

**NOTES  
DE L'IFRI**



**FEBRUARY  
2023**

# How the War in Ukraine is Changing the Space Game



Geopolitics of  
Technology  
Program

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ISBN: 979-10-373-0703-3

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Cover: Boxes with Starlink satellite equipment from Elon Musk's company SpaceX in front of a building in Ukraine.

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### **How to quote this publication:**

Guilhem Penent and Guillaume Schlumberger, “How the War in Ukraine is Changing the Space Game”, *Notes de l’Ifri*, Ifri, February 2023.

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1. This paper was written by the authors in their personal capacity. Their views do not reflect those of any institution.

# Résumé

Vitrine spectaculaire du nouveau paradigme commercial du secteur spatial (*New Space*), la guerre en Ukraine semble consacrer les efforts d'adaptation menés par les États-Unis – en particulier le Pentagone – depuis le milieu des années 2010. Elle met ainsi en évidence les transformations en cours et annonce de potentielles ruptures dans l'exploitation des orbites, surtout dans les domaines de la connectivité par satellite et de l'observation de la Terre. Elle dessine aussi de futures tensions, alors que la structuration des relations internationales autour des deux pôles constitués par les États-Unis et la Chine intensifie les interrogations sur la sécurité, la viabilité, la sûreté et la stabilité des activités spatiales. Ces développements mettent l'Europe au défi de rester pertinente dans ce secteur.

# Abstract

The war in Ukraine has become a showcase for the new commercial paradigm emerging in the space sector (*New Space*). As such, it seems to confirm the relevance of adaptation efforts led by the United States – more specifically the Pentagon – since the mid-2010s. Thus, it highlights the transformations underway and announces potential changes in the usage of orbits, particularly in the fields of satellite connectivity and remote sensing. It is also pointing to future tensions, as the structuring of international relations around the two poles constituted by the United States and China raises questions about the safe, sustainable, secure, and stable use of space. With these developments, Europe is faced with the challenge of remaining relevant in this sector.

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# Introduction

Some observers describe the war in Ukraine as the first conflict to be supported by the commercial space sector.<sup>2</sup> This opinion echoes the 1990-1991 Gulf War, which was often referred to as “the first space war”<sup>3</sup> due to the role it played in broadening the missions traditionally assigned to satellites, marking a paradigm shift with the transition from strategic space to “operational” space in support of military forces on the battlefield.<sup>4</sup>

In the case of Ukraine, it is highly likely that purely military assets will continue to play a leading role, although they remain classified and the evaluation of their performances is therefore limited. Nonetheless, the current war has indeed seen a spectacular emergence of connectivity and mass communication of information, made possible by commercial satellites.

This war comes at a time when a revolution in the use of space – the entry into a new space age (the so-called “New Space”), driven by an innovative entrepreneurial spirit but above all made possible by massive support from the U.S. federal government<sup>5</sup> – has been brewing in the United States for one, or even two, decades. It thus seems to announce the contributions and challenges to be expected of future space capabilities, in a context marked by a multiplication and diversification of actors and constellation projects under development for 2030.

The consequences could be of two kinds: first, a change in orbit usage; and second, a significant shift in international cooperation against rising competition between major powers. With these prospects, if Europe and the European countries want to retain their status as relevant space powers, they must be prepared for a challenge that will be both technological and strategic.

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2. See, for example, J. Feldscher, “The Ukraine War Is Giving Commercial Space an ‘Internet Moment’”, *Defense One*, April 6, 2022, accessible at: [www.defenseone.com](http://www.defenseone.com); S. Erwin, “Drawing Lessons From the First ‘Commercial Space War’”, *Space News*, May 20, 2022, accessible at: <https://spacenews.com>.

3. For an example see, P. Anson and D. Cummings, “The First Space War: The Contribution of Satellites to the Gulf War”, *The RUSI Journal*, Vol. 136, No. 4, 1991, pp. 45-53. This description above all reflects the potential that is now widely accepted beyond circles of experts and a future promise largely confirmed during the post-Cold War years. The very representative example of the massive use of GPS-guided weapons came later, starting with Operation Allied Force in 1999. See in this regard the March 2021 interview given by General Saltzman, now head of the United States Space Force, “Remembering the First ‘Space War’”, *Brookings*, accessible at: [www.brookings.edu](http://www.brookings.edu).

