacle to the Union's ambitions in space, particularly as space becomes an increasingly important strategic and economic arena.[561] The absence of equal legislative capacity between Member States raises fundamental questions on Europe's capacity to ensure safety, legal certainty, and competitiveness in the external space context. In this context, this chapter analyzes: **(I)** the legal basis and limits of EU space regulation; **(II)** the institutional process and political hurdles that have stalled the common Space Act adoption; and **(III)** hopes and suggestions linked to the upcoming legislative proposal, asking whether the EU can ultimately consolidate its command to guide Europe beyond the Earth's orbit.

I. Possible Legal Basis for EU Space Regulation: Scope and Limits

In the context of EU competence in the space sector, this analysis does not intend to refer to a general or inherent legislative competence. Competence is understood to be the authority conferred on the Union by the Treaties to adopt legally binding acts in a specific area, within the framework of established objectives, procedural standards, and substantive constraints. In accordance with the principle of conferral established in Article 5 TFEU, the Union can only act within the framework of the competences conferred on it by the Member States in the Treaties. Consequently, the Union's legislative competence in space must be traced back to specific provisions of the Treaties, each of which establishes both the extent and the intensity

[560] von der Dunk, Frans G. "Towards One Captain on the European Spaceship— Why the EU Should Join ESA" (2003). *Space, Cyber, and Telecommunications Law Program Faculty Publications*. 56. https://digitalcommons.unl.edu/spacelaw/55/

[561] Bartóki-Gönczy, Balázs, and Katarzyna Malinowska. "Paradigm Shift in the European Union's Space Policy: Institutional Restructuring and Its Possible Consequences for the CEE Region."

of the possible action.[562] As previously mentioned, Article 189(1) TFEU empowers the Union to develop a European space policy "*to promote scientific and technical progress, industrial competitiveness and the implementation of its policies*"[563]. Article 189(2) allows the European Parliament and the Council to adopt "necessary measures" to achieve these objectives, including establishing a European space programme, but explicitly prohibits the harmonization of national laws, "*excluding any harmonisation of the laws and regulations of the Member States*"[564]. This framework confirms that space is a shared competence: the EU can act and legislate in this area, but it cannot fully displace Member States' authority.[565] Article 4(3) TFEU further clarifies that in domains such as research, technological development, and space, the exercise of EU competence "*shall not result in Member States being prevented from exercising theirs*"[566]. Accordingly, no single Treaty provision grants the EU exclusive power over space, and the *anti-harmonisation* rule in Article 189(2) prevents the simple imposition of a uniform EU space law. Before the Commission's statement that Article 114 TFEU would be the basis for the upcoming Space Act, alternative articles of the Treaty had been examined as possible bases for EU action. We will analyze them below, and these remain relevant for understanding the scope and limits of EU competence in space.

1. Core Provisions: Article 189 TFEU

As previously mentioned, Article 189 TFEU, or some like to call it the "*space article*."[567] It enables the EU to develop a space policy jointly with Member States, by "*promoting joint initiatives, supporting research and technological development and coordinating the efforts*" needed for space exploration.[568] Its wording is rather supportive and coordinating. Crucially, under Article 189(2), any measures adopted by the ordinary legislative procedure "*may take the form of a European space programme, excluding any harmonisation of the laws and regulations of the Member States*".[569] This explicit "*no harmonisation*" clause significantly limits the competence of the Union to regulate space in a uniform manner. The drafting record shows Member States insisted on retaining sovereignty: Article 189(2) was added to ensure that no measure of the EU would operate to override national space laws. Article 189(4) provides that the space policy provision is "*shall be without prejudice to the other provisions of this Title*" that is, other competences can in theory also apply to space. However, as

[562] LexisNexis UK, *"EU Competence,"* Accessed February 14, 2026, https://www.lexisnexis.co.uk/legal/glossary/eu-competence
[563] European Union. *Consolidated Version of the Treaty on the Functioning of the European Union*. Official Journal of the European Union, C 326, October 26, 2012. Article 189(1). https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:12012E/TXT:en:PDF (accessed May 20, 2025).
[564] Ibid, TFEU C 326/131.
[565] European Union. *Consolidated Version of the Treaty on European Union*. Official Journal of the European Union, C 115, May 9, 2008. Article 4(3). https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12008E004 (accessed May 20, 2025).
[566] Ibid.
[567] Potter, Samantha, *Approaching Harmonization: Examining the European Union's Efforts to Create a Common EU Space Law and Assessing its Potential Legal Foundations*. Stanford-Vienna European Union Law Working Paper No. 77, 2023. https://law.stanford.edu/wp-content/uploads/2023/05/EU-Law-WP-77-Potter.pdf (accessed August 26, 2024).
[568] TFEU Article 189(1).
[569] TFEU C 326/131.

previously mentioned, the scope of Article 189(2) is expressly limited: it permits the Union to adopt the measures necessary to implement the objectives of the space policy without harmonizing the laws and regulations of the Member States. This provides an important safeguard for the autonomy of the Member States in that field and ensures that EU initiatives cannot preempt national competences. The exclusion of harmonization does not prohibit the adoption of binding EU measures *per se*. EU law is replete with examples where binding acts coordinate activities or manage behavior without pursuing uniform national laws, such as in social security coordination (e.g., Regulation (EC) No 883/2004)[570]. In this regard, although the EU has the possibility to adopt rules that guide, regulate, or facilitate space activities within the Union, it does not have the possibility to adopt a fully unified and harmonized EU space law under Article 189(2). This difference illustrates the limits of EU competence in space and the challenges of achieving strategic autonomy and regulatory coherence within the existing Treaty framework.

2. Internal Market Harmonization: Articles 114–115 TFEU

Both Articles 114 and 115 provide for the approximation of national laws in situations where differences in regulations have an impact on the creation or operation of the internal market. While Article 115 provides for the adoption of directives by a special legislative procedure on the basis of unanimity, Article 114 provides for the adoption of measures, including directives and regulations, by the ordinary legislative procedure. The difference is thus more procedural and functional, and in neither case is the provision limited to the internal market, although Article 114 provides more flexibility; Article 114(1) empowers the EU (in the framework of ordinary legislative procedure) to adopt national legislation into close proximity "*which have as their object the establishment and functioning of the internal market*".[571] Thus, if an action related to space can be couched in terms of removing trade barriers or encouraging market functioning, Article 114 could be a legal basis. For example, the Commission has argued that different national space legislations (e.g. on registration or licensing of satellites) could hamper the competitiveness of EU operators and cross-border services.[572] In principle, Article 114 would be applicable to directives harmonizing such provisions. Nevertheless, EU case-law tightly limits Article 114 to legitimate market objectives: Article 114 may not be relied upon to pursue objectives beyond the internal market or disregard express Treaty constraints, held the ECJ in *Germany v Parliament* (Tobacco Advertising)[573]. In the space context, Article 189(2) is

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[570] "Coordination of Social Security Systems," *EUR-Lex*, summary of Regulation (EC) No 883/2004, accessed November 19, 2025, https://eur-lex.europa.eu/EN/legal-content/summary/coordination-of-social-security-systems.html

[571] TFEU, C 326, October 26, 2012. Article 114

[572] Miglio, Alberto, Lorenzo Grossio, Alice Civitella, Cecilia Nota, and Margherita Penna. *Space and Defence: A Hybridisation of EU Space Policy and CSDP*. Centro Studi sul Federalismo Research Paper, December 2024. https://iris.unito.it/retrieve/5c6c9e73-fb2d-4aee-a800-2810343d4e23/CSF-RP_EU-Space-Policy_Miglio_Grossio_Civitella_Nota_Penna_Dec2024.pdf (accessed April 09, 2025).

[573] CJEU, Case C-376/98, Germany v. Parliament and Council, Judgment of 5 October 2000,The EU adopted Directive 98/43/EC banning tobacco advertising in the press and on the radio. Germany challenged this directive, arguing it exceeded the EU's competence under what is now Article 114 TFEU. Ruling: The Court annulled the directive, holding that it did not truly aim to improve the functioning of the internal market but instead pursued a public health objective.: To dive more into the topic In Tobacco Advertising (Case C-376/98), the Court

just such a Treaty constraint. It is worth mentioning that Article 114 has evolved into the Union's principal engine of regulatory harmonization. Its success in fields is structurally diverse, as financial regulation (e.g., the Market Abuse Regulation, MiFID II, and other post-financial crisis reforms)[574], Digital and data regulation, including the Digital Services Act, Product safety and environmental standards, and Chemicals regulation, such as REACH Regulation.[575] demonstrates that the provision is capable of sustaining complex and technically dense regulatory regimes, provided that the measure genuinely addresses actual or likely obstacles to the functioning of the internal market. Yet this success is conditional rather than automatic; any reliance on the internal market legal basis must comply with the "Tobacco Advertising" test. The aim of the measure must be to remove obstacles to trade or to avoid appreciable distortions of competition. A measure whose true aim was to secure a sector-wide unification of space law, regardless of the absence of a discernible market barrier, would go beyond the remit of Article 114.[576] Article 115 is a redundant standby in a number of senses: it also allows approximation (with unanimous Council voting) of laws with direct effect on the internal market[577], but insofar as Article 114 already operates by qualified majority and ordinary legislative procedure, Article 115 is thus more of a residual or politically sensitive provision, to be used where the involvement of Member States is essential or where Article 114 cannot be justified. In case Article 114 is the chosen one for the EU Space Act legal basis, it will be further analyzed in the next chapter.

3. The "flexibility clause": Article 352 TFEU

This article enables the European Union to take action when action is necessary to reach one of the aims of the Treaties, but where there is no specific legal basis. Unlike Article 114 TFEU, it is not confined to the internal market, and technically could be viewed as a means to fill legal holes in the EU's competence in space issues. But Article 352(3)[578] applies a strict restriction: it provides specifically that the Union may not invoke this Article to harmonize domestic law in areas where the Treaties expressly rule out harmonization. Since Article 189(2) TFEU prohibits harmonization of Member States' law in space, that restriction immediately applies to space law. Moreover, Article 352(4) excludes the application of this article in cases that involve the Common Foreign and Security Policy, again narrowing its scope in space cooperation.

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invalidated an internal-market directive because its underlying purpose was public health, not market integration. By analogy, any EU space policy must be genuinely linked to market or Treaty objectives. If, for example, an ostensibly internal-market measure is primarily about harmonizing safety standards (rather than removing trade barriers), it could be invalid. This emphasizes that Article 114 cannot simply be stretched to replace Article 189(2). Similarly, the general rule that EU action will respect "constitutional identity" of Member States means that exclusively national competences (e.g. licensing of launch sites or military satellites) remain with states in the absence of an express Treaty basis.

[574] European Commission, *"MEMO/14/305: Questions and Answers – European Defence Action Plan,"* July 30, 2014, https://ec.europa.eu/commission/presscorner/detail/en/memo_14_305

[575] European Commission, *"REACH Regulation,"* https://environment.ec.europa.eu/topics/chemicals/reach-regulation_en

[576] Potter, *Approaching Harmonization*.

[577] TFEU, C 326, October 26, 2012. Article 115.

[578] ex Article 308 TEC.

While there have been proposals by a few commentators that Article 352 might be the legal foundation for harmonization measures[579], such an approach is not legally justifiable for the establishment of a harmonized EU space law. Article 352 cannot overrule explicit treaty prohibitions like Article 189(2). Therefore, it cannot serve as the foundation of an overarching and harmonized EU space act.[580] Operationally, Article 352 only applies to gap-filling measures, for instance, supporting coordination of national programmes, launching joint action, or funding cooperation instruments falling short of infringing Member States' regulatory sovereignty in matters of space.

4. Other Relevant TFEU Articles

A. Industry and Networks (Arts. 170-173)

The Treaty contains sectoral provisions that edge towards space issues. Articles 170-172[581] deal with Trans-European Networks in transport, energy and telecoms. While not aimed directly at space, they allow for EU guides and projects (such as satellite telecommunications networks) under normal procedure. In practice these have not been used for harmonization in space. Article 173[582] on industrial competitiveness is more particularly relevant: it obliges the EU to "*ensure that the conditions necessary for the competitiveness of the Union's industry exist*" and allows Parliament and Council to adopt measures in pursuit of such objectives. Notably, Article 173(3) echoes the wording of Article 189 by empowering such measures "*excluding any harmonisation of the laws and regulations of the Member States*"[583]. Thus, any EU action under Article 173 (such as the creation of joint technology ventures) must also fall short of binding harmonized rules. Other technology and research items (such as Article 182 on R&D Framework Programmes) advocate EU financing of space-based research, or Article 186 on international research cooperation, but play equally only a supporting function and cannot create uniform law.[584]

B. Competence Classification (TFEU Art. 2 and TEU)

Space is listed in the Treaties as an area of shared competence; The Treaty provides that the EU has competence to "*carry out activities*" in research, technological development and space, but explicitly not to supplant Member States' role[585]. In practice, this means legislative acts in space must fit within Article 189 or other competences noted above and cannot transform the regulatory patchwork of Member State laws into a single code. The ECJ has repeatedly reaffirmed the principle of conferral: under Articles 3-6 TEU and 2 TFEU, the Union can only act where the Treaties grant power. Thus, the general competence rules underscore that space remains essentially a shared or supporting competence; elevating it to an exclusive Union area would require Treaty change.

[579] TFEU, C 202, June 7, 2016.
[580] Potter, *Approaching Harmonization*.
[581] ex-Articles 154-156 TEC.
[582] ex-Article 157 TEC.
[583] TFEU,C 326/125.
[584] Potter, *Approaching Harmonization*.
[585] TFEU, C 115, May 9, 2008. Article 4(3).

Latest Commission and Council policy documents articulate some efforts to word harmonization; In 2022 the Commission/HR approved an EU Approach to Space Traffic Management[586]. he key theme in this Joint Communication is safe and sustainable utilization of outer space because "*there is a direct threat to the safety and security*" of assets in space from collisions.[587] It notes, however, that EU action must not infringe on Member State competences. The STM approach necessitates joint "*incentive measures*" and stakeholder working groups rather than mandatory EU standards. Likewise, the 2023 Joint Communication on the EU Space Strategy for Security and Defence explicitly acknowledges current fragmentation: "*Some Member States have introduced national regulations to manage space activities… These regulations differ*." This divergence can "*affect the competitiveness of the EU space industry and the safety of the EU.*"[588] It then states that the Commission "*will consider proposing an EU Space law*" to ensure a consistent EU-wide approach.[589] Interestingly, even this commitment is framed in terms of considering a law and as ensuring respect for member-state competences "*while protecting national security interests*".[590]

5. Is it legal for the EU to adopt a Binding Space law?

To sum up, the legal feasibility of such an act greatly depends on how it is established. Under the current legal framework, it is not legally possible to enact a fully harmonized space law between EU Member States. Yet, a good treaty instrument that would accommodate the boundaries of EU competences could still see the light of day, thereby forging a coherent and efficient space governance framework.

As mentioned above, Article 352(3) categorically forbids the use of this clause to harmonize legislation in areas where the Treaties expressly forbid it. However, the legal framework is by no means absolutely prohibitive: Article 189(1) TFEU confers on the EU competence to take appropriate measures for the achievement of the said objectives. This would, within those limits, leave open the possibility of a legally valid "EU Space Act" with common principles and encouragement of interoperability, strictly avoiding binding harmonization of national space law. While such standards would not supersede national legislation, they might, in effect, make voluntary harmonization and, eventually, convergence possible. This could also reflect in the use of Article 114 TFEU as a legal basis, aiming at improving the conditions for the functioning of the internal market. However, this article has been criticized by some scholars because it mainly deals with distortions of competition and does not provide a robust enough legal basis for broader regulatory ambitions for the space sector. Any action taken under this article needs to be strictly confined to aspects relevant to the market and cannot aim at fully harmonizing or codifying national space legislations. This, together with the further legal and

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[586] European Commission and High Representative of the Union for Foreign Affairs and Security Policy. *An EU Approach for Space Traffic Management: An EU Contribution Addressing a Global Challenge*. Joint Communication JOIN(2022) 4 final. Strasbourg, February 15, 2022. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022JC0004 (accessed May 22, 2025).
[587] Ibid.
[588] European Commission and High Representative of the Union for Foreign Affairs and Security Policy. *European Union Space Strategy for Security and Defence*. Joint Communication JOIN(2023) 9 final. Brussels, March 10, 2023. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52023JC0009 (accessed May 20, 2025).
[589] Ibid.
[590] Ibid.; Potter, *Approaching Harmonization*.

practical implications, will be discussed in more detail in the next chapter. We must admit that the European Commission is well aware of the existing legal boundaries and will introduce a framework that focuses more on safety, reduction in liabilities, and resilience as opposed to national space law harmonization. The new legislation would, therefore, strengthen the existing national frameworks without replacing them. This is strategic reasoning for the recent use of the term "EU Space Act" instead of "Law", as was expected, and not because the initiative will be a single space code, but because it will symbolically and practically bring EU involvement in space governance to the next level.

II. Procedures and Challenges in Establishing an EU Space Act

To ensure that the EU Space Act fully reflects the views of everyone with an interest and satisfies the actual requirements of the space industry, a series of preparatory actions was adopted by the European Commission. Among them was conducting an impact assessment,[591] an overview of economic impact, an overview of social impact and an overview of the environmental impact of the draft regulation. One particularly important measure was the consultation process, which involved both the public and key stakeholders **(1)**. Even so, there are challenges **(2).** These are best seen in the delays in revealing the draft proposal, which slowed down the legislative process and postponed the start of the negotiations between the European Parliament and the Council.

1. Targeted stakeholder consultation

One of the most important steps in preparing the legislative proposal was the European Commission's focused consultation, as an online survey,[592] on the draft EU Space Act one of its goals is to help assess the current situation and problems. It was launched on September 29, 2023, and is a milestone in the development of an integrated legal setting for space activities under the European Union.[593] Released under the auspices of President von der Leyen's Letter of Intent for the work programme of 2024, the initiative reflects the growing realization of the need for a structured, coordinated legal framework underpinning the regulation of Europe's increasingly dynamic and strategic space environment. The consultation process was rendered transparent and inclusive with the active seeking of inputs from diverse stakeholders, like academic/research institutions, business associations, spacecraft manufacturers, space operators, airlines or air navigation service providers, consumer organizations, environmental organizations, non-governmental, organizations (NGOs), public authorities, trade unions, and any other individual who may be affected by EU legislation can have their opinion in the process. Such an open method goes on to depict the Commission's effort to base the legislative

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[591] See, European Commission, *Executive Summary of the Impact Assessment Accompanying the Proposal for a Regulation on the Safety, Resilience and Environmental Sustainability of Space Activities in the Union* (SWD-COM(2025) 225 final), June 25, 2025, https://defence-industry-space.ec.europa.eu/document/download/84813bcb-51e3-4b49-bc8b-0ad53b8677c0_en?filename=SWD-Executive-summary-of-the-impact-assessment.pdf.

[592] The questions of the survey can be found here: European Commission. *Targeted Stakeholder Consultation on EU Legislative Initiative on Safety, Resilience and Sustainability of Space Activities ('EU Space Law')*. EUSurvey. https://ec.europa.eu/eusurvey/runner/EUSLsurvey

[593] Ibid.

process on the technical reality and ambitions of the space community. However, this perception was not universally shared; Many entities that contributed to the consultation expressed uncertainty about the next steps and the overall direction of the initiative. Moreover, Member States were reportedly kept uninformed about the content and progress of the draft proposal for several months, which led to growing unease over the repeated delays and the lack of communication from the Commission.

The questionnaire is organized into two parts: a short section of respondent profile questions (sector, role, etc.), and the substantive section on space activities and governance.[594] In it, the authors alternate between closed-choice items, single and multiple select questions, including rating scales, and open-ended text fields for detailed opinions. The major themes of the questions reflect the three pillars of the coming EU Space Act. For example, under the Safety pillar, questions were asked about space traffic management and debris mitigation-according to the rules, they should "minimize collision risks" and also specify how to prevent or remove defunct satellites and debris.[595] Under Resilience, the survey asked about the security of space systems, including ground segments, "physical and cyber" seems to have been expressly under consideration, as it was "clearly at the centre" of this section.[596] Under Sustainability, questions dealt with long-term environmental effects: life-cycle footprint of launch and satellites, orbital debris, and effects on astronomy, a quiet and clear sky.[597]

Concerning the feedback of this consultation, from among 27 EU Member States (47% of respondents) and several third countries like Canada, Japan, Norway, Switzerland, the U.S., and the U.K. (5%). The origin of the remaining responses (49%) was an unknown entity. A total of 333 contributions were received, and 65 accompanying documents were submitted, which were 170 from organizations, 153 from individuals, and the remainder being anonymous. Of the organizations involved, 62% were small or medium-sized companies. The survey responses and position papers presented, including those by industry associations, confirmed broad support for the EU Space Act.[598]

By gathering inputs on legal, technical, and regulatory matters, the consultation has positioned itself to potentially become a new model for EU legislation, particularly in domains such as space, where technological advances leave traditional regulatory horizons in the dust. Unlike relying on pure top-down commitments, the new model, bottom-up, unites commitments with voluntary standards and mutual-recognition practices. [599] By doing so, the targeted consultation

[594] Latvian Technology in Space. "Targeted Consultation on EU Space Law." *Latvian Technology in Space*, September 2023. https://space.sciencelatvia.gov.lv/en/news-events/targeted-consultation-on-eu-space-law/ (accessed May 22, 2025).
[595] Andreas Lenz and Thomas Jansen, "Ready for Impact?: Outlook regarding the soon to come EU Space Law – objectives and expectations," *Lexology*, March 14, 2024, originally published by Heuking Kühn Lüer Wojtek. https://www.lexology.com/library/detail.aspx?g=b1449665-17ae-4561-9e98-77ba7df89b57
[596] Ibid.
[597] Ibid.
[598] European Commission, *Proposal for a Regulation of the European Parliament and of the Council on the Safety, Resilience and Environmental Sustainability of Space Activities in the Union* (COM(2025) 225 final), June 25, 2025, Article 75.
[599] Cesari, Laetitia. "Developing an EU Space Law: The Process of Harmonising National Regulations." *Institute of Air & Space Law – McGill University*, February 16, 2024. https://www.mcgill.ca/iasl/article/developing-eu-space-law-process-harmonising-national-regulations (accessed August 15, 2024).

reveals more than just a step toward a new legislative initiative; it suggests a potential shift in the manner in which EU legislation emerges, in advanced, strategic, and knowledge-intensive areas, also striving to secure its position as a player of global space.[600] After this consultation, other steps for sure had emerged, following the usual steps for drafting and adapting laws within the EU commission.

2. Challenges: Delays In Finalizing the EU Space Act Draft, A Hesitation or Uncertainty About Its Effectiveness?

The long-awaited EUSL has finally experienced continuous postponements. Initially scheduled in 2023/early 2024, the draft was postponed twice, first pushed beyond the June 2024 European Parliament elections[601] , and later planned for June 2025. There are deep legal, political, and institutional concerns under these delays. European space policy must find a balance between a complex treaty regime (most notably Article 189(2) TFEU) and Member States vested interests in sovereignty and industrial policy. Consequently, fundamental questions of EU competence and the balancing of interests have meant hesitancy in settlement. To sum up these challenges, we can mention the diverging national ambition in the EU toward the space sector (**A**), the institutional and political dynamics (**B**), and, surprisingly, for some experts, these delays can have a positive effect, which justifies the waiting period (**C**).

A. Diverging National Interests

Member States possess distinct space-capabilities and industrial interests, complicating consensus on uniform rule-making in the European space domain. France and Germany, as Europe's leading space powers and primary contributors to European Space Agency programmes such as the Ariane launcher series, share leadership roles in the launcher and satellite-manufacturing sector (via entities such as ArianeGroup and Arianespace). They generally support a robust European industrial base and advocate continued leadership in areas like launchers, Earth observation, and satellite navigation.

By contrast, smaller or newer Member States, especially in Central and Eastern Europe,[602] operate with more limited space budgets and industrial capacity, making mechanisms that guarantee equitable industrial returns particularly important.[603] In this respect, ESA's *geographical return* (or "juste retour") principle is legally entrenched in the ESA Convention. According to Article IV of the Convention for the Establishment of the Agency, "*a Member State's overall return coefficient shall be the ratio between its percentage share of the total value of all contracts awarded among all Member States and its total percentage contributions*." [604] The Agency explains that the ideal target is a coefficient of 1.0 (an

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[600] Ibid.

[601] Gleason, Michael P., and Catrina A. Melograna. *Anticipating the New European Union Space Law*. Center for Space Policy and Strategy, October 2024. https://cdn.ymaws.com/satelliteconfers.org/resource/resmgr/pdfs/05a_neweuspacelaw_gleason_20.pdf

[602] Bartóki-Gönczy, Balázs, and Katarzyna Malinowska. "Paradigm Shift in the European Union's Space Policy: Institutional Restructuring and Its Possible Consequences for the CEE Region." .

[603] Ibid.

[604] ESA convention.

approximation of equal return relative to contribution), subject to weighting factors for technological interest.[605] Accordingly, despite this method being criticized as mentioned in a previous chapter, some smaller States reliably insist on maintaining this principle to validate continued national industrial participation.

In some cases, France has been seen to advocate for greater flexibility and reform of the geographical return mechanism in order to boost industrial competitiveness and strategic efficiency, while Germany has been seen to favor the maintenance of the principle for the sake of ensuring industrial participation and return on contribution. Recent commentary confirms that the geo-return rule remains "*absolutely important for the Member States*" according to ESA's Director General.[606] This divergence gives rise to intra-European institutional tension: larger Member States wish to preserve industrial prerogatives and national influence, whereas smaller States advocate a more integrated internal market approach in space governance. The drive to reform the geo-return system forms part of the broader effort to counter fragmentation of Europe's space industrial base.[607]

Although some national agencies, such as the Centre National d'Études Spatiales (CNES, France) and the Deutsches Zentrum für Luft- und Raumfahrt (DLR, Germany), maintain bilateral cooperation agreements with third-country agencies such as NASA or the Japan Aerospace Exploration Agency (JAXA), these arrangements complement rather than replace European multilateral cooperation under ESA. Meanwhile, the European Union, primarily through programmes like Galileo and Copernicus and via limited engagement by the European External Action Service (EEAS) and the European Commission's DG INTPA, plays a supporting role in external space relations.[608]

Such differing national views not only impact on the policy unity in ESA but have also had an effect on the European Union's space governance process. The several postponements of the proposal for an EU Space Act before its eventual submission are indicative of the way in which national views on industrial distribution, competencies, and the need to maintain the geographical return principle in ESA membership might impede the way forward in having a more unified legal framework. However, it is also possible that other strategic considerations might have been at play, even if these are not always openly expressed.

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[605] European Space Agency, "ESA, an Intergovernmental Customer," *ESA* (website), https://www.esa.int/About_Us/Business_with_ESA/Business_Opportunities/ESA_an_intergovernmental_customer (accessed March 13, 2025).
[606] Josef Aschbacher, "ESA Director General Reaffirms Geo-Return Policy as 'Fundamental'," *European Spaceflight*, January 2, 2025, accessed March 13, 2025, https://europeanspaceflight.com/esa-director-general-reaffirms-geo-return-policy-as-fundamental/
[607] European Spaceflight, "EU Report Advocates for Scrapping ESA Geo-Return Policy," *European Spaceflight*, September 9, 2024, accessed March 13, 2025, https://europeanspaceflight.com/eu-report-advocates-for-scrapping-esa-geo-return-policy/
[608] See, Jenni Tapio and Alexander Soucek, "The European Space Agency's Contribution to National Space Law," in *International Actors and the Formation of Laws*, ed. Katja Karjalainen, Iina Tornberg, and Aleksi Pursiainen (Cham: Springer, 2022), 113–134, https://doi.org/10.1007/978-3-030-98351-2_6

B. Institutional and political dynamics

Other institutional and political factors have been obstacles to the process. On the institutional side, one relevant development was the change in the European Commission's space portfolio in 2024. Under the mandate 2019-2024, space affairs were part of the Internal Market portfolio, which was under the responsibility of Commissioner Thierry Breton, and DG DEFIS - Defense Industry and Space. In the next Commission, Andrius Kubilius was the first commissioner to be given the dedicated portfolio of Defense and Space. This step has signified that the European Commission increasingly acknowledges space as a strategic domain strongly connected with defense and security policy.

Commissioner Breton, who had committed to revealing the draft of the law by Spring 2024, in April 2024 admitted it was "not yet mature" and put it back until after the June parliamentary elections.[609] In reality, these political schedules put the EU legislative process at the mercy of calendar overhauls at any moment: a path agreed upon by one Commission may change if priorities or seats change. Indeed, the Space Strategy for Security and Defense (2022) called for a common EU structure, and von der Leyen's 2023 Letter of Intent placed prioritizing making a space law for 2024.[610] But with the 2024 elections in mind, Commissioners and Member States naturally made less progress on sensitive new legislation. There is also EU-ESA overlap challenge institutionally; ESA as an intergovernmental agency not controlled by the EU, with non-EU members like the UK, has a huge role in European space activities. EU Member States are eager to protect ESA's prerogatives and national interests within it. EU legislation being developed with intersections over ESA activities (e.g. launchers, Earth observation) must navigate this two-tier structure. In practice, this can slow down decision-making: EU officials must consult with ESA and reconcile with its multilateral governance, and Member States negotiate how much of space policy to make intergovernmental. The absence of precedent for EU-level regulation of space (as opposed to, e.g., air or telecoms) is that there is no clear idea of which EU bodies should deal with authorizations, licenses, etc., and how this aligns with national space agencies.

Finally, budget and programmatic battles have crept in. The EU is funding giant new space missions (Galileo, Copernicus, and the upcoming IRIS² broadband constellation). It is difficult to see how an EU regulation would coexist with ESA-managed launcher programmes, such as Ariane and Vega, which are developed and operated by industrial partners under ESA oversight rather than being ESA-owned assets. Differences of opinion on the future structure of ArianeGroup have already highlighted national sensitivities surrounding ownership and control. In parallel, the debate over a potential "European launch preference", that EU missions should be launched on EU rockets, further illustrates these tensions. Arianespace has repeatedly advocated for stricter "launch-from-Europe" rules, citing recent delays that forced reliance on non-European providers.[611] The high-profile case of two Galileo satellites being launched

[609] Gleason, Michael P., and Catrina A. Melograna. *Anticipating the New European Union Space Law*.
[610] Ibid.
[611] Parsonson, Andrew. "Arianespace Advocates Enforcing European Launcher Preference." *European Spaceflight*, June 26, 2024. https://europeanspaceflight.com/arianespace-advocates-enforcing-european-launcher-preference/ (accessed May 23, 2025).

aboard SpaceX rockets in April 2024[612] underscored the absence of such enforceable rules. While this debate is central to Europe's strategic autonomy, (it has yet to find a place within the draft EU Space Act, revealing how the proposed framework still avoids the politically sensitive question of industrial protection versus open competition.)

C. Positive effects of deliberations

Ironically, it has been contended by some that the postponements will actually generate a stronger law and a more coherent legal framework. The additional time has allowed the European Commission to gather preliminary feedback and reflect internally on the policy implications of such a complex initiative. Yet, consultations cannot be seen as the main reason for the delay. For most of 2023 and early 2025, no draft text was made available, leaving national agencies, industry groups, and Member State experts unable to provide substantive input beyond general expectations. The real causes of postponement appear to lie in the institutional and political negotiations surrounding competence-sharing between the European Union and the European Space Agency, as well as in concerns about how far the proposed regulation should extend into strategic and defence-related domains.

The eventual alignment of the forthcoming EU Space Act with broader policy frameworks[613], remains a delicate process. If, despite these tensions, a consensus can be reached once Member States fully engage with the released draft, the final law could indeed emerge more stable and politically sustainable. A framework negotiated transparently and examined thoroughly by both Parliament and Council would carry greater legitimacy, not because of its delay, but because of the breadth and balance of its deliberation.

III. Expectations and Recommendations for the coming EU Space Act

As of May 26th, 2025, the date of writing of this part of the thesis, the final policy and legal system of the EU Space Act proposal remains officially unreleased. Nevertheless, the European Commission promised to submit its legislative proposal on 25 June 2025.[614] , a date that holds the promise to transform the lawfulness of space activities in the Union. Since the Commission announced its intention to establish an EU-wide framework of law, a variety of actors including institutional think tanks, academics, and industry players have undertaken pre-emptive efforts to anticipate and shape the final content of the law. These forward-looking contributions not

[612] Ibid.
[613] such as the EU Space Strategy for Security and Defence (COM(2023) 70 final) and the European Defence Industrial Strategy (COM(2024) 65 final).
[614] European Parliament. "EU Space Law." *Legislative Train Schedule – A Europe Fit for the Digital Age*. April 20, 2024. https://www.europarl.europa.eu/legislative-train/theme-a-europe-fit-for-the-digital-age/file-eu-space-law (accessed May 23, 2025).

only mapped out the present gaps in the regulation but also explicitly set forth what the expectations are of what the EUSL can deliver with regard to legal certainty, strategic autonomy, and harmonization of space activities in Member States.

Among these seminal contributions is the report "*Anticipating the New European Union Space Law*" [615] by the Center for Space Policy and Strategy. This study examines the structural options the Commission might pursue in shaping the EUSL, ranging from negligible regulatory action to a highly harmonized legislative instrument. The report also takes into account comparative approaches, in particular the U.S and other member state space architectures, and underscores the need for alignment with existing EU regulatory instruments in fields such as cybersecurity, environmental protection, liability, and private operator authorization. It promotes a legal structure with the ability to balance flexibility and enforceability so that European players, especially emerging companies, will be able to compete in complex business environments without too much legal fragmentation.

With this is the paper issued by the Association of European Space Research Establishments (ESRE) entitled "*Recommendations on a Future EU Space Law: Towards a Regulatory Framework on Space Safety, Sustainability and Security*"[616]. ESRE proposals are technologically and operationally driven, emphasizing the need to assume a regulatory framework that maximizes Europe's technological sovereignty and asserts its adherence to international commitments. Key propositions include establishing an integrated licensing scheme for space activity, increasing coordination among defense and non-defense actors, integrating sustainability principles (such like debris mitigation and STM), and defining minimum safety standards. ESRE argues that the EUSL should not only be a legislative tool but a strategic instrument for long-term competitiveness and resilience in the context of a rapidly evolving global space economy.

Further academic analysis appears in the paper "*Towards European Legislation for Space Activities: Status – Assessment – Action*" [617]by an aggregation of scholars and practitioners. This provides an in-depth comparative study of today's patchwork of EU Member State space legislations and identifies key inconsistencies that undermine the building of an integrated internal space market. The authors advocate a modular and principle-based EUSL; one that gives binding rules where appropriate (e.g., safety, liability, and registration) with subsidiarity and Member State freedom remaining in non-critical areas. Notably, the reports also highlight the importance of legal instruments that reflect the expanding role of commercial actors and the dual-use nature of much space technology.

Together, the reports constitute both an echo of the European space community's aspirations and a blueprint for legislation. They also fulfill some expectations for the EUSL: it should

[615] Gleason, Michael P., and Catrina A. Melograna. *Anticipating the New European Union Space Law*. Center for Space Policy and Strategy, October 2024. https://csps.aerospace.org/sites/default/files/2024-11/05a_NewEUSpaceLaw_Gleason_20241104.pdf (accessed December 10, 2024)

[616] Association of European Space Research Establishments (ESRE). *ESRE Recommendations on a Future EU Space Law*. October 2023. https://www.esre-space.org/wp-content/uploads/2023/10/ESRE-Recommendations-on-a-future-EU-Space-Law.pdf (accessed May 23, 2025).