4. X. Pasco, “L’espace et les approches américaines de la sécurité nationale”, *L’Information géographique*, Vol. 74, No. 2, 2010, pp. 85-94.

5. X. Pasco, *Le nouvel âge spatial. De la Guerre froide au New Space*, Paris, CNRS, 2017.

# Announcing a Change in Orbit Usage

## Space Internet: are Mega-Constellations Destined for Success?

The communications constellations venture has been punctuated with technical or commercial failures that have fueled great skepticism – at least on this side of the Atlantic<sup>6</sup>. Yet, the war in Ukraine has come at a time when two movements are maturing in the United States, among military users and among Internet operators.

The U.S. military is aware of its dependence on space to provide essential force projection capabilities. However, the ensuing vulnerability is highly problematic since it hinges on a limited number of sophisticated satellites, with predictable trajectories, and originally built for an uncontested domain. Since the mid-2010s, it has been working on the need for what is now described as the "pivot to low Earth orbit" (pLEO)<sup>7</sup> by implementing constellations in pursuit of two main objectives: improve service, and above all ensure greater resilience to attacks.<sup>8</sup> At the same time, leading internet players have begun investing in infrastructure to gain access to new markets, both in the United States and elsewhere, thanks to the transmission capacities made possible by low Earth orbits.

Just as the mass deployment of Starlink, the first mega-constellation in the making, kicks off with its first generation of satellites (3,000 in December 2022), the war in Ukraine appears to be illustrating the relevance of the approach, both for military operations and for a society whose communications infrastructure is either ruined or deficient.<sup>9</sup> The continuity of service it has provided, despite the likely attempts to interrupt it,

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6. Failure of the first large constellations in the mid-1990s, such as Iridium, which was saved from bankruptcy by the US federal government. Elon Musk, satellite conference 2020, cited in Jonathan E. Hillman, *The Digital Silk Road, China's Quest to Wire the World and Win the Future*, New York, Harper, 2021, p. 193.

7. The acronym particularly refers to "proliferated LEO".

8. *Space Domain Mission Assurance: A Resilience Taxonomy*, Office of the Assistant Secretary of Defense for Homeland Defense & Global Security, September 2015, accessible at: <https://policy.defense.gov>. Also see P. Swarts, "Loverro: Defense Is the Best Deterrent against a War in Space", *Space News*, October 14, 2016, accessible at: <https://spacenews.com>.

9. S. Erwin, "Starlink's Survivability in War a Good Sign for DoD's Future Constellation", *Space News*, October 25, 2022, accessible at: <https://spacenews.com>. Also see E. Vincent, A. Piquard and C. Pietralunga, "Comment Starlink et les constellations de satellites d'Elon Musk changent la guerre", *Le Monde*, December 15, 2022, accessible at: [www.lemonde.fr](http://www.lemonde.fr).



contrasts starkly with the rapid shutdown of the broadband service provided by Viasat<sup>10</sup> (attack on modems installed for long enough for their vulnerabilities to be exploited) and speaks to the system's robustness against cyber or electronic attacks, which is vital for the trust of future users. Ukrainian development of apps – including for military purposes – supported by third-party resources, suggests that constellations have significant potential to deliver added value downstream. Finally, the current conflict offers an extensive showcase for all projects of this kind. Despite its advantage of being the first entrant, which gives it access to rare resources such as orbits and the related frequency bands, Starlink faces competition, from Kuiper for example, the project launched by Amazon.

This demonstration should also strengthen the U.S. military's appetite for data transport and, ultimately, on-board data processing constellations, based on a variety of solutions, ranging from proprietary constellations to purchased services (hybrid constellations). It lends credibility to a vision where information can be transmitted down to the lower levels in the field and in real time (low latency) at a rate equivalent to terrestrial solutions. In recent conflicts, the U.S. has systematically purchased a large part of commercial telecommunications available and this well-established trend now takes on a whole new dimension.

Just like Internet, the unlimited investment capacities and the technological advances made possible by New Space hold out the promise of breakthrough achievements. However, the Pentagon's procurement budgets clearly show that it is still investing to renew sophisticated satellites<sup>11</sup> and does not appear to be turning completely to satellite constellations in low Earth orbit. Even though the demonstrations and launch of the first phases of proprietary constellations are confirmed, along with an ambitious schedule,<sup>12</sup> it could instead undertake a fast but controlled migration, while maintaining a legacy core for the most demanding needs and, more broadly, a diverse, multi-orbit combination of complementary assets. The now verified threat of “inspector-eavesdropper-repeater” satellites, which is a major concern for the few, difficult-to-manuever, military satellites, will only accelerate this transition in the name of resilience.

The cohabitation of such powerful and ambitious players will bring challenges in terms of interoperability between complex systems, and between technical and regulatory standards: the solutions adopted will then reflect the economic, technical or legal power relations – mainly between

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10. Viasat, “Ka-Sat Network Cyber Attack Overview”, March 30, 2022, accessible at: [www.viasat.com](http://www.viasat.com).

11. S. Erwin, “DoD Satcom: Big Money for Military Satellites, Slow Shift to Commercial Services”, *Space News*, June 22, 2022, accessible at: <https://spacenews.com>.

12. T. Hitchens, “Space Development Agency’s Satellite Plan Gets New Name, but Focus on Speed Stays”, *Breaking Defense*, January 23, 2023, accessible at: <https://breakingdefense.com>.

Americans –, and will have every chance of becoming a universal or at least a Western standard. Moreover, the American government has always sought to keep several options open to avoid being subjected to a monopoly, and it has the regulatory means to do so. Starlink's recently announced interest in developing a new service entirely dedicated to defense and security (Starshield)<sup>13</sup> illustrates the attraction of the Pentagon's contracts and provides an indication of how complex the topic is.

This dispersion of telecommunication nodes in space based on standardized and, to a certain extent, miniaturized satellites, could come with an increase in on-board computing capabilities (for data collection satellites). This could lead to a veritable adaptive and decentralized array, mapping the contours of space architectures combining very high-performance and low-vulnerability – both space and cyber – hardware and software layers. In addition, the software layer could facilitate incremental modernization, especially in cyber security, without the need to replace platforms and radically alter the logic of on-orbit obsolescence. This could lead to a convergence of space and digital or cyber skills, bringing about a real breakthrough.

## Space-Based Observation: Can the Commercial Sector Break Free from Governmental Buyers?

In parallel to the steady growth in commercial space-based observation capabilities, in 2016 the U.S. government began launching pilot programs to explore the possible advantages of these services in addition to their own classified capabilities.

The war in Ukraine has come at a good time to dispel any remaining doubts by demonstrating their operational utility in a degraded context: technical speed and agility in providing information; fewer constraints than those frequently encountered in the distribution of classified information, both to national users and to coalition members; and more effective media coverage thanks to the possibility of comparing information with other sources (social media).<sup>14</sup> This has generated a sense of widespread transparency that will likely become the norm for future conflicts and will greatly reduce the impunity of actors, in both the preparation and conduct of operations.

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13. S. Erwin, “SpaceX Rolls out New Business Line Focused on Military Satellite Services”, *Space News*, December 3, 2022, accessible at: <https://spacenews.com>.

14. On the use of open source, see the speech by General Hockenhull, “How Open-Source Intelligence Has Shaped the Russia-Ukraine War”, Ministry of Defence, Strategic Command (UK), December 7, 2022, accessible at: [www.gov.uk](http://www.gov.uk).