[617] *Towards European Legislation for Space Activities: Status – Assessment – Action*. SpaceWatch.Global, February 18, 2022. https://spacewatch.global/wp-content/uploads/2022/02/Towards-European-Legislation-for-Space-Activities-180222.pdf (accessed December 10, 2024).

reduce legal fragmentation, provide legal certainty to both private and public actors, harmonize with international commitments of space law, and promote sustainable and secure space activities. In so doing, the Commission is required to outline a legislative strategy that is favorable to innovation without undermining national competences, as provided for in Article 189(2) of the TFEU, which attributes to the EU a supportive, rather than harmonizing, function in matters relating to space.

Conclusion of the chapter:

This chapter discussed the complexity of legal foundations and political factors affecting the European Union's efforts to create a binding space law. While the EU competencies in space are shared and more limited, the legal basis for action is not absent. We analyzed that Articles 189, 114, 115, and 352 TFEU each provide different ways in which the EU might act in space. Yet, all of these are subject to the limits established in Article 189(2), excluding the harmonization of national laws. For example, Article 114 may serve as the legal basis for promoting common principles, enhancing interoperability, or removing barriers to the internal market, but cannot serve as a fully legal basis for replacing or overruling Member States' legal systems entirely. Article 115 authorizes EU action regarding issues that require coordination between Member States, while Article 352 provides a flexibility clause allowing the EU to act where no other legal basis exists; again, it could not, however, be used in conflict with the limitations contained within Article 189. These latter considerations thus underscore the nuanced ways in which the EU has scope to legislate in space, while its powers are nonetheless strictly limited, and any EU Space Act will necessarily be limited by these restrictions. The specific legal considerations and possible effects of these articles vis-à-vis use by the proposed EU Space Act that will be discussed in more detail in the following chapter. Other Treaty provisions regarding industry, networks, and competence classification also offer weight to the argument. Overall, the analysis once again confirms that the adoption of a binding EU space act is possible from a legal perspective, though the choice of legal base will condition its content as well as its validity. However, converting this legal possibility into legislative reality is turning out to be difficult. Procrastination in finalizing the EU Space Act draft conceals more than technical issues; it reveals underlying political and institutional problems. National converging and diverging interests, the need for ESA coordination, and broader debates on strategic autonomy and industrial policy all shape the pace and direction of this process. But the debates have also delivered valuable outcomes: higher levels of awareness among stakeholders, more extensive consultations, and a higher level of introspection on what such a common space law needs to achieve. For this reason, the law must balance extremely well among legal precision, political consensus, and long-term strategic intent.

Chapter 6: The EU Space Act Draft: A Legal Analysis of Its Scope, Implications, and Future Enforcement

Fragmentation upon the fragmentation?

On June 25, 2025, which is precisely the date upon which writing this part of the thesis began, the European Commission published the much-anticipated draft of the EU Space Act. For those of us following this development closely, the release feels like a significant milestone. At several points during the preparation of this thesis, I found myself wondering whether the proposal would truly be finalized, especially given the recurring feedback from experts suggesting further delays. But today, even though it is not yet a binding law and will mostly know particular modifications, its publication marks a critical moment in the evolution of European space policy. In that context, the timing of this research could not be more relevant. It has closely followed the discussions, consultations, and preliminary suggestions that led to this proposal. Now that the full text is available, this thesis aims to take a step further: to analyze the draft and implications of the EU Space Act **(I),** to evaluate its potential impact on national space laws **(II),** and to reflect on whether it can truly meet its ambition of establishing a unified and effective legal system for space activities in Europe. Last but not least, to predict the challenges and difficulties that could hinder its adoption and weaken its implementation, if adopted with its current version **(III).**

The EU Space Act is intended to bring legal clarity and predictability for operators across the Union. It comes at a time when space activity is expanding exponentially and becoming ever more becoming increasingly complex. While greater activity inherently raises operational and safety risks, improved data, monitoring, and coordination mechanisms, such as enhanced space situational awareness and collision avoidance systems, have also strengthened the capacity to mitigate these risks. Within this chapter, the words "proposal" and "draft" will be used interchangeably while addressing the revealed Act. We will not only analyze but also criticize its flaws to determine whether the proposal responds to the challenge of these problems by creating a more stable and consistent regulatory framework. The initiative attempts to make the space industry of EU more competitive while promoting the long-term sustainability of outer space.

As previously mentioned in the introduction of this thesis, several political and strategic developments helped shape the emergence of this legal initiative. In which we can recite them briefly: The European Commission's Political Guidelines for 2024–2029 have clearly identified space as one of the key sectors for the Union's strategic future.[618] Likewise, the Draghi report on European competitiveness has recommended the creation of a common legal

[618] European Commission, *Proposal for a Regulation of the European Parliament and of the Council Establishing the Union Space Law for the Safety, Resilience and Sustainability of Space Activities*, COM(2024) 670 final (Brussels, November 20, 2024), https://commission.europa.eu/document/e6cd4328-673c-4e7a-8683-f63ffb2cf648_en

framework to ensure a functioning internal market for space, particularly in the short term.[619] The Commission itself has presented the EU Space Act as a priority in two key policy documents: the EU Approach to Space Traffic Management and the EU Space Strategy for Security and Defense.[620]

Importantly, the proposal could be a response to repeated calls by Member States for action. In several Council conclusions, national governments have recognized the urgent need to reduce fragmentation within the internal space market, ensure competitiveness[621] and to ensure a level playing field for all operators [622]. The support has extended beyond government ministries. Several national parliaments have also expressed their backing for a clear and harmonized legal framework, one that ensures the long-term sustainability of space activities.[623]

The same message has come from industry; Many space companies, particularly small and medium-sized enterprises (SMEs), have been asking for a predictable legal environment in which they can grow, innovate, and compete fairly.[624] For them, this Regulation may offer not just rules, but the foundation for long-term investment and planning.[625]

At the end of this chapter, we will have an answer to the following question: Does the draft address all these challenges, present clear answers, and meet expectations as hoped for?

I. Overview of the proposal

This part of the thesis offers a overview of the proposal from five key angles: **(1)** the scope of the proposed regulation, identifying the types of space activities and parties it seeks to include; **(2)** its law basis, in accordance with subsidiarity and proportionality principles; **(3)** its consistency with cross-cutting policy priorities, safety, resilience, and sustainability, pursued in a coherent internal market setting; **(4)** its extraterritorial reach and anticipated impact on the EU's leadership in international space governance; and **(5)** the regulatory centralization impact, here referred to as the "ACT-ification" of EU space law.

[619] Draghi, *The Future of European Competitiveness.*

[620] European Commission. "EU Space Strategy for Security and Defence."

[621] Council of the European Union, *Council Conclusions on Strengthening Europe's Competitiveness through Space: Boosting Investment, Innovation and International Leadership*, ST 14512/23 INIT (Brussels, December 6, 2023), https://data.consilium.europa.eu/doc/document/ST-14512-2023-INIT/en/pdf.

[622] Council of the European Union, "Space Traffic Management: Council Adopts Conclusions on the Current State of Play," press release, December 8, 2023, accessed July 17, 2025, https://www.consilium.europa.eu/en/press/press-releases/2023/12/08/space-traffic-management-council-adopts-conclusions-on-the-current-state-of-play/

[623] Assemblée nationale, "Loi européenne sur l'espace,"

[624] See position papers by Eurospace (association representing the views of more than 80 space companies, including primes); SME4Space (association defending the views of more than 800 companies, including 90 start-ups); YEESS (recently created association, representing the views of 13 New Space companies).

[625] See the Explanatory Memorandum; European Commission, *Proposal for a Regulation of the European Parliament and of the Council Establishing a Union Regulatory Framework for Space Activities*, COM(2024) 670 final (Brussels, November 20, 2024),[hereinafter EU Space Act], https://defence-industry-space.ec.europa.eu/document/download/0adeee10-af7a-4ac1-aa47-6a5e90cbe288_en?filename=Proposal-for-a-Regulation.pdf.

1. Scope of the proposal

The EU Space Act is a key step in the European Union integration of space regulation. The Regulation, according to Article 1 of the proposal,[626] aims at establishing an internal market for space services and space data with a harmonized legal framework and focusing on safety, resilience, and environmental sustainability. It is more than regulating individual missions or launches; it instead implements a whole legal framework that applies to the authorization, registration, and governance of space activities by both Union-based and third-country entities. In addition, the Act provides EU-level mechanisms such as collision-avoidance services[627] and a Union Register of Space Objects (URSO), and a voluntary Union Space Label promoting the best sustainability practices.[628]

However, as a first step to understanding the proposal, we can realize that the scope defined in Article 2 is broad. It applies to any provider of space services or space-based data within the Union. Whether they are Union-based, third-country, collision-avoidance service providers, or international organizations,[629] none are excluded. As mentioned, we must admit that it is difficult to pinpoint the precise scope of the draft Act since its definitions are unclear. Depending on the analysis of the preliminary feedback of reliable scholars, "*Several definitions, including those of key terms, are largely circular.*"[630] In light of this, we can mention several examples; a "*collision avoidance space services provider*" is "*a provider of collision avoidance services*";[631] an "*international organization*" is just "*an international organization…*";[632] and a "*space services provider*" is "*a provider of space services*."[633] These kinds of formulations make it harder to determine the exact regulatory scope of the Act.[634]

In addition to complexity, some definitions appear contradictory; "*Environmental sustainability*" is initially defined as the ability to preserve and protect the natural environment of Earth over the long term,[635] on other occasions, it clarified to include sustainability in space as well as on Earth.[636] Similarly, the Act suggests that a communications service provider is a "*space operator*" if it operates or controls a satellite,[637] but the formal definition of "*space operator*" requires operation, control, and return of a space object.[638] Thus, the scope of the Act could be interpreted more broadly or narrowly, depending on how these disparate definitions are ultimately reconciled.[639]

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[626] Ibid.
[627] see EU Space Act, Title IV, Chapter V.
[628] Ibid., Title VI, Chapter II.
[629] EU Space Act, Art. 2(1)(a–d).
[630] Laura Cummings, Paolo Esposito, Milton "Skip" Smith, and Ester Latorre, "The EU Space Act: Scope and (European) Space Operator Authorization," *GT Alert*, July 16, 2025, https://www.gtlaw.com/en/insights/2025/7/the-eu-space-act-scope-and-european-space-operator-authorization.
[631] EU Space Act, Art. 5(23).
[632] Ibid., Art. 5(23).
[633] Ibid., Art. 5(12).
[634] Cummings et al., "EU Space Act: Scope and (European) Space Operator Authorization."
[635] EU Space Act, Art. 5(60).
[636] Ibid., Art. 96(1).
[637] Ibid.,(38).
[638] Ibid., Art. 5(16)(a)
[639] Cummings et al., "EU Space Act: Scope and (European) Space Operator Authorization."

Further problems are caused by the use of undefined terms; For instance, the Act envisages that a space operator requires authorization from the Member State in which it "*intends to operate,*"[640] but fails to clarify what is intended by "*operation*." This could be any one of a number of places, for instance, where the mission control center is located, or where the ground infrastructure, such as command uplinks, is located. Where "*control*" is synonymous with control by a natural or legal person,[641] "*operation and control*" of a space object is not defined. The definitional uncertainty leaves it unclear which Member State an authorization is required from.[642]

2. Compliance with International Space Law

In light of this, an important question may arise, especially in the case where the definition of the space sector is problematic. In that case, did Article 5 of the proposal respect the same terminology logic in international space treaties, or was it different?

We can say that the definitional structure of the proposed EU Space Act is significant when considered in light of the conceptual framework of international space law, and specifically the Outer Space Treaty. The problem could be one of inconsistency and one of structural incompatibility between two legal systems that are organized around different logics of responsibility and regulation. As we know, international space law is built upon the centrality of the State; for instance, Article VI of the OST establishes that States bear international responsibility for national activities in outer space, whether conducted by governmental or non-governmental entities. Authorization and continuing supervision are the means by which States fulfill this responsibility. Article VIII further links jurisdiction and control over a space object to the State of registry. In conjunction with the concept of the "*launching State*" articulated in the Liability Convention, the system establishes a vertically integrated framework in which responsibility, jurisdiction, and supervision are firmly rooted in the State and internationally attributable.

The EU Space Act Proposal, on the other hand, uses functional and market-oriented language. In line with its internal market legal foundation in Article 114 of TFEU, the Proposal sets out definitions for "*space activities*", "*space services*" and "*space operators*" in terms of their economics and operations. The Proposal's structure is therefore internally coherent in terms of market integration but fails to map onto the jurisdictional categories of international space law. The first tension arises in the change of regulatory emphasis from State responsibility to compliance by operators. Under the OST, the State is always internationally responsible, regardless of the structure of supervision under its internal law. The EU Proposal, on the other hand, has developed a structure of regulation in which the operators are the direct addressees of the rules and the Member States implement and supervise compliance in a harmonized framework, even though it does not remove State responsibility under international law. Although this is not in conflict with international responsibility, it arguably obscures the connection between the EU-level mechanisms of compliance and responsibility under Article VI OST in cases of operations involving multiple States in the EU. A further difference relates

[640] Id. Art. 6(3).
[641] Id. Art. 5(18).
[642] Cummings et al., "EU Space Act: Scope and (European) Space Operator Authorization."

to the concept of the "*launching State*." In space law, this concept is broadened to include *States launching, procuring the launching of, or from whose territory or facility the space object is launched*. In contrast, there is no mention of this concept in the EU proposal. It only deals with entities established on the territory of the Union or providing services there. Therefore, there might be a difference between the scope of liability and the scope of the EU Act.

In this regard, it should be noted that there might be a situation where there is a single operator established on the territory of one member state, launching from the territory of another member state, and using a service of a launch provider from a non-EU state. In this regard, there might be several launching States according to space law principles, and only one compliance requirement under the EU Act proposal. Third, the relationship between authorization, supervision, and registration may become fragmented. Article VIII OST connects jurisdiction and control with registration in a unifying manner. The notion of "*appropriate State*," which is referred to in practice as such in the context of authorizing and overseeing non-governmental activities in space, a notion which is part of the OST, is another good example of this problem. These remarks indicate that a parallel system of regulation has been devised, one which focuses on internal market principles, which might lead to conceptual fragmentation.

Thus, the memorandum of the draft explains that the EU Space Act draws inspiration from the OST, particularly its requirement that States authorize and continuously supervise the space activities of non-governmental entities under their jurisdiction. While the OST establishes this general framework, it leaves implementation to States. Since the European Union is not itself a Party to the OST, the Act's reference to these obligations reflects an effort to harmonize Member States' divergent national practices, rather than to implement EU-level treaty duties. While the OST sets a general legal framework, it does not specify how such authorization or supervision should be carried out.[643] This lack of detailed guidance has led EU Member States to develop divergent national practices as priviously disscussed.[644] In response, the EU Space Act seeks to harmonize the implementation of these principles across the Union by establishing a common, binding framework; notably through the designation of National Competent Authorities (NCAs)[645] and harmonized authorization conditions, [646]which will be explained in detail in the coming pages.

However, we cannot deny the reality that the draft also establishes definite boundaries. For instance, Military applications are entirely excluded, both objects solely used for defense and those temporarily under military control. Furthermore, the Regulation does not encompass missions launched before 1 January 2030, nor spectrum and frequency coordination issues, which are still dealt with in accordance with existing EU legal instruments and international agreements.[647]

[643] See the Explanatory Memorandum of the proposal p.2
[644] Recital 5
[645] Art.28
[646] Art.6 to 10
[647] see Recital 18; Art. 2(3).

3. Legal basis, subsidiarity and proportionality

A. Legal basis

As we have reviewed in the previous chapter, one of the first legal matters any EU-wide regulation will have to tackle is: on what legal basis is it proposed? In the case of the EU Space Act, the legal basis has been Article 114 of the TFEU, even though some stakeholders thought it could be based on other articles.[648] The chosen article is commonly applied when the Union wishes to harmonize the laws of the member states for the aim of ensuring the free operation of the internal market, that is, the common economic area of the whole EU. But there is already a particular article in the Treaties, Article 189 TFEU, which is devoted to space policy. Then why did the Commission not use that? The answer lies in the limitations of Article 189; While it does allow the EU to promote and coordinate space-related activities, it categorically precludes harmonization of national law.[649] Article 189 allows the EU to aid Member States to cooperate in space exploration or co-fund joint ventures, but not take binding legislative rules overruling national law. Because the EU Space Act would effectively do the latter, take binding, harmonized standards in matters of safety, environmental concern, cybersecurity, and authorization procedures, for this reason Article 189 simply cannot serve as the primary legal basis. The Commission thus appealed to Article 114 "*can be used as a legal basis for the establishment and functioning of the internal market in space services and space-based data*"[650] which grants the power to establish measures ensuring the proper functioning of the internal market.[651] Space-based services and data, in the Commission's justification, have become essential to the EU economy across different sectors such as communications, transport, climate services, and even national security.[652] However, this choice of legal basis is not free of concern. As discussed in earlier chapters, some experts fear that using internal market powers to wield technical, safety, or sustainability regulations might be "*stretching*" Article 114 beyond its intended limits. If this legal argument is put to the test in the future, it may be for the Court of Justice of the EU (CJEU) to decide whether the Regulation stayed within the limits of EU competence.[653]

In more detail, relying on the internal market competence stretches Article 114 into an area that more naturally belongs to Article 189, an article that, importantly, contains an explicit prohibition on harmonizing national space laws.[654] The proposed EU Space Act inevitably touches questions of safety, environmental responsibilities, and the handling of space objects, matters that go beyond pure market access and enter broader public-policy territory. This raises an essential legal question: is it truly possible to avoid Article 189's harmonization prohibits

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[648] See chapter 5 section I.
[649] Explanatory Memorandum of the proposal p.3
[650] Affaire C-376/98, RFA c. Parlement et Conseil [2000] Rec. p. I-8419, Affaire C-380/03, RFA c. Parlement et Conseil, Rec. [2006] I-1157.
[651] Explanatory Memorandum, .
[652] Ibid.
[653] Güneş Ünüvar, "The EU Space Act: Internal Harmonisation and External Influence," *EJIL: Talk! (blog)*, July 1, 2025, https://www.ejiltalk.org/the-eu-space-act-internal-harmonisation-and-external-influence/.
[654] Ioana Bratu and Frans Gerhard von der Dunk, "The EU Space Act Proposal and Its Impact on the Dutch Space Ecosystem" (Working Paper, SSRN, August 11 2025), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5389410

simply by framing the initiative as a market-integration measure? A useful comparison can be drawn from aviation;[655] Long before air transport was formally included within the EU's transport competence, pressing concerns around safety and efficiency justified early harmonization, and eventually integration, of national air traffic management systems under a European framework. What began as cooperative structures under Eurocontrol gradually evolved into an EU-backed regulatory regime. The parallel is tempting: where fragmentation creates operational and safety risks, the EU has previously taken a stronger coordinating role, even without an explicit Treaty mandate at the outset.[656]

B. Subsidiarity (for non-exclusive competence)

Invoking subsidiarity, the issue is: is it better that the EU act (take the action to regulate), or do Member States continue to regulate the issue themselves? The Commission has an unequivocal reply: action by the EU is necessary.[657] As things stand, Member States have highly diversified approaches to regulating space activity. Some impose strict technical safety inspections, others prioritize liability or environmental concerns, and others have no meaningful space law at all. This kind of disparity fosters uncertainty and deters firms from cross-border operations. The Commission declared that "*The establishment of a framework at Union level would increase the common level of safety, resilience and environmental sustainability of space activities, generating significant added value, compared with individual action at Member State level*."[658]

C. Proportionality / balance

On proportionality, the Commission argues that the proposal does not go beyond what is necessary to advance its objectives. It recognizes that not all space activities are of the same level of risk.[659] A small CubeSat launched into low-Earth orbit, for example, does not have to be regulated in the same way as a high-end satellite constellation. That is why the Regulation has proportionality provisions, such as a simplified procedure for small missions and different requirements by orbit and risk category. This point can't be passed by without being criticized, because such a distinction is not always clear-cut: small satellites can sometimes pose greater operational or collision risks, especially in swarms or launched by inexperienced operators. Therefore, this justification for differentiated treatment by the Commission needs further elaboration, particularly on how "risk" is to be assessed and proportionate obligations determined.