In just a few weeks, U.S. government budgets allocated to the procurement of services have skyrocketed, turning this customer into a major, or even preeminent, market player. The multi-year contracts received by Maxar, Blacksky or Planet signal large-scale, long-term relations.<sup>15</sup> Further still, areas formerly reserved are now opened up to private companies and largely supported, outlining multi-sensor tracking of activities.<sup>16</sup>

Beyond observing the battlefield and military operations, these services are proving their benefits in terms of persistent intelligence and even in understanding and predicting economic activities, which are of great importance given the hybrid and global nature of the conflict. From crop harvests and means of transport, to monitoring the electricity sector and nuclear power plants, or the state of infrastructure, these data are just as important for national security as they are for purely economic purposes. And they represent a growing market.

Two major consequences are possible:

- As circumstances evolve, Americans could be tempted to control the dissemination of information, at least in the Western world. The size of the government's contracts renders their trusted suppliers dependent, but also gives them a dominant commercial position over other Western operators. Such restrictions can range from an interruption to the selective dissemination of this kind of information, thereby influencing perceptions of the course of conflicts.
- Demand dynamics and increasing requirements will further stimulate technological developments in sensing capabilities, possibly leading to the coordination of different assets operated by different players in order to identify the best sensor to answer the question, and turning a disparate set into a decentralized and responsive system of systems. On-board data processing seems promising, and not only reduces the need for downstream data flows, thus saving time in exploitation, it also improves security.

However, this temptation to monopolize information is being defeated commercially, particularly by the emergence of competition from Asia. This is illustrated by the continuously lower resolution of the images sold by the Americans in order to be competitive.<sup>17</sup> Similarly, no sensitive zone can be universally “blurred”. With regard to the war in Ukraine, the Russians may

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15. See S. Erwin, “Maxar Receives \$192 Million Contract to Supply Imagery to U.S. Allies”, *Space News*, February 8, 2023, accessible at: <https://spacenews.com> and “Analysts: NRO Contracts Will Have Long-Term Ripple Effects on Satellite Imagery Industry”, *Space News*, June 1, 2022, <https://spacenews.com>.

16. See Feldscher, “The Ukraine War Is Giving Commercial Space an ‘Internet Moment’”, *op. cit.*

17. J. Foust, “Commerce Department Releases Streamlined Commercial Remote Sensing Regulations”, *Space News*, May 19, 2020, accessible at: <https://spacenews.com>.

well have commercial satellite intelligence from non-Western sources. In addition to the question of possible flaws in the chains of command and communication between the different levels of command, they have so far let their adversaries dominate public coverage of the operations.

Some countries have already decided that they need sovereign capabilities in this area and we are seeing a proliferation of non-military services, made affordable by technical progress. They need agile capabilities and the ability to keep control over the story. Rather than depending on a single source whose information cannot be confirmed, countries that have realized the importance of these services are tempted to develop their own offer or to find alternative solutions from foreign suppliers.

Finally, in the future, attention could turn to the integrity of information from space, regarded as irrefutable evidence until now, including in disputes. Progress in artificial intelligence (AI) raises fear of falsified or fabricated images, opening the door to deep fake from space with negative impacts on public confidence.

# The New Face of International Cooperation in a Context of Competition Between Major Powers

## Is Strategic Stability in Orbit Under Threat?

In November 2021, a few months before the outbreak of hostilities and while its troops were massed on the borders of Ukraine, Russia tested a direct-ascent anti-satellite missile (DA-ASAT) and destroyed one of its obsolete satellites in low Earth orbit.<sup>18</sup> With this spectacular demonstration of its ability to neutralize enemy space support capabilities in the event of high-intensity conflict, it drew attention to the fragility of space by creating multiple long-lived debris, potentially jeopardizing the exploitation of useful orbits which have never been so populated (around 6,000 active satellites to date).<sup>19</sup>

So far, the conflict in Ukraine has been the scene of more or less successful denial-of-service or degradation attacks by cyber or electronic warfare means. While highlighting the diversity of potential threats and their impact on economic life, including in non-belligerent countries, this has also shown that the passive protection measures put in place are, to a certain extent, effective: despite GPS jamming, the military mode would appear to hold out, and precision firing continues. Similarly, the likely attempts to jam Starlink communications have not brought the service down.<sup>20</sup>

In parallel, Chinese experts are studying ways to disrupt commercial services such as Starlink's in the event of a conflict with the Americans or their allies,<sup>21</sup> proving that these developments are causing concern and altering strategic calculations. Meanwhile, the Chinese space forces are

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18. See for example C. Maire, "Réflexions sur l'essai anti-satellite russe du 15 novembre 2021", Note de la FRS n° 41/2021, December 2021.

19. Union for Concerned Scientists Satellite Database, accessible at: [www.ucsusa.org](http://www.ucsusa.org).

20. See for example M. Höyhtyä and S. Uusipaavalniemi, "The Space Domain and the Russo-Ukrainian War: Actors, Tools, and Impact", Hybrid CoE Working Paper 21, January 2023.

21. P. Rabie, "Chinese Researchers Publish Strategy to Destroy Elon Musk's Starlink", Gizmodo, May 27, 2022, accessible at: <https://gizmodo.com>.

demonstrating their ability to conduct in-orbit servicing (IOS) operations, whose dual nature has not gone unnoticed.<sup>22</sup>

Russia is now developing a dangerous rhetoric by publicly expressing the view that space assets – whether civilian or military – are legitimate targets for retaliation, insofar as they participate in the conflict.<sup>23</sup> This means that not only military capabilities can come under attack, but the full spectrum of investments.

The possibility of adding dual-use or military payloads to small satellites, whether or not inserted into constellations, either discreetly in the case of camouflaged satellites or "nesting dolls", or more overtly, will reinforce the ambiguous nature of infrastructure. Some unexpected behavior can be seen in orbit, including with respect to other satellites. Thus, the "perfidy" noted by the French Defence Ethics Committee could soon be widely exported to outer space, causing even greater concern and prompting more extensive space defense.<sup>24</sup>

The prospect of multiple constellations could eventually be a powerful incentive for uninhibited powers looking for new ways to interrupt space services. And the risk is heightened because outer space, even more than cyber space, lends itself to attacks that can be difficult to prove and attribute.

A whole new set of questions thus arises, pertaining to commercial or governmental protection, deterrence, and the strategic value of these private capabilities. While the first answers have focused primarily on resilience, we could also see the deployment of "active" protection capabilities, both overt and concealed.

Until now, there have been no space wars.<sup>25</sup> For decades, the strategic nature of systems and the beginnings of an international framework for space have preserved this domain from attacks and conflict. Even if the actors maintain a cautious stance, the stability of space is now more uncertain...

This prospect is nothing new: the United States (which goes so far as to describe space as a "warfighting domain"),<sup>26</sup> NATO ("operational domain")<sup>27</sup> but also France<sup>28</sup> for example, now regard space as a domain of

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22. T. Hitchens, "China's SJ-21 'Tugs' Dead Satellite Out of GEO Belt: Trackers", *Breaking Defense*, January 26, 2022, accessible at: <https://breakingdefense.com>.

23. See for example the statement of the Russian delegation to the First Committee of the 77<sup>th</sup> UN General Assembly on October 26, 2022, accessible at: <https://estatements.unmeetings.org>.

24. French Defence Ethics Committee, *Opinion on ethics of space defence*, September 2022, p. 15.

25. G. Penent, "The space war will not happen", *Vortex*, No. 1, June 2021, pp. 87-97.

26. "Spacepower: Doctrine for Space Forces", *Space Capstone Publication*, June 2020, accessible at: [www.spaceforce.mil](http://www.spaceforce.mil).

27. NATO's overarching Space Policy, January 17, 2022, accessible at: [www.nato.int](http://www.nato.int).

28. French Ministry for the Armed Forces, *Space Defence Strategy*, Report of "Space" working group, 2019, accessible at: [www.vie-publique.fr](http://www.vie-publique.fr).

possible rivalry and confrontation. But the extent and growing diversity of threats in a rapidly deteriorating context have undoubtedly been underestimated. And the timeline for developing and deploying the means of responding to them spans a ten-year period.