It is important to highlight that, to respect national sovereignty in defense and national security matters, the draft expressly stated that military space activities are entirely at the discretion of Member States.[660] Yet, this is not without controversy. What constitutes "defense" and "national security" is often differently interpreted between the European Commission and the Member States, notably with respect to dual-use technologies and security-sensitive space infrastructures. This makes the proportionality review complex because the regulation needs to

[655] Ibid.
[656] Ibid.
[657] Explanatory Memorandum, .
[658] Ibid.
[659] Ibid. p 5.
[660] EU Space Act, Art 2(3)

balance the EU's coordination role with the protection of the exclusive competences of the Member States pursuant to Article 4(2) of Treaty on European Union (TEU).

There is, however, an alternative view about the topic; Some analysts and scholars have raised concerns about compliance with the principle of proportionality expressed in Article 5(4) of TEU[661] as a guiding principle of EU law by the EU Space Act. Accordingly, the principle of proportionality requires that any action by the EU must be proportionate to its desired purpose, must not do more than needed to attain such a purpose, and must maintain an equal proportion between the means used and ends pursued. In reviewing the draft Act, certain provisions go too far and thereby offend proportionality.[662] For instance, the Act mandates that the Commission "*shall*" establish a Union Space Label Framework that will promote voluntary compliance with high levels of protection for space activities[663], while there are no current national requirements for such labels. Because methods of determining the environmental impacts of space activities are themselves in the process of development, the necessity for such labeling is questionable and may be premature.[664] Further, the limiting implication of proportionality, balancing the regulatory costs against benefits, has also been called into question. The Act's impact assessment says that the extra costs for the operators will be fully recouped by long-term benefits, employing the premise of 50% removal of space debris within ten years to a large extent.[665] Yet, without any technical justification that this could be feasible. To keep it positive, we may say that this premise could be crucial somehow, because it does not just predict deceleration of debris growth but extrapolates half the existing debris list being cleared out, which is again a wild premise. In the event that such desired diminution is not possible, the desired benefits would then be reduced proportionally, even potentially falling short of balancing the regulatory burden. [666] These critiques pose powerful arguments with respect to the questions of proportion and feasibility regarding the EU Space Act and invite a responsibility to balance grand regulatory ideals against operational realities.[667] Added to these economic and practical proportionality concerns are questions as to the extent of powers the European Commission grants itself under the Act. The proposal empowers the Commission to investigate and, where appropriate, bring enforcement proceedings against operators or Member States in breach of the Regulation. These investigatory and prosecutorial powers, as we will analyze in the coming pages, may challenge the proportionality threshold by centralizing authority at the EU level in such areas yet strictly consigned to national

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[661] Consolidated versions of the Treaty on European Union art. 5(4), Oct. 26, 2012 O.J. (C 326) [hereinafter TEU].
[662] Laura Cummings and Ester Latorre, "The EU Space Act: Une Révolution," *GT Alert* (Greenberg Traurig LLP), July 2025, https://f.datasrvr.com/fr1/425/51685/GT_Alert_The_EU_Space_Act_Une_R%C3%A9volution.pdf.
[663] EU Space Act, art. 111(1).
[664]Cummings and Latorre, "EU Space Act: Une Révolution."
[665] European Commission, *Commission Staff Working Document: Impact Assessment Report Accompanying the Document Proposal for a Regulation of the European Parliament and of the Council on the Safety, Resilience and Sustainability of Space Activities in the Union*, SWD (2025) 355 final (Mar. 6, 2025), 50 https://defence-industry-space.ec.europa.eu/document/download/b093b1ce-91ca-41af-bd8e-817026c2c1c3_en?filename=SWD-Impact-assessment-report-part2.pdf [hereinafter Impact Assessment].
[666] Cummings and Latorre, "EU Space Act: Une Révolution.".
[667] Anselm Küsters and Matthias Kullas, *"The EU Space Act Is an Ambitious and Necessary Legislative Initiative,"* CEP Policy Brief, July 2025, CEP – Centrum für europäische Politik, https://cdn.table.media/assets/europe/ceppolicybrief_eu-space-act_com2025-335_long-version.pdf

jurisdictions.[668] This institutional dimension of proportionality underlines the continued tensions about competence allocation and the respect of Member State sovereignty in the governance of the EU space.

3. Achieving Core Pillars: Safety, Resilience, Sustainability, Within a Single Market Framework

The EU Space Act sets out the basic technical requirements for space operators, structured in three pillars: safety, resilience, and environmental sustainability.[669]

A. Free movement; One single market:

The EU Space Act primarily envisions the creation of a truly integrated internal market for data and services based on space. This ambition receives its most explicit enunciation under Article 3, guaranteeing free movement of space services within the Union. According to this provision, no Member State may restrict access to space services or data provided by an operator registered in the Union Register of Space Objects. In effect, the Regulation treats space data as part of the cross-border flow of digital services, placing it firmly within the EU's broader digital single market strategy. Importantly, the proposal does allow some flexibility; If a Member State is the physical host of a launch site or the operational base for a space mission not based in its territory, it may still impose stricter conditions, but only where this is objectively necessary to protect national safety, resilience, or environmental sustainability.[670] These exceptions must also be transparently disclosed through a shared EU information portal under Article 110,[671] While this latter allows for Member States to impose stricter conditions, this flexibility risks undermining the proposal's overall objective of market unification. These derogations threaten to bring back fragmentation in the internal market, legal uncertainty for space operators facing potentially disparate national rules, and delays or discriminatory barriers to cross-border access. This tension between internal consistency and regulatory flexibility highlights the challenge of fragmentation that remains when implementing the regulation in the future. The provision is meant to cover situations in which a company operates several subsidiaries across different Member States, often for reasons such as tax planning or to satisfy national industrial-participation requirements. Yet the text does not make clear which entity within such a group should count as the formal "*applicant*" when control, financing, and day-to-day responsibilities are spread across multiple affiliated companies, "*or how potential disputes between authorities over primacy would be resolved*". [672]

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[668] Kristian Stout and Eric Fruits, *"Comments on the Proposed EU Space Act"* (International Center for Law & Economics, August 13, 2025), ICLE. https://laweconcenter.org/resources/icle-comments-on-the-proposed-eu-space-act/
[669] EU Space Act, Title IV.
[670] Ibid, Art 3(2).
[671] Ibid (3).
[672] Bratu and von der Dunk, "EU Space Act Proposal and Its Impact on the Dutch Space Ecosystem."

B. Safety

The EU Space Act introduces a broader set of safety standards for both Spacecraft and launchers, aiming to bring up standards of operation alongside harmonizing them with international standards.[673] Starting with launch operators, they must collaborate with corresponding national authorities and space traffic management service providers to avoid collision hazards for both launch and re-entry missions.[674] The draft also mandates the installation of flight termination systems and facilities for real-time monitoring to ensure off-target launches can be safely shut down.[675] As part of this, every launch operator also has to set up sound debris mitigation practices.[676] These include not deploying unnecessary objects into orbit to the design of systems so as not to cause in-orbit breakup and proper disposal of upper stages. Whereas certain operational requirements, like the widely applied 25-year rule for low Earth orbit, will be fleshed out by subsequent implementing acts, their implementation within the EU is a step from best practice on a voluntary basis to one by legal obligation. For spacecraft, as far as spacecraft are concerned, the draft requires space operators to ensure trackability of their space objects and subscribe to collision avoidance services. At least a minimum degree of maneuverability must be maintained at every phase of the mission lifetime, and re-entry must be ensured by coordinating properly.[677] The proposal takes a balanced attitude; University-led research and educational missions, including university-led CubeSats and very low earth orbit (VLEO) missions, would be eased by a less complex regime if they are small, traceable, and low-risk.[678] This flexibility, however, has to be carefully protected to prevent loopholes in regulation. All other satellites are more heavily regulated: they must be trackable to reduce collision hazards[679], and operators must subscribe to certified collision avoidance (CA) services that can issue alerts and control manoeuvres[680] which represents a strong step towards Union-wide traffic management. To prevent orbital congestion, permission to launch is now based on prior determination of the final orbit of the satellite, ideally to less crowded regions of space.[681]

C. Resilience

The EU Space Act aims to make space activities not only technologically innovative but also safe and resilient by design. It creates a framework structure obliging space operators to design for a wide range of cyber and physical threats along the whole lifecycle of their missions.[682] Unlike earlier EU space initiatives that had focused mainly on funding or coordination, this chapter places precise legal obligations on both industry players and public authorities. By

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[673] See, Andreas Lenz and Thomas Jansen, "Reaching High: A First Look at the EU Space Act – (and the Vision for the European Space Economy)," *Lexology*, July 2, 2025, republished from Heuking Kühn Lüer Wojtek. https://www.lexology.com/library/detail.aspx?g=408f0cc5-0798-47a7-a099-f4c58e06d680.

[674] Ibid, Art 58-73.

[675] Ibid, Art. 60. These technical requirements are supported by a risk assessment procedure, outlined in Annex I, that must preface each launch and assess possible injury to individuals, infrastructure, and the environment.

[676] Ibid, Art. 61.

[677] Art 62 (1)

[678] Ibid.

[679] Art. 63

[680] Art. 64

[681] Arts. 68 -69

[682] Chapter II (Articles 75–95)

doing so, it establishes a new benchmark for managing risks in outer space. Legal certainty is the point of departure. Some scholars stressed that it emerges shortly after the Directive 2022/2555 (NIS2)[683] and the Critical Entities Resilience (CER) Directive[684] enter into force,[685] luckily EU Space Act will be a *lex specialis* (special law) to the aforementioned.[686] In simple terms, this means that for space operators which qualify as "*essential*" or "*important*" [687] entities within the meaning of NIS2 or as "critical" infrastructure within the meaning of CER, the EU Space Act becomes the lead legal document they must follow to avoid duplication. Turning to the responsibilities themselves, the draft makes risk management an ongoing requirement.[688] Space operators "*shall take all the necessary measures to manage the risks posed to the security of network and information systems and the security of the physical infrastructure and environment*" [689], from the very first design phase through to spacecraft disposal. The proposal also obliges operators to document their risk assessments and prepare treatment plans for each significant vulnerability discovered.[690] This risk regime is not one-size-fits-all. Recognizing the heterogeneity of space actors, it suggests a simplified risk management regime for small or non-critical operators.[691] While Chapter II of the EU Space Act does lay down a necessary benchmark for lifecycle-based risk management across the space industry, its overlay nature is likely to produce implementation issues, particularly for small and fledgling operators. Moreover, the draft overly depends upon ISO compliance and Annex VII[692] scenarios but is short in specifying explicitly enforcement measures or categorically defining how uniform surveillance of compliance will be maintained throughout the Union. This invites the worry that, in real life may differ strongly, depending on administrative capacity and oversight tightness at the national level.

D. Sustainability

One of the most innovative features of the EU Space Act is its environmental sustainability strategy, which proves compliance and alignment with international norms such as UNOOSA guidelines in this matter. For the first time ever in space policy, the proposal establishes the Environmental Footprint (EF) principle for all space missions.[693] According to Article 96, all Union space operators, with the exception of SMEs and educational institutions, who are provisionally exempted until 31 December 2030, shall calculate and report the full

[683] Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No. 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 (NIS2 Directive), *Official Journal of the European Union* L 333 (27 December 2022): 80–152, https://eur-lex.europa.eu/eli/dir/2022/2555/oj/eng.
[684] Directive (EU) 2022/2557 of the European Parliament and of the Council of 5 December 2022 on measures for a high common level of resilience of critical entities (Critical Entities Resilience Directive), *Official Journal of the European Union* L 333 (27 December 2022): 1–63, https://eur-lex.europa.eu/eli/dir/2022/2557/oj/eng.
[685] Ünüvar, "The EU Space Act: Internal Harmonisation and External Influence,"
[686] Art 75.
[687] Ibid.
[688] Articles 76 and 78.
[689] Art 76 (1).
[690] Art. 78.
[691] Art. 79.
[692] In a lot of article the commission require compliance with it for further guidance.
[693] Chapter III (Articles 96-100)

environmental impact of their missions. Such a mandate extends to the whole life cycle of the mission, namely design and production, launch, operation, and decommissioning.[694]

Another requirement is that operators must obtain detailed environmental data from their suppliers and submit an Environmental Footprint Declaration (EFD)[695] as part of the authorization process. This declaration must be supported by a Qualified Technical Body (QTB) certificate[696], and accompanied by a study based on both aggregated and disaggregated datasets.[697] The Commission is tasked with adopting and implementing acts to create standardized calculation rules and impact classification systems.[698]

This action helpfully translates the EU Product Environmental Footprint (PEF) model, applied to consumer products[699], to space. But getting there will not be straightforward. There is uncertainty over the measurement of emissions for launch vehicles or satellite production, particularly where value chains cut across international borders. The process of certification also implies further administrative and financial burdens, especially on smaller organizations. Nevertheless, the Commission will establish a Union database to bring together all submitted EF data[700] and enable tracking in the future. While the policy objective is to be commended, practical implementation will be complex and will demand significant capacity-building, especially in less developed space-faring Member States.

In addition to the mandatory EF regime, the proposal provides for a voluntary Union Space Label (USL) scheme.[701] The eco-label seeks to reward operators who meet better than mandatory standards of sustainability, security, and operability. In conformity with Article 111(2), any subsequent labelling scheme shall include key areas such as debris mitigation, light and radio pollution, ground and space safety, infrastructure resilience, and overall environmental performance.

From a market perspective, the combined EF system can reduce fragmentation and improve legal certainty at borders. But if it becomes too complex, it may discourage innovation or push smaller players out of the market. The EU will therefore have to strike the proper balance between achieving environmental governance of sufficient strength while keeping it feasible, proportional, and adequately resourced.

What about the zero debris charter ? Risk of Fragmentation or Added Value?

While analyzing the environmental articles of the EU Space Act draft, one question comes to mind: will the Regulation be in line with other recent developments on sustainability, such the Zero Debris Charter developed by ESA? As clearly mentioned in a previous chapter of this

[694] Art 97 (2).
[695] Art 96(4).
[696] Art 98.
[697] Art 96(5)–(7)
[698] Art 97
[699] See, European Commission, *Environmental Footprint Methods – Environmental Footprint Methods*, Green Business Forum, accessed July 2025, https://green-forum.ec.europa.eu/green-business/environmental-footprint-methods_en.
[700] Art 99.
[701] in Chapter II of Title VI, Art 111–112.

thesis[702], the charter is a voluntary approach that aims to leave no new debris in orbit after 2030, we can say that it is an aim much more ambitious than the current EU draft. Although the Charter is non-binding, its simple existence is a little concerning. It could also create confusion: The EU Space Act sets out what can be seen as the bare minimum in legal obligations to sustainability and debris mitigation. This is because it has an emphasis on establishing clear, binding rules that all space operators in the EU must adhere to, for instance, requiring deorbit plans within a timeframe of 25 years and mandating risk assessments and collision avoidance systems. However, the Zero Debris Charter calls for no new debris to be left in orbit after 2030, an objective that already goes beyond what the EU Space Act currently mandates. That is, if some operators choose to follow only the minimum legal standards of the EU Space Act, and others follow voluntarily the stricter Zero Debris Charter targets, this can result in a discrepancy of operational practices within the Union. This difference may engender legal uncertainty and even competitive distortions, in that operators who engage in other sustainability practices to a greater extent are at a disadvantage than those that do only the minimum legal requirements. Otherwise, if we want to present another view that could be positively oriented, we might say, despite fragmentation, following the zero debris charter or the EU space act requirement, in the end, the goal is one: less debris.