Advocacy at the UN – instigated by the British in 2021 – for a political framework clearly defining responsible peacetime behaviors<sup>29</sup> in order to secure orbit usage and reduce the possibility of misunderstandings, could no doubt limit the risks, especially for the most destabilizing and dangerous activities associated with the deliberate creation of debris.<sup>30</sup> Even though, barring surprises, international discord will limit the progress that can be made, the awareness raised is beneficial and would help to condemn actions that are liable to compromise the integrity of space activities. It could also push up the cost of this type of action.

## Space Is a Visible Aspect of the China-U.S. Competition

The war in Ukraine illustrates the U.S.'s lead in global digital competition. It has also revealed the importance of space services and of the "ground component" of systems, to reach both local populations in the theatre of operations and third-country opinions.

The U.S. authorities' alarmist reports repeatedly stress the dynamic action being taken by China across all space sectors, from constellations to the development of offensive capabilities, including the quest for information superiority.<sup>31</sup> Through the space component of the "new silk roads", Beijing is rolling out space diplomacy. And although the aim is indeed to streamline various initiatives, it could hinder U.S. services in accessing areas and populations nonetheless. Today, China is above all focusing on positioning services (Beidou) and Earth observation. Regarding communications constellations, the sector's reorganization through the creation of China Satellite Networks Limited,<sup>32</sup> is no doubt a turning point. However, operational implementation should take another decade, thus giving competitors a window of opportunity.

Beijing has set its sights on becoming a major space power, rivaling with its main competitor. Some analysts expect it to be on an equal footing with the U.S. in just a matter of years, unless the American government

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29. Report of the Secretary-General on reducing space threats through norms, rules and principles of responsible behaviors, A/76/77, July 13, 2021, accessible at: <https://undocs.org>.

30. T. Hitchens, "US Pledges No Destructive ASAT Missile Tests, Urges International Norm", *Breaking Defense*, April 18, 2022, accessible at: <https://breakingdefense.com>.

31. See for example Defense Intelligence Agency, *2022 Challenges to Security in Space: Space Reliance in an Era of Competition and Expansion*.

32. A. Jones, "China Establishes Company to Build Satellite Broadband Megaconstellation", *Space News*, May 26, 2021, accessible at: <https://spacenews.com>.



makes sufficient efforts in favor of its industry.<sup>33</sup> Digital competition is also unfolding in orbit infrastructure, between two players who master the necessary technologies, have resources commensurate with the challenges, are established in application markets that raise hopes of long-term sustainability, and are driven by antagonistic political ambitions.<sup>34</sup> The future could be marked by a consolidation of this global duopoly, supported by alliances and necessarily active space diplomacy.

The war in Ukraine is also isolating Russia, at least from the United States and Europe, by suddenly breaking off the cooperation, including scientific, on which positive relations were maintained.<sup>35</sup> While it has put an end to Moscow's commercial launch activities, it also represents a significant cost for European countries in the pursuit of their ambitions, and emphasizes the need for agile and affordable sovereign access to the space domain. In a way, it polarizes the international landscape even more.

## International Regulation of Space Traffic is Vital but Belated

The challenges posed by the congestion of useful orbits have long been identified. However, the proliferation of constellations is rapidly and substantially changing the debate, be it for debris tracking or space surveillance. Until now, the liberal framework has been satisfactory overall, but it is too limited to preserve the long-term sustainability of space activities: the development of New Space comes with the urgent need to introduce mechanisms for the coordination or even the management of space traffic (Space Traffic Management - STM).

Although new companies such as ExoAnalytics, Leolabs, Slingshot Aerospace, etc. are developing original ways to make up for the foreseeable shortcomings, activities that were formerly the prerogative of governments, the lack of a regulatory framework is preventing the emergence of an adapted supply. Given the value of the investments being made, operators cannot endure a situation in which their business models are jeopardized by accidents. Soon, this will no longer be merely a question of sovereignty; it will be vital to commercial operations. Similarly, questions are arising concerning deconfliction, as the numerous launches could impact air or maritime security.