4. The Extraterritorial Scope and Global Impact of the EU Space Act Proposal

A. The Brussels Effect and EU Space Law

The proposed EU Space Act is more than a piece of European law; it could become a strategic tool for establishing international space norms. Besides extending to space services, providers established in the Union, it also extends to providers from third countries providing space-based data or space services within the Union.[703] Accordingly, the scope of application of the regulation may then alternatively rely either on a territorial connection (establishment) or on the supplying of services within the EU single market (marketplace approach).[704] By being extended beyond the territory of the Union, the Act aims to drive European technical, safety, and environmental standards as the benchmark by which every space operator seeking to access the EU market is judged. More strategically, by importing its third-country operator commitments to the Union, the draft exercises Europe's normative power over a field previously dominated by soft law and has the promise of covering outer space activities within the so called 'Brussels Effect'.[705] The term was coined by Professor Anu Bradford and refers to the EU's unique capacity for exporting its standards and legislation abroad, even where no formal treaties or coercive pressure apply.[706] The EU accomplishes this by way of market forces: because it is one of the world's largest and most valuable consumer markets, foreign

[702] See Chapter II of this dissertation.
[703] Art. 1(2)(a).
[704] Alberto Miglio, "The EU Space Act Proposal: A GDPR for Outer Space?," *European Law Blog*, July 8, 2025, https://www.europeanlawblog.eu/pub/9sj1z48z (accessed July 21, 2025).
[705] Ünüvar, "The EU Space Act: Internal Harmonisation and External Influence,"
[706] Miglio, "The EU Space Act Proposal: A GDPR for Outer Space?,"

companies often elect to comply with EU regulations in order that they may continue to do business with European consumers.

This has already been felt in areas such as data protection (via the General Data Protection Regulation, GDPR), digital markets (via the Digital Services Act and Digital Markets Act), and artificial intelligence (via the AI Act), and lately, with the EU Space Act tracks the same path.[707]

In this respect, it seems that the EU Space Act draft follows the same pattern of regulatory evolution. Indeed, by making access to the Union market dependent on the respect of the Union's safety, resilience, cybersecurity, and environmental rules, the EU Space Act proposal provides an incentive for third-country operators to consider the EU rules, regardless of the launch or registration site of their satellites. Moreover, due to the global nature of the space industry, which is also highly integrated, it is likely that the large operators of the space market will consider it economically viable to respect the EU rules, at least on a global scale, regardless of the location of their satellites. This would eventually result in the evolution of the EU rules; however, the extension of regulatory influence into outer space is not without legal and political implications. Unlike the realm of digital services or consumer protection, space activities are subject to a thick set of international law, as previously mentioned, which is based upon the law of State responsibility and the principle of sovereign equality, as no state should claim sovereignty over outer space. The extension of the EU's regulatory influence through the conditions governing access to the market must be sensitive to the constraints set by the World Trade Organization, the principle of non-discrimination, and the remaining supremacy of the OST. We may say, whereas the Brussels Effect relies upon the attractiveness of the EU's internal market, the effectiveness of the Brussels Effect in the realm of space law may depend upon the attractiveness of alternative regulatory centers, such as the United States or new space powers. Therefore, whereas the EU Space Act possesses the potential to extend the normative influence of the EU beyond its borders, the effectiveness of the Brussels Effect in the realm of space law is subject to the interplay between the market power and geopolitical alignment of the major space actors, which makes the topic even more sensitive than just a territorial reach.

B. The legal framework for the non-EU space operators

a. Who can access the Internal market ?

The European Union aims to allow space operators from non-EU countries to access its single market, but only if they meet the same high standards as European operators. We can find this in the definition of "Union space operator", "*means a space operator established in the Union or controlled by a natural person or a legal person that is a space services provider established in the Union.*" [708] Hence, the question of being an operator, or of "*established*", becomes recurrent to establish whether one qualifies as an EU stakeholder or a third-country stakeholder. What remains, however, is that the term at issue is not, as yet, defined within the draft itself.[709]

[707] Ibid.
[708] Art 5
[709] Andreas Lenz and Thomas Jansen, "Reaching Wide: EU Space Act (2) – Perspective of Third-Country Space Operators," *Heuking*, July 17, 2025, https://www.heuking.de/en/news-events/newsletter-articles/detail/reaching-wide-eu-space-act-2-perspective-of-third-country-space-operators.html (accessed July 24, 2025).

In that case, to understand what a space service provider is, depending on the draft it could be: "*(a) Space operators; (b) Collision avoidance space services providers; (c) Primary providers of space-based data; and (d) International organizations"*.[710] Furthermore, to make it more flexible the proposal also states that even providing services from outside the EU to the EU space assets is considered as providing to the Union's internal market.[711] The proposal outlines two categories of s of non-Union space operators; Third country space operators[712] and international organizations[713] and stipulates specific authorization processes for each to access the internal market.[714] This might seem like flexibility; however, it could not be. According to some critics, this provision risks an extraterritorial effect by extending the reach of the regulation beyond EU borders, possibly with an unforeseen consequence: this could burden European industry more than third-country competitors. Overlapping or conflicting regulatory requirements result in increased operational costs and higher legal uncertainty for European operators active globally. Proportionality and jurisdiction, therefore, are concerns from a legal perspective. The principle of proportionality tries to make sure measures cannot go beyond what is necessary to achieve them. Applying EU standards to activities carried out abroad, especially when such activities are already regulated under other national systems, can come into conflict with such a balance. In the same way, under international law, the competence of the EU to impose obligations on entities operating outside its territory is limited, especially in those fields where international cooperation and shared jurisdiction play a central role, as in the case of space.

b. Registration and Certification Requirements

To operate in the EU, a third-country space service provider must register its spacecraft or service in the Union Register of Space Objects (URSO) and obtain an "e-certificate" proving compliance with EU rules.[715] In practice, a foreign company submits evidence, from its debris control plans to its cyber resilience policies, and, once approved, is listed in URSO, this registration via either of two methods: a streamlined, "equivalence decision" procedure, or a more complete "evidenced application." And while the underlying operator requirements are the same[716], the process, and the burden of registration differ significantly.[717] Later, EUSPA provides digital certificate that it must present in every EU contract for space data or services. This e-certificate guarantees the integrity and traceability of data generated by compliant

[710] Art2.
[711] Art 14.
[712] Art. 5(19) including spacecraft operators, launch vehicle and launch site operators, and in-space servicing providers.
[713] Art. 14(2) such as the European Space Agency (ESA) or the European Organization for the Exploration of Meteorological Satellites (EUMETSAT).
[714] Laura Cummings, Kathryne C. Dickerson, Paolo Esposito, and Ester Latorre, "The EU Space Act: 'Foreign' Space Service Providers, Equivalence, and Registration," *Greenberg Traurig GT Alert*, July 22, 2025, https://www.gtlaw.com/en/insights/2025/7/the-eu-space-act-foreign-space-service-providers-equivalence-and-registration (accessed July 22, 2025).
[715] EU space act, Art. 14–15.
[716] Art 15.
[717] Cummings et al., "EU Space Act: 'Foreign' Space Service Providers, Equivalence, and Registration."

operations, we can see it as “passport”, without it, foreign provider cannot legally offer space-related services or data within the Union.[718]

c. Equivalence of Foreign Laws

To avoid the unnecessary duplication, the Commission may recognize the space law regime of a third country as equivalent to the EU[719]. Like adequacy decisions in GDPR[720], equivalence means operators from the said country are presumed to be achieving EU standards, speeding up their registration and certificate process. Equivalence decisions will come with conditions or time frames, and the Commission has the ability to withdraw them if a state's rules subsequently fall below the threshold. This fast-track treatment means foreign operators from “equivalent” jurisdictions are presumed compliant.[721] If they have been approved, the Agency then has to establish cooperation arrangements with the authorities of that state[722], such as data exchange regarding operators and each other alerting in case of non-compliance. If the foreign government thereafter worsens, equivalence can be withdrawn by the Commission.[723] Equivalence decisions from another aspect could be difficult in identifying an equivalent legal and supervisory system of a foreign nation. Second, equivalence under the Act requires that there be an equivalence recognition system in place in the foreign country.[724] “*While reciprocal equivalence may exist for some subjects within the Act’s scope, such as orbital debris oversight, it may be lacking in other areas, like launch operator authorization”*.[725] If the foreign country's system had to be entirely equivalent, it could potentially be difficult for regimes already in place or on the near horizon to satisfy this reciprocal obligation.[726] Although the Act facilitates access for foreign space operators by means of decisions of equivalence, other operators outside such arrangements must undergo a full-deep application process and prove full adherence to the sophisticated commitments outlined in Article 15 and related regulations. This complexity highlights the necessity of advance legal and operational readiness by companies likely affected.[727]

5. The influence of ACT-ification

One of the most important analytical lenses through which to view this initiative is the phenomenon of “*actification*”[728]; the Commission’s increasingly frequent use of regulations

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[718] Recitals 46-48.
[719] Article 105
[720] Article 45, *Regulation (EU) 2016/679 (General Data Protection Regulation)*, Official Journal of the European Union L 119, May 4, 2016, “Transfers on the basis of an adequacy decision,” https://gdpr-info.eu/art-45-gdpr/ (accessed July 24, 2025). See also, ActiveMind Legal, “Adequacy Decision Guide,” *ActiveMind Legal Guides*, accessed July 24, 2025, https://www.activemind.legal/guides/adequacy-decision/; Cummings et al., “EU Space Act: ‘Foreign’ Space Service Providers.”
[721] Art. 16.
[722] Art. 105(5).
[723] Ibid.
[724] Art. 105(2)(c).
[725] Cummings et al., “EU Space Act: ‘Foreign’ Space Service Providers, Equivalence, and Registration.”
[726] Ibid.
[727] Ibid.
[728] Vagelis Papakonstantinou, “The ‘act-ification’ of EU law: The (long-overdue) move towards ‘eponymous’ EU legislation,” *European Law Blog*, January 26, 2021, https://www.europeanlawblog.eu/pub/the-act-ification-of-eu-law-the-long-overdue-move-towards-eponymous-eu-legislation/release/1 (accessed July 21, 2025).

which includes the Data Governance Act,[729] the Digital Services Act (DSA)[730], the Digital Markets Act (DMA)[731], the Data Act[732] and the Artificial Intelligence Act (AI Act).[733] Their precursor is usually identified[734] in the General Data Protection Regulation (GDPR)[735] to build an integrated digital and economic single market. The EU Space Act follows this legislative pattern in line with the regulatory, which is generally seen as the ambition of this type of law-making.[736] The use of short and memorable names in EU law, such as "GDPR" instead of "Regulation 2016/679", is also central to a simpler to memorize and interactive law for citizens. Notwithstanding, real-world experience shows that abbreviated names facilitate citizens' identification and referencing of directly affecting legal documents more. As EU legislation becomes more part of citizens' daily lives, especially in such sensitive areas as data protection, short titles allow citizens to identify, remember, and discuss central regulations. It not only raises legal awareness but also strengthens a shared European legal culture, something that an alphanumeric code alone cannot achieve.[737]

Actified regulations, however, are not likely to be complete and detailed. Despite being directly applicable, they may require national procedural rules, administrative adjustments, or secondary legislation and thereby are akin to directives in practice, as shall be illustrated in the subsequent analysis, a hybrid character that is challenging for uniform implementation.[738] In the EU Space Act, this hybridization appears in different areas. For example, while the Act creates harmonized technical standards (security, tracking of space objects, cybersecurity, and environmental provisions), it leaves out core issues like liability of the operator and regulation

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[729] *Regulation (EU) 2022/868 of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act), Official Journal of the European Union* L 152 (3 June 2022): 1–44, https://eur-lex.europa.eu/eli/reg/2022/868/oj/eng (accessed July 21, 2025).

[730] *Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 establishing the Single Market Programme, repealing Regulations (EU) 1291/2013 and (EU) 1288/2013, Official Journal L 277 (27 October 2022): 1–43*, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022R2065 (accessed July 21, 2025).

[731] *Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act), Official Journal of the European Union* L 265 (12 October 2022): 1–66, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022R1925 (accessed July 21, 2025).

[732] *Regulation (EU) 2023/2854 of the European Parliament and of the Council of 8 November 2023 establishing the Connecting Europe Facility (CEF-2) and repealing Regulation (EU) 1316/2013*, *Official Journal of the European Union* L 314 (20 November 2023): 1–144, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32023R2854 (accessed July 21, 2025).

[733] *Regulation (EU) 2024/1689 of the European Parliament and of the Council of 27 June 2024 laying down harmonised rules on artificial intelligence (AI Act), Official Journal of the European Union* L 206 (12 July 2024): 1–127, https://eur-lex.europa.eu/eli/reg/2024/1689/oj (accessed July 21, 2025).

[734] Vagelis Papakonstantinou and Paul de Hert, "Post GDPR EU Laws and Their GDPR Mimesis: DGA, DSA, DMA and the EU Regulation of AI," *European Law Blog*, April 1, 2021, https://www.europeanlawblog.eu/pub/post-gdpr-eu-laws-and-their-gdpr-mimesis-dga-dsa-dma-and-the-eu-regulation-of-ai/release/1.

[735] *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), Official Journal of the European Union* L 119 (4 May 2016): 1–88, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016R0679 (accessed July 21, 2025).

[736] Miglio, "The EU Space Act Proposal: A GDPR for Outer Space?,"

[737] Papakonstantinou, "The 'act-ification' of EU law: The (long-overdue) move towards 'eponymous' EU legislation,"

[738] Miglio, "The EU Space Act Proposal: A GDPR for Outer Space?,"

of space resources, which remain subject to national or international laws. This partial coverage may jeopardize the coherence of the single internal market for space services and generate uncertainty in law for cross-border markets.[739] And drives us question the remaining existence of fragmentation.

II. Comparative Analysis of EU Space Act Proposal and National Space Laws

This chapter mirrors the examination that was developed in Chapter I of the thesis, where the selected national space laws of the EU Member States, specifically ***Austria, Belgium, Denmark, France, and Luxembourg***, were under rigorous examination and revealed to be highly diversified. There has been each member state's traditional approach to space activities with individual regulatory strategies, and this has resulted in inconsistency in authorization processes, registry requirements, and sustainability standards. With the introduction of the EU Space Act proposal, a new question arises: how will this draft regulation interact with, or transform, existing national laws? Through a structured comparison, this section explores five key areas where the proposed Regulation intersects with the selected national frameworks of this study: **(1)** authorization, particularly the challenge of aligning national authorization regimes; **(2)** registration, including the establishment of the Union Register of Space Objects and the issuance of electronic certificates, and how these will interact with national registries; **(3)** debris mitigation, assessing the gaps and necessary adjustments at the national level; **(4)** environmental sustainability; and **(5)** unresolved areas in the current draft, such as space resources and national security. This analysis attempts to assess the potential for legal harmonization and its implications within the EU Space Act framework, in the face of the current fragmented regulatory environment.

1. Authorization

A. Authorization of Space Activities under the Draft EU Space Act

The EU Space Act creates a harmonized system for the authorization of space activities within the EU, which is significantly different from the current system, where each Member State has its own licensing regime. Comprising four chapters, this Title outlines who is subject to authorization, how and on what conditions it is granted, aiming to increase legal certainty, reduce administrative burden, and promote cross-border space activities in the Union. Firstly, the draft addresses Union space operators[740], It stipulates that any operator established in the EU shall be obligated to hold an authorization by a Member State before engaging in space activities.[741] Of note is that licenses granted by one Member State are formally recognized by all others[742], something that fosters the internal market for space services

[739] Ibid.
[740] Chapter I (Articles 6–10)
[741] Article 6(1).
[742] Article 6(2).

outright and prevents the duplication of licenses. Where operations cross multiple jurisdictions, such as beginning in one and established in another, both national authorities must coordinate their assessments.[743] The authorization procedure itself is also designed to mirror contemporary EU regimes of safety. Applicants will be required to submit an overall technical file on how Title IV's requirements (safety, cybersecurity, environmental standards) have been fulfilled.[744] These assessments must be reviewed by a QTB, selected by the applicant and with a limit of six months to provide its technical opinion. Upon approval, the authorization is registered in the URSO under Article 24 as mentioned above.

In the interest of flexibility, the draft regulation offers special regimes for certain types of missions. For example, "*the competent authority shall issue an authorization for the entire satellite constellation ('single authorization')*"[745] this offers a single "constellation" authorization for a set of satellites of similar kinds with identical launch plan.

Moving on, the Act lays down a special regime for EU-owned space assets such as Galileo, Copernicus, and GOVSATCOM. In such a situation, authorization is not addressed through the Member States but through the European Commission, pending technical appraisal by the EUSPA.[746] Furthermore, these authorizations can be withdrawn in the event, for example, that false information was submitted or the operator is no longer meeting ongoing conditions.[747] While this procedure ensures strict control, it could also lead to problems with responsiveness and administrative burden. The process demands and strict compliance, however, may deter some foreign partnerships, especially in regulatory jurisdictions where regulatory approaches vary far away from EU regulatory models.

B. Aligning National Authorization Regimes

As mentioned above Under this regime, an authorization from one Member State would have automatic effect across the EU, doing away with multiple licenses and facilitating the cross-border provision of space services. But existing national regimes present a highly fragmented picture that must be overhauled in order for such mutual recognition to work. For instance, Denmark national space law[748] requires that a space activity by a Danish operator or from Danish territory be nationally authorized by the Danish Minister of Education and Research.[749] The procedure requires detailed documentation on technical qualifications, environmental protection, insurance, and ITU registration.[750] There is no allowance under Danish law for recognition of authorizations of other EU states, and so full compliance with Article 6 would require legislative amendment.

[743] Article 6(3).
[744] (Article 7).
[745] Article 9
[746] Chapter II (Articles 11–13)
[747] Article 13
[748] Part, 2, 3, 5, 6, 7 and 13 of the Danish Outer Space Ordinance. .
[749] Part 5 of the Danish Outer Space Act. .
[750] See chapter I of this thesis.

In Belgium, the 2005 Federal Law stipulates that all operators be issued a national license before they carry out space activities, even if they possess an authorization from another Member State. are subject to prior authorization from the Minister responsible for space research and its applications within the framework of international cooperation.[751] Authorization must be requested by the operator and is granted on a personal and non-transferable basis.[752] The system is national regulation-based and reflects a general tendency for Member States to exercise control over their own space industry. Like Denmark, Belgium would have to legislate to allow the mutual recognition of other EU member state authorizations.

France follows the same path in its Loi relative aux Opérations Spatiales (LOS), already years of governing national space activity. As mentioned in chapter I of this dissertation; there is three categories of conditions for issuing authorizations in French,[753] authorities grant licenses only after carrying out extensive assessments of technical and financial ability, safety standards, and compliance with national security and environmental legislation.[754] Despite the fact that the French regime already has several guarantees which are analogous to the Draft EU Act, it is yet to recognize other locations within the Union to grant authorizations. Adoption of mutual recognition would require legislative update to harmonize LOS with the proposed EU regime.

Austria's Space Law reflects this national form as well. Licensing decisions are in the hands of the competent minister (now the Federal Ministry of Climate, Environment, Energy, Mobility, Innovation and Technology in 2020), who has to assess the credibility of the operator, the security of the mission, and conformity with international obligations.[755] Austria's system, like that of the other national legislations, is still founded on territorial jurisdiction and still does not provide for the cross-border recognition of licenses granted in other EU member states. Adopting the new EU pattern would require a change in both Austria's legislative provisions and administrative habits. Luxembourg's licensing procedure is nationally focused and does not incorporate the mutual recognition of EU authorizations. granted by the minister responsible for space policy and legislation is required for the exercise of any space activity as defined in the Luxembourg Space Activities Law.[756] This minister is currently the Minister of Communications and Media.[757] Obtaining the authorization referred to in Art. 5 ch. 1 does not exempt from the need to obtain other required approvals or authorizations, where applicable.[758] It would also need to apply its framework to include the envisaged new types of missions under the Draft Act as well. Collectively, these examples show that the Draft EU Space Act attempts

[751] Art. 2 § 1 and art. 3 of the Belgian Space Law; Belgian space bill, 17, ad. art. 3.
[752] Art. 4 § 2 of the Belgian space law.
[753] Art. 4 para. 1 and 2 of the French law relating to space operations.
[754] Art. 5 of the French law relating to space operations.
[755] § 3 of the Austrian Outer Space Act.
[756] Art. 5 (1) of the Luxembourg Space Activities Act; "*These provisions are inspired by existing authorization and supervision solutions for other regulated activities and in particular the law of April 5, 1993 relating to the financial sector as amended, while obviously taking into account the specific purpose of the activities space and the concrete purpose of the authorization and monitoring system. To the extent that certain formulations have been borrowed from existing texts, the meaning of the latter can thus serve as an element of interpretation for the provisions of this bill*" (Luxembourg space bill, 13, ad. art. 5).
[757] Art. 1 of the Grand Ducal Decree of May 28, 2019 establishing the Ministries.
[758] Art. 5 (2) of the Luxembourg Space Activities Act.

to change this by replacing the current patchwork with an interoperable, harmonized one authorization system.

2. Registration

A. *The Union Register of Space Objects and the E-certificate*

The suggested source EU Space Act provides for a single registration system under the Union Register of Space Object.[759] The register, to be administered by the EUSPA "*The Agency shall draw up, update and publish on the URSO website the consolidated lists of all space services providers referred to in paragraph 1*",[760] is to serve as the EU-wide repository for all the space objects granted permission to operate under the authority of the Union. To make accessible to the EU member states "*URSO shall have a centralized inventory and platform*."[761] The register aims to enhance traceability and transparency through a register of all Union space operators. As mentioned above, third-country operators and affected international organizations should also follow this process in order to provide their services to the EU market.[762]

On registration, providers are issued an electronic certificate or "e-certificate" testifying compliance with the technical conditions of the Regulation.[763] The certificate is imbued with important data such as operator identification, mission parameters, launch details, relevant standards, and most importantly, certification of compliance with debris mitigation. Notably, according to Art. 25, any agreement for the supply of space data or services within the Union must be supported with a valid e-certificate. In practice, this makes the EUSPA not just a registrar but a regulator compliance certifier.

Following this, we notice that the proposed Act would place EUSPA in an intensely expanded role, along with conducting technical assessments for authorization and supervision, supporting Member States that do not have qualified technical bodies, and providing support to the Commission via new structures such as the Compliance Board and Board of Appeal. Meanwhile, ESA would retain primarily optional technical support.[764] But this shift has engendered concern; The German association for the aerospace industry, BDLI, warns that an extension of EUSPA's tasks could lead to double structures and unnecessary bureaucracy, harm the good and lasting collaboration between the Member States and ESA, and reduce Europe's innovative powers and competitiveness in space.[765]

B. *Interaction with National Registries*

All Member States of the EU now possess national space objects registries primarily to be in line with the UN Registration Convention. These systems are discrete and focused on notifying the launch to the United Nations. Denmark's register, for example, is overseen by its Outer

[759] Arts 24.
[760] Ibid (3).
[761] Ibid (3).
[762] Ibid (c), (d).
[763] Article 25 (1).
[764] European Space Policy Institute (ESPI), *"Bold Words, Blurred Lines: A Reflective Look at the EU Space Act"* (ESPI Brief, 8 October 2025), https://www.espi.eu/briefs/bold-words-blurred-lines-a-reflective-look-at-the-eu-space-act/
[765] Ibid.

Space Act and tracks objects launched domestically and reports relevant information to the UN.[766] Belgium, France, Austria, and Luxembourg follow suit: each maintains a registry, reports at the national level, and fulfils its international commitments without a coordinated EU effort.

But the Draft EU Space Act introduces a new element: the URSO[767], and the issuance of electronic certificates[768] of registration. That is a whole new framework; On the one hand, the URSO would bring coordination, transparency, and control across the EU to a higher level. It would make it easier to know who is responsible for what in space, maybe reducing duplication or gaps in responsibility. But on the other hand, it is yet another bureaucratic procedure when it comes to implementation, adding that Member States will need to pay for reconciling IT systems, making timely notifications, and checking data for accuracy.

3. Debris Mitigation

A. EU vision for debris management

The EU Space Regulation draft foresees a paradigm shift in the regulation of space debris and traffic with the incorporation of debris mitigation as a mandatory legal requirement for all phases of space activities, clearly mentioned under Article 70. Unlike the voluntary character of earlier international suggestions[769], outlines a code of enforceable rules for launch and satellite operations. This is aided by Article 61 titled "*Space debris mitigation for launchers*", which imposes an obligation on every mission to submit a thorough Debris Control Plan[770] in which it lists procedures for reducing the production of debris, for example, stage separation procedures and passivation procedures. Significantly, the Regulation makes the long-standing "25-year rule" of post-mission disposal in low Earth orbit. The duties continue throughout satellite operation. All operational spacecraft, except for very small research satellites exempted by Article 62, must adhere to rigorous guidelines regarding trackability, maneuverability, and end-of-life planning. Also, operators need to subscribe to certified of collision avoidance services.[771] Removal of satellites in case of successful completion of a mission shall be done safely through deorbiting or in a graveyard orbit, with the full compliance report sent to national authorities and the EUSPA.[772] All these actions constitute a comprehensive life-cycle regulation strategy that includes debris mitigation into the heart of every operation, reinforced by the pillar of safety of this regulation. However, we have to admit that this reduction is not just a positive side effect but forms the core justification for the regulatory intervention.[773] Whether such an ambitious target can realistically be achieved remains far from certain. Moreover, the Act could inadvertently encourage forum shopping: operators may locate themselves, or obtain authorization, strategically in Member States

[766] Part 10 (1) (2) of the Danish Outer Space Act.
[767] Arts 24.
[768] Arts 25.
[769] Articles 58–73.
[770] Art 61 (2) (a).
[771] Article 64
[772] Articles 70–73.
[773] European Space Policy Institute (ESPI), *"Bold Words, Blurred Lines: A Reflective Look at the EU Space Act"*.

offering lighter, more flexible, or quicker procedures, even where their intention is to operate across the EU as a whole.[774] Such dynamics risk weakening the Regulation's harmonizing purpose and reproducing the very fragmentation it seeks to overcome.

B. National Gaps and Required Adjustments

Most EU Member States currently rely on national law that marginally addresses space debris at best, mainly to satisfy general commitments under the Outer Space Treaty and UN Debris Mitigation Guidelines. Austria binds operators to taking measures in accordance with good practice and taking into account internationally recognized guidelines for space debris mitigation,[775] but does not require having written Debris Control Plans or tracking traffic. Belgium mandates environmental impact assessments,[776] but these are not equivalent to operational duties such as post-mission disposal or collision avoidance procedures. The Danish Outer Space Act does reserve the right of authorities to make requirements for debris and states a disposal period of 25 years,[777] but has no concrete, enforceable obligation. France allows conditions on debris mitigation to be linked to licenses, but with no standardization.[778] Luxembourg, having originally quoted debris mitigation provisions in its proposed legislation,[779] however, it was changed in the final act, and the reference to space debris was removed, leaving only general appeals for environmental responsibility.

None of these frameworks currently involves the detailed measures implemented under the Draft EU Space Act; this harmonization will require profound legal alterations, but the final product represents a step towards a uniform and enforceable regime ensuring orbital sustainability and elevating existing soft-law standards to Union binding obligations.

4. Environmental Sustainability

A. Environmental Sustainability in the EU Space Act

As mentioned at the beginning of this chapter, one of the main pillars of this draft is sustainability; it significantly encourages environmental sustainability by making it a mandatory condition in its safety and resilience policy.[780] It sets the concept of an Environmental Footprint for all space missions "*Union space operators, except for those referred to in Article 10(4), shall calculate the EF of the space activities they carry out*".[781] This new requirement involves operators undertaking a comprehensive life cycle analysis of all phases, including design and manufacture, to launch emissions and in-orbit usage, and through to end-of-life disposal of the satellite. The results are then to be incorporated into an Environmental Footprint Declaration.[782] In the interest of integrity and scientific objectivity,

[774] Ibid.
[775] section 5 of the Austrian Outer Space Act.
[776] Art. 8 § 2 of the Belgian Space Law; art. 7 and 8 of the Royal Decree.
[777] part 6 of the Danish Outer Space Act.
[778] arts. 5 to 8 LOS.
[779] Luxembourg space bill, p. 13, ad. art. 4 of the bill.
[780] EU space Act proposal, Chapter III of Title IV (Articles 96–100)
[781] Art 96 (2).
[782] Art 96 (4).

such statements need to be certified by a QTB identified under the Regulation[783], thereby harmonizing the evaluation for all missions. Furthermore, the Regulation provides authority to the European Commission to adopt Implementing Acts.[784] These Acts will determine detailed calculation procedures and classification principles, "*Those implementing acts shall be reviewed to take into account scientific and technological developments and adapt to technological progress*."[785] Toward that end, the Union-wide database could be managed by the EU Agency.[786] This database brings together all EF data to enable regulators and the public to monitor trends in long-term sustainability.

Yet, critics maintain that such information requirements only raise the administrative burden and intricacy of the whole process, something particularly onerous for small operators without a dedicated compliance team, while failing to establish concrete, sanctionable requirements for actually reducing environmental impacts and emissions. [787]

B. National Gaps and Required Adjustments

Currently, the majority of the EU Member States lack specific or binding Environmental Footprint (EF) regulations in space activities. Denmark, for example, only requires launches to be "*environmentally safe manner*"[788] without requiring formal studies or indicators. The Belgian Space Law provides that any activity falling within the scope of the law must be the subject of an environmental impact study, and its completion may be requested at different stages of the activity[789] , but they are unrelated to the use of standardized EF calculations. In France, licenses are accompanied by requirements, particularly in the interest of the environment,[790] but no strict mention of performing studies on EF. Austria requires compliance with two obligations relating to the environment. First, the operator must comply with the general obligation not to cause harmful contamination or adverse changes to the environment.[791] Second, the operator is required to adopt measures to limit the production of space debris.[792] Luxembourg only refers to the importance of the safety of the environment and its protection[793] but has no lifecycle footprint analysis or certification as well.

To comply with the EU act, these countries will need to strengthen their legal framework and develop EF reporting systems. That means specifying how emissions, waste impacts, and lifecycle sustainability are computed and audited. Though this means more bureaucratic time and cost, a total of €4,000 to €8,000 per mission, it is also a huge step forward.[794] The advantage

[783] Art. 98 (2).
[784] Art. 97 (4)
[785] Ibid.
[786] Art. 99
[787] Küsters and Kullas, "EU Space Act Is an Ambitious and Necessary Legislative Initiative.", Chassot et al., Droit spatial national,.
[788] Part 3 of the Danish Outer Space Act
[789] Art. 8 § 1 of the Belgian Space Law.
[790] Art. 5 of the French law relating to space operations.
[791] § 4 and 5 of the Austrian Outer Space Act; Froehlich and Seffinga, p 94; Chassot et al., Droit spatial national,.
[792] § 4 and 5 of the Austrian Outer Space Act., see chapter I of this thesis.
[793] Art 2 , 9 Luxembourg space bill.
[794] Magda Cocco, Helena Correia Mendonça, Cristina Melo Miranda, and Sara Pinto Ferreira, "The EU Space Act & the EU Vision for the European Space Economy," *Lexology*, June 30, 2025, https://www.lexology.com/library/detail.aspx?g=0166cff2-9161-403a-933c-745bd9f8d895 (accessed July 26, 2025).

is considerable: a harmonized EF regime could render Europe's space sector cleaner and more transparent. But practically, compliance with the new rules will be difficult.

5. Gaps in the EU Space Act: Space Resources and National Security

The most obvious absence of the draft EU Space Act may well be its express failure to even mention space resource development, such as asteroid or lunar mining. The Regulation, as defined by Article 2, is limited in scope to licensing, regulation, safety, resilience, and sustainability, explicitly excluding military use and refraining from broaching politically sensitive topics such as frequency allocation and resource ownership. This choice helps the EU avoid the legal niceties of Article II of the Outer Space Treaty, which does not allow national appropriation of celestial bodies but never addresses the legal status of resources mined, and avoids potential conflict with national laws in this area, like Luxembourg's 2017 law[795], which grants private companies property rights to mined resources without claim of sovereignty. By leaving this issue to Member States. The same philosophy applies in national security: Section 2(3) and Section 4 of the Act guarantee that military space activities and defense-related space activities remain under national jurisdiction, in conformity with existing national legislation such as France's space law[796] which exempts military operations from generalized authorization mechanisms. However, at the EU level, it remains "*unclear what consequences such exclusions will trigger and how they will be implemented in practice*";[797] especially for dual-use or dual-purpose space objects. On paper, the provisions demonstrate the Commission's intention to respect Member State competences. Yet implementation becomes far more complex when, as the Commission itself acknowledges in the Space Strategy for Security and Defense, "*most space technologies are dual-use*."[798] Because of this technological overlap, the current wording risks creating legal and operational uncertainty. Operators and authorities may experience difficulty in knowing exactly when an activity qualifies as civilian or military, by what criteria that determination is guided, and how situations should be handled if a system is later reclassified. [799]

III. Future Adoption and Enforcement

Current events also serve to underscore the fact that, in addition to the considerable difficulties that could occur during the implementation of the draft if adopted with its original version **(1)**,

[795] Luxembourg Space Agency, *Law of 20 July 2017 on the Exploration and Utilisation of Space Resources* (English translation), 2019, accessed via Luxembourg Space Agency website.
[796] Art. 26 of the French law relating to space operations
[797] Bratu and von der Dunk, "EU Space Act Proposal and Its Impact on the Dutch Space Ecosystem."
[798] European Commission & High Representative, *Joint Communication to the European Parliament and the Council — European Union Space Strategy for Security and Defence* (10 March 2023), JOIN (2023) 0009, EEAS,
https://cms.spacesecurityportal.org/uploads/EU_Space_Strategy_for_Security_and_Defence_fb31753be0.pdf
[799] Bratu and von der Dunk, "EU Space Act Proposal and Its Impact on the Dutch Space Ecosystem."

there is also the issue that the legislative process is still open, evolving, and unresolved (at the time of writing this part of the thesis). In addition to the Commission proposal discussed in this dissertation, another text proposed by the Council has been formulated and presented as the Council compromise text under the Danish presidency, which will be analyzed in this section**(2)**. In this context, the Presidency of the Council, currently occupied by Cyprus, issued a revised draft of the EU Space Act on 30 March 2026.[800] The new draft will reportedly be considered during a working group meeting on 21 April 2026, with Andrius Kubilius participating. Nevertheless, considering this recent draft has already been characterized as "*moving in a backward direction*,"[801] and other modifications and compromise text will likely emerge in the coming period, such as during the Irish presidency period; here emerges a risk of the legislation proceeding to the stage of either being prolonged or being progressively weakened, thus possibly resulting in a failure of the EU Space Act to be adopted at all **(3)**.

Not only this, but as others have appeared within the European Parliament, in this respect, on 24 March 2026, the Internal Market Committee (IMCO) **"***lawmakers approved their opinion on the EU's first space law, which aims to create a simpler and more predictable single market for space companies"*.[802] Such a proposal considers several sensitive matters such as dealing with foreign operators, aiding start-up firms, and the level of the risk-based regulatory standards, taking into consideration the growing fragmentation of the European space industry. This opinion will be used by the Industry, Research and Energy Committee (ITRE) to move forward with the amendments and progress in the legislation process.[803]

It is important to note that even though all of these approaches continue to fall within the sphere of the ordinary legislative procedure, their coexistence is indicative of an incomplete consolidation of consensus in respect of the definitive contours and nature of the proposed EU Space Act. As opposed to the creation of a coherent perspective, the situation seems to have created a number of divergent visions with regard to the extent of harmonization, the level of concentration of regulatory power, and the extent of flexibility in the approach. These differences go beyond mere procedural issues and touch upon more fundamental aspects of "integration" versus "sovereignty". From a longer term perspective, in the author's opinion, it is likely that such differences would carry consequences beyond the simple matter of adopting new provisions. In case of a failure to address them properly, such differences might get represented in the new regulatory regime itself, thus repeating the problem of fragmentation even at the implementation stage. As such, while a harmonized legal instrument could become one means to ensure regulatory convergence, the differences between national approaches may hinder the ability to deliver on this task effectively. In this regard, the current legislative procedure does not only confirms the presence of fragmentation in national legal structures but also demonstrates its appearance within the law making process of the Union, forming serious doubts on the ability of the proposed EU Space Act to overcome the existing challenges.

[800] Council of the European Union, *ST-7806/2026 INIT* (Brussels, 2026), https://data.consilium.europa.eu/doc/document/ST-7806-2026-INIT/en/pdf

[801] Jeff Foust, "New EU Space Act Draft Seen as a Step Backward," *SpaceNews*, April 17, 2026, https://spacenews.com/new-eu-space-act-draft-seen-as-a-step-backward/

[802] European Parliament, "A Stronger Space Market: Europe's Next Big Leap," last modified March 25, 2026, https://www.europarl.europa.eu/committees/en/a-stronger-space-market-europe-s-next-bi/product-details/20260324CAN77201 (accessed April 8, 2026).

[803] Ibid.

To be fair, and from a positive point of view, it can be stated that such a phenomenon can be regarded as an expected phase in the harmonization process. The diversity of suggestions and approaches may indicate the ongoing process of negotiations that would lead to a more stable and efficient system in the end. If properly reconciled, this variety may result in a more resilient and flexible system and pursue the EU's goals in the field of space.

1. Current Implementation Challenges

After the Commission's June 2025 proposal, the ordinary legislative procedure was set in motion: it is based on Article 114 TFEU (internal market), as already mentioned, and requires ordinary assent (qualified majority voting in Council and co-decision with the European Parliament).[804] The draft foresees an entry into force on 1 January 2030 (after a two-year transition).[805] European Parliament rapporteurs and national capitals have begun scrutiny; Germany has already indicated it will "*swiftly*" implement the EU regulation as its national law.[806] But key stakeholders have voiced concerns; Several Member States and industry actors opposed a "binding regulation", preferring a more "*flexible directive*". [807] Indeed, the ESPI notes that "*several provisions raise questions regarding implementation, legal certainty, proportionality, and the balance of competences between EU institutions, Member States and international actors*".[808] In short, participants in the legislative process are debating not only technical details (debris rules, cybersecurity, registrations) but also whether this is an appropriate use of EU power. When it comes to the legislative procedure of the draft, after being proposed by the Commission, it is now under review by the Parliament and Council. Council will decide by qualified majority (55% of states, 65% population), and the Parliament's Committee on Industry, Research and Energy (ITRE) is the lead.[809] However, a series of implementing acts and delegated powers is foreseen to flesh out details post-adoption.

Implementing the regulation will be complex, lengthy, and costly. This will create a considerable administrative burden, in particular in smaller or medium-sized countries, when establishing the new Competent Authorities in the Member States. At the same time, very far reaching investigative powers for the Commission and EUSPA, including inspection powers at operators' premises, are foreseen. Such powers will not only apply to EU operators but also to intergovernmental organizations and third-country providers. This creates serious concerns regarding oversight, checks and balances, and due process. Enforcement is another open question: how will sanctions be applied, and across borders? For third-country operators, the Act requires them to appoint an EU-based legal representative to ensure cooperation, but how the EU will actually enforce compliance remains unclear. Negotiating equivalent binding agreements with major powers like the U.S and China will be politically delicate and slow.[810] If mutual recognition fails, enforcing licensing requirements on launchers or ground-based operators operating exclusively abroad could prove very difficult.

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[804] Küsters and Kullas, "EU Space Act Is an Ambitious and Necessary Legislative Initiative."

[805] European Space Policy Institute (ESPI), *"Bold Words, Blurred Lines: A Reflective Look at the EU Space Act"*.

[806] See, Timo Stellpflug, "The EU Space Act – Europe's Law for Space," *Taylor Wessing* (blog), July 4, 2025, https://www.taylorwessing.com/en/insights-and-events/insights/2025/07/eu-space-act-nimmt-form-an

[807] European Space Policy Institute (ESPI), *"Bold Words, Blurred Lines: A Reflective Look at the EU Space Act."*

[808] Ibid.

[809] Küsters and Kullas, "EU Space Act Is an Ambitious and Necessary Legislative Initiative."., Bratu and von der Dunk, "EU Space Act Proposal and Its Impact on the Dutch Space Ecosystem."

[810] Stout and Fruits, "*Comments on the Proposed EU Space Act*."

Beyond legal enforcement, the real success of the Act may hinge on regulatory culture, not just rules. Whether Member States and EUSPA embrace pre-licensing dialogue, provide guidance, and offer training will be crucial. Without implementing acts (delegated or technical), many of the Act's ambitions, on standardization, sustainability, cybersecurity, and data traceability, remain conceptual.[811] Only once secondary legislation is adopted will we fully understand how it works in practice. One particularly sensitive area is standardization under Article 104 and recitals 33-34, which could shift technical rulemaking away from ESA's traditional domain. While the Commission may ask European standardization bodies to draft new standards, for e-certificates, for example, this shift toward politically-led technical regulation risks bureaucratic burden and tension with national experts at ESA.[812] Institutionally, the Act signals a major rebalancing; EUSPA would be entrusted with central tasks: authorizing EU and third-country operators, managing the Union Register of Space Objects, issuing compliance certificates, running a "high-interest event" contact list, and providing appeals and compliance oversight through a newly created Board of Appeal and Compliance Board.[813] By contrast, ESA's role is limited to purely technical support for Member States; a change that has raised red flags in industry. The German aerospace association (BDLI) warns this reform risks creating "*double structures and unnecessary bureaucracy*," potentially stifling innovation and undermining the long-standing collaboration between Member States and ESA.[814] Legally, the Act's broad harmonization ambitions run up against Article 189 TFEU, which prohibits the EU from harmonizing national space legislation. In this way, it could potentially conflict with the Treaty's principles of respecting Member States' autonomy in space.[815] Some analysts have expressed concern that it could create fragmentation rather than unity. The purpose of the Act is to simplify authorization, and impose uniform rules on sustainability, cybersecurity, reporting, and financial responsibility, and it is ambitious and could create a deeper EU regulatory framework. But can a regulatory framework alone deliver autonomy? Probably not. A law on debris and service resilience does little to build rockets or satellites; real autonomy requires industrial and military investment. For example, the Act's exclusion of purely defense satellites from its scope means that each country's military remains outside EU purview, which is logical, but reminds us that security capabilities (the very stuff of autonomy) stay national.

The Act could indirectly bolster autonomy if it genuinely makes the European space sector more competitive and secure. A uniform safety regime might help European constellations scale up without legal headaches. And by mandating common cybersecurity and debris standards, the EU might deter non-EU companies from undercutting on lax rules. Yet, some warn that if the Act boils down to protectionism (targeting US companies, for instance), it might backfire by isolating EU firms from global supply chains.[816] In practice, then, Europe's aspirations for space autonomy rest more on budgets and technology development than on harmonized licensing. The Space Act could be a piece of the puzzle, but it cannot substitute for a strong industrial strategy or robust defense cooperation. One important point worth mentioning here is the US comment about the EU space act proposal, which was mostly negative; According to the U.S. State Department, the draft regulation would impose

[811] European Space Policy Institute (ESPI), *"Bold Words, Blurred Lines: A Reflective Look at the EU Space Act."*

[812] Küsters and Kullas, "EU Space Act Is an Ambitious and Necessary Legislative Initiative."

[813] See the EU space law Draft

[814] Küsters and Kullas, "EU Space Act Is an Ambitious and Necessary Legislative Initiative.".

[815] Bratu and von der Dunk, "EU Space Act Proposal and Its Impact on the Dutch Space Ecosystem."

[816] Stout and Fruits, "*Comments on the Proposed EU Space Act*."

"*unacceptable regulatory burdens*" [817]on US space-service providers, threatening not only commercial cooperation but also NATO-wide strategic alignment.[818] The U.S. argues that some of the Act's provisions could undermine transatlantic partnership by creating barriers for non-EU operators, particularly large constellations[819] based in the U.S Implications for EU Strategic Autonomy. If the EU follows U.S pressure, such as by deleting or diluting extraterritorial control rights, it may save transatlantic market access, but only at the expense of its strategic autonomy. Weaken the provisions, and the Act loses one of its strongest levers for European regulatory sovereignty. On the other hand, resistance carries the risk of isolating the EU's ambitions: U.S. companies may withdraw or scale down their involvement, while cooperation on defense related space activities may fray. In sum, strategic autonomy implies resilience and capability, not just common rules. If the regulation fails to drive innovation or inadvertently saddles Europe with uniquely burdensome standards, it could even hamper the very competitiveness it seeks to enhance.

2. The Fragility of Consensus: Legislative Negotiation and the Council Presidency Compromise

It is important to mention that the legislative path of the proposed EU Space Act cannot be analyzed from the sole perspective of the Commission's proposal in June 2025, but it is also necessary to analyze it from the perspective of the institutional reactions it provoked. In this sense, the Council Presidency compromise text of 05 December 2025 (ST-16437-2025-INIT) is a crucial step in the legislative path of the proposed EU Space Act.[820] In fact, it is a working document drawn up under the Danish Presidency with the objective of consolidating Member State positions and mapping out points of convergence and divergence in the Council. In other words, the compromise text is therefore not a new draft in a constitutional sense; it is a consolidated working version reflecting how Member States wish to amend the Commission text.

However, its role is much more significant since it reveals the tensions implicit in the Commission's original proposal and makes visible the political and constitutional limits within which EU space regulation has to operate. From a procedural perspective, the fact that a presidential compromise text was required is itself open to question. Had the Commission's proposal of June 2025 found the right balance between harmonization and Member State sovereignty, it is likely that the level of Council mediation required would have been unnecessary. The drawing up of the compromise text indicates that the original text did not enjoy a stable majority in its original form. This is not uncommon in EU law-making, but in a strategically important area like space activity, opposition at this early stage is a bad sign.

In the progress report of the compromise text, it was stated that: *"One of the main requests from delegations has been the simplification and clarification of the text itself. As a result, the*

[817] United States of America, *"Comments of the United States of America on the Proposed EU Space Act"* (submission to the European Commission, November 4 2025), https://cdn.table.media/assets/europe/090166e52487d15d.pdf
[818] Ibid.
[819] Stout and Fruits, "*Comments on the Proposed EU Space Act*."
[820] Council of the European Union, *ST-16437-2025-INIT: Draft Presidency Compromise Text on the European Union Space Act*, 05 December 2025, https://data.consilium.europa.eu/doc/document/ST-16437-2025-INIT/en/pdf

Danish Presidency intends to simplify articles, streamline wording and restructure parts of the text to improve the clarity and coherence of the provisions of the proposal."[821]

The compromise text, therefore, becomes a diagnostic tool: it enables one to identify which features of the proposal were considered too much, too unclear, or too politically intrusive. There are several features of the presidency text that indicate that Member States attempted to rebalance the allocation of regulatory power. Explanations regarding supervisory powers, changes to compliance procedures, and refinements to definitional reach indicate an underlying concern with centralization. The Commission had characterized the Act essentially as an internal market measure to tackle fragmentation and ensure a consistent level of safety, security, and environmental sustainability. However, activities in space are not only commercial activities; they are also related to national security, industrial autonomy, and international responsibility in public international law. The presidency compromise text implicitly recognizes this duality. Through the insertion of drafting changes that maintain a higher level of national flexibility in implementation and supervision, the Council seems to reiterate that harmonization cannot be reduced to uniformity in an area where Member States continue to have international responsibility. Moreover, the compromise text shows the political delicacy that surrounds the issue of integration in strategic sectors. The ambition of the Commission to establish a comprehensive and highly technical framework shows that it understands space as essential infrastructure that supports digital connectivity, navigation, defense, and environmental observation. In this respect, fragmentation is not only an economic problem but also a systemic issue. However, it is clear that Member States have very different levels of maturity in terms of regulation, industrial development, and strategic vision. Member States that have developed space sectors and strong national frameworks may see the need for harmonization as an interference in well-working systems; on the other hand, Member States with developing sectors may prefer flexibility over prescriptive approaches. The presidency text takes a middle ground in these competing demands and suggests that a balance in regulatory intensity is necessary for reaching a consensus.

An important point that frequently emerged is that "*Delegations have questioned the legal basis of the EU Space Act (Article 114 TFEU), including whether the Commission has demonstrated the existence of market barriers in the space sector. Delegations have sought clarity on the impact of the proposed Regulation on the liability of Member States under the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. The Danish Presidency decided to advance the examination of the text in parallel to having more clarity on those issues."* [822] This tension raises a broader constitutional question: as previously discussed in this dissertation, to what extent can Article 114 TFEU, as a legal basis for internal market harmonisation, sustain a regulatory framework that indirectly shapes how Member States discharge their obligations under Article VI of the Outer Space Treaty? Although the EU cannot assume international responsibility for national space activities, a detailed regulation will necessarily impose limitations on the scope of regulatory freedom available to Member States. The recalibrated text of the presidency could be interpreted as an effort to address the symmetry of this issue,

[821] Council of the European Union, *ST-15830-2025-INIT: Progress report Presidency Compromise Text on the European Union Space Act*, 26 November 2025, https://data.consilium.europa.eu/doc/document/ST-15830-2025-INIT/en/pdf
[822] Ibid.

where Member States remain internationally responsible, but their domestic authorization and oversight structures would be conducted within parameters agreed at the EU level.

Furthermore, the compromise text reveals the political sensitivity surrounding the problem of integration in strategic sectors.[823] The ambition of the Commission to establish a comprehensive and highly technical framework shows that it understands space as essential infrastructure that supports digital connectivity, navigation, defense, and environmental observation. In this respect, fragmentation is not only an economic problem but also a systemic issue. However, it is clear that Member States have very different levels of maturity in terms of regulation, industrial development, and strategic vision. Member States that have developed space sectors and strong national frameworks may see the need for harmonization as an interference in well-working systems; on the other hand, Member States with developing sectors may prefer flexibility over prescriptive approaches. In this scenario, the presidential document has attempted to implement the idea of equilibrium, which means that an equilibrium is needed to reach a consensus.

Another point that needs to be mentioned with regard to this compromising text is the connection between aspiration and attainability. The Commission defended the Space Act as being essential in the improvement of safety, sustainability, and resiliency in an ever congested and competitive space environment. Yet the Council's interventions indicate concern over administrative burden, compliance costs, and institutional complexity. If the original draft was perceived as overly intricate or unclear in its allocation of competence, this perception carries political consequences: legislative momentum may stall, and industry support may weaken. The presidency text thus functions as an exercise in political pragmatism. It does not fundamentally reject EU action, but it tempers its scope in order to preserve the prospect of eventual adoption.[824] In this regard, the compromise text embodies a Union that is operating in a complex of fragilities at various levels. On the one hand, the EU is faced with the challenges of geopolitical turbulence and the escalating global rivalry in space technology. On the other hand, the EU is required to balance its supranational ambitions in regulatory affairs with its member states' sensitivities in the areas of sovereignty, security, and industrial policy. The role of the Danish Presidency in this compromise is significant in that it highlights the incremental nature of integration in high-tech areas. In addition to this, the presidency text also highlights the intergovernmental character of EU governance. Thus, while the Commission sets the agenda for legislation and provides the narrative for European added value, the Council is where interests are aggregated and defended.

The process of compromise, therefore, reveals that the Space Act is not simply a technocratic project. Rather, each change in the text represents a compromise between integrationist and intergovernmental logics. The wider significance is that the legislative fate of the EU Space Act is likely to be less a function of legal principle and more a function of coalition-building. The presidency compromise may signal a necessary step towards a wider consensus, but also a limit to that consensus. The issue is clearly not one of acceptance of the need for coordination, on which all Member States appear to agree, but rather one of willingness to acknowledge regulatory flexibility in an area that affects core sovereign interests.

[823] See Council of the European Union, *ST-16437-2025-INIT: Draft Presidency Compromise Text on the European Union Space Act*.
[824] Ibid.

3. Towards the Potential Abandonment of the EU Space Act?

Taking into account the analysis provided above, I, the author of this study, tried to achieve some compromise between critical considerations and a rather cautious attitude of hopefulness, hoping that the mentioned feedback and procedures would eventually lead to the creation of a stronger EU Space Act, therefore to the strengthening of the EU's independence in outer space. Nevertheless, there is an additional and even more essential question which comes to mind: and what will happen if the Union fails to adopt the draft at all? This is not an assumed situation but still holds some analytical validity given the present state of the negotiations.

In fact, the Presidency of the Council, currently occupied by Cyprus, issued a revised draft of the EU Space Act on 30 March 2026, as a continuity of simplification and carefully adjustion the line of the scope of the act.[825] The new draft will reportedly be considered during a working group meeting on 21 April 2026, with Andrius Kubilius participating. Nevertheless, as stated by Michael Overby, deputy director of space affairs at the State Department, "*Unfortunately, this latest version that just came out last month from Cyprus, in our view, moves in a backward direction*."[826] Moreover, as pointed out by Lesley Jane Smith, president of the International Institute of Space Law, "*It is not clear that this piece of legislation will pass*."[827] The draft law has come under criticism for failing to proceed in the European Parliament, and a number of member states belonging to the Council of the European Union have called into question the competence of the draft. In this situation, harmonization will no longer serve as the cure for fragmentation; it may even cause fragmentation. The drive toward harmonization, if not implemented effectively, can create uncertainty, slow down decision-making, and especially reveal the limitations of the regulatory capacity of the Union within a sector that involves a high degree of dependency on external factors.

In this light, one could interpret the EU Space Act discussion as not only a normal legislative process but also as a test of the Union's ability to manage outer space operations by means of an effective internal regulatory process. This changes the nature of the problem; it does not simply become about whether the union will reach its goal, but whether it can successfully manage the process of achieving that goal. In other words, one of the most important features of the ongoing process is not only that of the elaboration of the draft document itself, but rather the even more critical uncertainty related to the general feasibility of such a process. In the end, however, rather than moving along a path of harmonization, the present development reveals a complex legislative process wherein subsequent versions of the draft legislation may fail to move towards stability but, instead, incorporate a series of concerns that undermine legal certainty and compromise on regulatory effectiveness. In this case, it is not a matter of lack of will but of the inherent limits within harmonization itself, and if the space law situation in the EU will remain the same, fragmented. In other words, not adopting the proposal would not lead to the development of any new rules; rather, the current fragmented regime would persist, and the harmonization effort would be left incomplete.

It might be argued, however, that such a scenario could equally point to the notion that the consolidation of the space industry is fundamentally different from other forms of harmonization initiatives in EU law. Indeed, the space sector stands out precisely because it

[825] Council of the European Union, *ST-7806/2026 INIT* (Brussels, 2026)
[826] Foust, "New EU Space Act Draft Seen as a Step Backward,"
[827] Ibid.

represents an unprecedented combination of commercial activity, scientific progress, strategic independence, and national security. As such, the space industry cannot be considered solely on economic or technical grounds but must also incorporate geopolitical considerations and even military aspects. It could very well be that the inherent nature of the space industry and its strong link with sovereign interests make the quest for legal consistency more difficult in practice than in other areas of Union policy integration. Nonetheless, such challenges must not necessarily be considered sufficient evidence to suggest that harmonization can never be achieved effectively. On the contrary, they might be used to support the following hypothesis: that the integration of the space sector into the European Union context poses a bigger challenge than harmonization in many other regulatory domains because of the specific interdependence between the sector and commercialization, technological development, independence, and national security. This hypothesis demands further analysis since it can potentially shed light on the reasons behind the unique regulatory development of the European space sector. However, this hypothesis cannot be taken as a definite answer yet; Much will depend on how negotiations and the following political developments progress.

Conclusion of the chapter

The draft Regulation goes well beyond merely streamlining authorization procedures; it layers in a comprehensive suite of substantive and procedural obligations. These include harmonized criteria for authorization, requirements for sustainability and debris mitigation, cybersecurity and resilience duties, reporting and notification regimes, risk-assessment methodologies, financial responsibility/ insurance parameters, as well as data-traceability obligations and mechanisms for cooperative enforcement. Rather than just aligning existing national rules, it imposes new obligations that significantly deepen the EU's regulatory footprint in space.

This problem pictures a typical structural contradiction: the delicate balance between harmonization and national sovereignty. While the EU Space Act could be binding in its entirety on all Member States, its practical effectiveness could rely on the enforcement capability of Member States. Those Member States with established space infrastructures; CNES in France or ASI in Italy, will have relatively straightforward compliance. And institutional challenges will be encountered by less experienced Member States. The Regulation calls for the establishment of National Competent Authorities and Qualified Technical Bodies to carry out licensing, conduct inspections, and ensure compliance with safety. However, where domestic expertise is lacking, states can be forced to outsource these processes, which is more expensive and slows down approval for operators. This has the potential for a twisted implementation plan, with a few Member States running ahead and others failing to meet minimum requirements. Another important point is that the draft introduces a three-tier system for governing space activities, which divides powers between the European Commission, EUSPA, and Member States, as opposed to a centralized approach based on a single European entity. The European Commission is granted normative powers through delegated acts and implementing regulations; EUSPA is responsible for operational tasks; while Member States retain powers for authorization, supervision, and designating Qualified Technical Bodies. At the same time, the draft introduces ESA into the framework by providing for reliance on ESA technical opinions by Member States and for a future cooperation agreement between the Union and ESA. This structure, although reflecting a

constitutional caution and political compromise that preserves national responsibility in accordance with international space law, also increases the number of interfaces between institutions. In this way, the proposal does not simplify the system of European space law; rather, it may lead to a complex network of technical, administrative, and monitoring interfaces that call into question efficiency and accountability. This could result in a worrying trend: fragmentation of fragmentation. Rather than the regulatory unity the EU had wanted, we may instead witness an outburst of isolated national responses to an allegedly uniform legal tool. These differences not only imperil the emergence of a truly integrated European space market but, more insidiously, threaten to destabilize the legitimacy of the EU's broader space governance idea. Such two-level fragmentation, both horizontal (between Member States) and vertical (between national and EU-level foreign policy competence), also has strategic and economic implications. Legal uncertainty discourages investors and operators. Which was the reason for the compromise text, therefore, it becomes a diagnostic tool: it enables one to identify which features of the proposal were considered too much, too unclear yet challenged to be adopted as its current version. There are several features of the presidency text that indicate that Member States attempted to rebalance the allocation of regulatory power. Overall, though the EU Space Act is a necessary and commendable step in the direction of a concerted regulatory framework for Union space activity, its success will depend on how effectively it accomplishes harmonization while still accommodating flexibility. Of central importance will be assisting Member States in acquiring administrative and technical capacity.

Conclusion

Is the law enough for EU strategic autonomy in outer space ?

The current European space governance structure is based on a structurally fragmented environment. As discussed within ***Chapter I*** of this thesis, this fragmentation takes place at a vertical level between the national legal systems and the emerging regulatory role of the Union, as well as a horizontal level between the national space laws of the different Member States. As shown within the comparative analysis of the Austrian, Danish, Belgian, French, and Luxembourgian space laws, the differences between the European national space laws are not superficial but rather structural. These countries were chosen not to give an exhaustive overview of the European national space law, but rather to reflect the different regulatory approaches that exist within the European Union. It is clear that the laws on space in Europe vary; however, France has created an elaborate legal framework due to its technological advancement in the area, which has a rich history of space involvement. Luxembourg, on the other hand, has developed a strategically innovative regulatory structure, acting as a pioneer within the field of space law. The cases of Belgium and Denmark, for example, illustrate the characteristics of medium-sized space actors with structured authorization systems that strive for a balance between administrative control and operational capability. In the case of Austria, however, there are several lessons for smaller, more research-oriented space faring nations in fulfilling international obligations with less institutional capacity to do so. These cases, therefore, illustrate that space legislation in national jurisdictions is also strongly related to their economic scale, strategic ambitions, and administrative principles. Some have opted for more extensive *ex ante* authorization and supervisory systems, reflecting a more precautionary and control-oriented logic. Others have opted for more facilitating approaches that encourage commercial involvement while meeting international obligations, particularly with regard to Article VI of the Outer Space Treaty. The result is therefore not only diversity, but also regulatory irregularity.

Fragmentation, however, does not stop at the national level; it is also found in the European regional architecture, as evidenced in ***Chapter II*** of this study. The co-existence of intergovernmental and supranational structures, in particular the European Space Agency with a membership mix of EU and non-EU countries, and the European Union Agency for the Space Programme working within the EU-only legal framework, results in a dual structure of European space governance, with ESA being in charge of the technical development and programme implementation, and EUSPA being in charge of operational EU programmes such as Galileo, Copernicus, GovSatCom, and IRIS^{2}.In a certain manner, the dual structure of European space governance mirrors the vertical and horizontal fragmentation of the European space law, as identified above. Operators may need to comply with several layers of rules, including national authorization regimes, EU programme rules, and, in a few instances, ESA rules, in particular in the field of technical standards. For operators with activities in several Member States, this may imply dealing with a multitude of legal regimes, each of them specific to a particular context or programme. In this respect, as shown in ***Chapter III***, the same degree of inner legal fragmentation is not a problem for either the United States or China. Both

countries operate within a constitutionally centralized system, even though the underlying regulatory philosophies are significantly different.

The United States has developed a primarily federal and nationally coordinated regulatory regime for space activities. The core legislative acts, which are currently reflected in Title 51 of the U.S. Code, serve as the overarching statutory basis, with the actual implementation left to the responsibility of specialized federal agencies. For example, the licensing of launches and entries into space is the responsibility of the Federal Aviation Administration, satellite communications fall within the remit of the Federal Communications Commission, and the licensing of remote sensing activities is a task of the National Oceanic and Atmospheric Administration. However, this does not equate to fragmentation in the European sense; The system has continued with a vertical integration under federal control, with no differences in space law regulation from state to state. This has ensured a relatively coherent regulatory environment that, although differentiated in terms of sectors, remains within a unified constitutional space. Its market-oriented character, with its inherent flexibility and support for commercial innovation, has proved instrumental in supporting the dynamism of the private sector. The Chinese regulatory model has a different character, with a strong underlying logic of the role of the state. While it has yet to develop a comprehensive and consolidated law for outer space, space activities remain subject to a range of centrally promulgated regulations, administrative measures, and strategic planning documents. The regulatory control remains centralized, with space development being strongly aligned with the underlying logic of national industrial policy. The multiple actors and normative documents represented by the various ministries do not translate into a constitutional fragmentation, but rather into a form of administrative distribution within a unified political space. The European context, however, is qualitatively different, since the structure of EU space governance is marked not only by "functional differentiation," but by "structural dispersion in multiple legal orders." In other words, national authorization regimes coexist with emerging EU regulatory tools, along with intergovernmental instruments, creating a multi-layered structure without constitutional unity, as in the U.S or Chinese models. Although the Chinese model may be considered normatively dispersed, and the U.S model administratively specialized, neither of these models faces the dual challenge of horizontal diversity among the constituent units, combined with vertical division of competence, as in the EU context.

The comparison does not imply that one model is better than another. It merely demonstrates the ease with which coherence, strategic positioning, and regulatory clarity are achieved by centralizing constitutional authority. The challenge for the European Union is not an absence of regulatory capacity, but how to resolve the tension between its current model of multi-level governance and the demands for consistency, certainty, and strategic direction in an ever more competitive global space environment.

The initiative of the Union for the creation of a common space law is also connected with the goal of enhancing European strategic autonomy, as has been examined in ***Chapter IV***. Indeed, space has gradually moved from being a domain for technological pride to a key element for economic strength, security, and geopolitics. As a result, autonomy is no longer a mere concept,

but it is connected with the ability to launch and control space activities without significant external dependency.

However, it should be noted that the pursuit of strategic autonomy in space is a complex issue, both at the institutional and material levels. The EU is part of a complex governance pattern in which competences, funding systems, and strategic policies for space activities are shared, coordinated, or divided between the EU, its Member States, and the European Space Agency. At the same time, space activities have a natural dual character; The civilian, commercial, and security dimensions of space activities often have a technological unity, but they have distinct legal regimes. The dual character of space activities, particularly in areas that have a direct link with security and economic competitiveness, raises legal uncertainty.

The paradox is that space is at the same time the source of autonomy and the source of exposure. The modern economy, digital infrastructure, and the military are increasingly reliant on the services provided by satellites. The more the EU depends on the services, the more vulnerable it becomes to external actors. The aim of the EU to limit its exposure to non-EU services for launches, essential components, and data infrastructures is part of the broader strategy for enhancing autonomy. Autonomy, however, cannot be achieved through industrial means; it also has to be achieved through regulatory means that can support the integrated European space services market, that what we have called in this thesis “Law as a tool” for EU strategic autonomy in outer space.

In this regard, the proposed legal harmonization framework is an enabler. By reducing differences and establishing common rules, the proposed framework aims at creating an environment conducive to the Union’s external action. A unified legal “language” in space is not an end in itself but an essential feature of the space regulatory environment. The creation of an EU space framework is an exercise in coherence, driven by an internalization drive and an externalization drive. The EU space framework is an exercise in creating an environment conducive to the Union’s external action.

As has been shown in ***Chapter V***, the discussion surrounding a binding EU space act is far from hindered by a lack of legal foundation, but rather by the complexity of the EU’s constitutional landscape. While space policy remains a shared competence and Article 189 TFEU specifically restricts harmonization by excluding the adoption of laws and regulations of the Member States in some respects, the Treaties nevertheless offer a number of different legal entry points for action. Each of Articles 189, 114, 115, and 352 TFEU offers a different normative entry point, from specific competence, through internal market harmonization, and finally through a general competence, albeit all of which must be realized within the structural confines of Article 189 TFEU (2), which maintains Member State competence in key areas. The process and the delays that have accompanied the drafting of the EU Space Act suggest that there are underlying issues that go beyond those which might be attributed to the process and drafting/technical issues. As can be seen, there are national interests and concerns, which are related to industrial competitiveness, the role of ESA, and other issues of strategic autonomy.

The Commission’s June 2025 proposal for a Regulation on the EU Space Act is an important step forward from an institutional perspective, as has been examined in ***Chapter VI**,* the final

chapter. The scope of the proposed Regulation is defined by safety, security, and sustainability concerns and is designed to demonstrate the need for intervention on the basis of risk management rather than industrial centralization. The key elements of the proposal include the adoption of harmonized standards in the fields of collision avoidance, orbital debris mitigation, and lifecycle risk assessment, as well as the creation of a regime of "mutual recognition" in which an authorization issued by a Member State would be valid on the entire EU territory. The "single authorization" concept directly addresses the horizontal fragmentation identified above.

The proposal is also interesting because it has an "extraterritorial" element, since operators from outside the EU, which operate in the European market, must comply with EU standards. From that perspective, the EU Act proposal follows the logic that is traditionally attributed to the so-called "Brussels effect." The EU regulatory influence is projected beyond its territory, and its regulatory reach is exercised through the terms and conditions that grant access to its market. However, it is essential that the application of EU standards for operators outside the EU is compatible with EU obligations in the context of the World Trade Organization, the principle of non-discrimination, and the continued applicability of the Outer Space Treaty. The space sector is different from data protection or digital markets because it is located in a particularly strategic and geopolitically sensitive environment. The effectiveness of the regulatory spill-over effect will therefore depend not only on the attractiveness of the EU market, but also on the relative strength and strategic positioning of other regulatory centers, particularly the United States and other space powers.

While the EU Space Act, if adopted with its current version, would face many challenges with regard to its implementation, it would be applicable directly across the Union as a Regulation, though the enforcement would largely be left to the Member States. This would require the Member States to establish competent authorities, modify the procedures for the authorization of activities, and adjust the technical standards with the new EU regime. In addition, national legislation that adds requirements or varying conditions would also require amendment or repeal for the purpose of fully implementing the concept of mutual recognition. There would be a risk that the national authorities might interpret the Regulation differently, leading to fragmentation at the level of application. And yet political resistance is perfectly conceivable; The reference to the legal base of Article 114 TFEU underlines the internal market dimension, but some Member States might also ask themselves whether the degree of divergence is sufficient to justify harmonization at the EU level, particularly in light of the constraints imposed by Article 189 and the principle of proportionality. Some elements of this might arguably be seen as going beyond what is necessary to redress the imbalance of the internal market. The negotiating process through the European Parliament and the Council will establish not only the extent of harmonization but also the limits of EU competence in this area.

Finally, the EU Space Act represents an essential, though transitory, step toward regulatory unification. The entry into force of the Regulation, which is not expected before the end of the decade, will be subject to political compromises and institutional coordination. If successful, the Regulation has the potential to reinforce the internal market for space services while safeguarding key national competencies in security and defense policies. The key question is

how to achieve this balance effectively, moving forward towards integration and coherence without undermining the fragile balance of competences that characterizes the EU's constitutional architecture.

Is the law enough for strategic autonomy in outer space? While legislative harmonization can lay the groundwork with a framework and prevent fragmentation, autonomy is just as much tied to investment, technology, and industry. The EU bodies themselves have recognized that regulatory alignment is just as much tied to large financial commitments, development of infrastructure, and programme continuity. The draft Space Act can create common standards and clear roles, but it does not create launch capabilities, supply chains, and technology autonomy. For strategic autonomy to be achieved in the space domain, it is therefore not just about regulation but about financing, strengthening European industry, securing supply chains, and integrating space capabilities into overall security and defense strategies. The cooperation has to be multi-layered between the EU and Member States, with ESA, and with international partners, as well as securing autonomy of action. Regulation is one part, but investment and policy substance are another. EU leaders themselves emphasize that there needs to be heavy investment and industrial capacity alongside. In June 2025 MEPs called for a €60 billion multi-year EU space programme, roughly triple the current budget[828]; arguing that without major investment, Europe cannot compete. They warn that an EU dependent on non-EU launches or data would be "*economically weaker, vulnerable and…lacking the tools to be strategically autonomous*".[829]

In this sense, it is submitted that regulation alone is insufficient to deliver autonomy in space. Although legislative harmonization can prove effective in the overall framework and in minimizing the consequences of fragmentation, it is equally important to have sustained investment, technological capability, and depth in industry. The EU institutions have recognized the need for not only legislative harmonization but also the need for financial commitment, the development of infrastructure, and the need for programme continuity. The Space Act, as it is proposed, can prove effective in the overall framework, but it cannot, by itself, establish launch capability. Therefore, strategic autonomy in space will involve a multidimensional approach that will go beyond the regulation of space activities and will also involve financing innovation, reinforcing European actors in industry, and accessing critical components as well as integrating space into broader security and defense strategies. It requires cooperation to take place on multiple levels, between EU institutions and Member States, with ESA, and with international partners, while maintaining strategic autonomy for the EU. Thus, from this analysis, the main research questions and hypotheses established at the beginning of this thesis are proven. The persistence of fragmentation, the limitations of EU competence set out by the Treaty, and the geopolitical influences on space governance all point to the same fact: legal harmonization is not only necessary but also insufficient. The research findings here point to the proposition that a comprehensive approach to regulation and strategic industrial

[828] Lucia Del Bello, "MEPs Call for €60B Standalone EU Space Programme," *Science|Business*, June 20, 2025, https://sciencebusiness.net/news/aerospace/meps-call-eu60b-standalone-eu-space-programme.
[829] Ibid.

policy is necessary to achieve the EU's objective of strategic autonomy in the new global order of space activities.

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