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33. See for example N. Eftimiades, *Small Satellites: The Implications for National Security*, Atlantic Council, May 2022, or "State of the Space industrial base 2022: Winning the New Space Race for Sustainability, Prosperity and the Planet", July 2022, accessible at: <https://assets.ctfassets.net>.

34. Hillman, *The Digital Silk Road*, op. cit., p. 194 et seq.

35. J. Foust, "ESA Suspends Work with Russia on ExoMars Mission", *Space News*, March 17, 2022, accessible at: <https://spacenews.com>.



Here again, the U.S. space community is proving to be particularly inventive, despite the administrative red tape involved in actually implementing tools. In response to insistent domestic demand, they could consolidate their advantages and be in a strong position to impose their solutions on their allies and operators, concerned about access to the North American market. However, they will not avoid a rapprochement with more hostile countries. Regulation of this kind needs an international agreement and cannot be established on a unilateral basis.<sup>36</sup> Unfortunately, the current landscape in which international competition is fierce, does not seem conducive to progress in this area.

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36. S. Sonty, J. Wenstrup and C. Scott, “Op-ed | Parking Spots for Satellites Reduce Congestion, Promote Technological Growth”, *Space News*, November 16, 2022, accessible at: <https://spacenews.com>.

# Europe Faced with the Challenge of Staying Relevant

Europeans, meanwhile, will face a battle for survival in this context of transformations that will test their ability to take a fresh look at the strategic space environment and to adapt policies in order to protect their interests. It will also challenge Europe's determination not to let the gap widen with the major players, which implies matching resources with ambitions.

## A Possible European Move toward Standardization in Space Defense and Security

Compared with the major players, Europe's space sector has always been marked by a chronic lack of investment in security and defense issues, and limited cooperation. This situation stems from the fact that it has developed around civilian needs, and that the different nations have never shared the same view of the action required in the field of defense.<sup>37</sup> The ascendancy of the European Union (EU) as a reference in space policy, and the extensive work done by Member States to formalize a space defense strategy or to create dedicated organizations (following in the footsteps of France and the North Atlantic Treaty Organization (NATO) in 2019), are helping to change the state of play.

There is growing awareness of the vital role that space will play for societies and economies, but also for security and defense, and even more so as a result of the war in Ukraine.

This trend is illustrated by the drive to further leverage the opportunities offered by the space sector, and to strengthen and improve the integration of security and defense interests at the European level. It comes with the ambition to better assess dependencies, as well as vulnerabilities to potentially irreversible actions that are difficult to detect, attribute and counter. Lastly, it emphasizes the need to couple the policy adjustments being made by both the EU and its Member States with equivalent efforts to improve resilience and responsiveness, and to protect European space interests.

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37. F. Heisbourg and X. Pasco, *Espace militaire : l'Europe entre souveraineté et coopération*, Paris, Choiseul, 2011.

However, the associated level of ambition raises questions in a complex institutional context. The first test will be the implementation of the "Strategic Compass", recognizing space as a contested domain and calling for the development of an EU strategy for space security and defense. It was published by the EU institutions in March 2023.<sup>38</sup>

## In Search of a New European Model

These efforts also reflect a sense of urgency, because the technological, commercial and industrial changes underway are not only regarded as opportunities to achieve ambitions that were previously out of reach, but also as risks, posing an existential threat to the current European space model:

- Risk of being overtaken, with the emergence of new players who are gaining skills and power, leading to heightened competition for the largely export-dependent European industrial sector;
- Risk of being outclassed, by maintaining or even widening a gap with major actors whose accelerated investments could bring an unprecedented risk of being ousted from spectrum-orbit resources.

Voluntarism is an even greater problem for Europeans since they have no choice but to prioritize their efforts. Choices must be made among the actions of the most advanced countries, to select those to be emulated and readapted, and those to be sidelined. Neither the United States nor China face this issue and can go all out in their efforts for space.

The ambitious European secure connectivity project, IRIS<sup>2</sup>, which was put on the European agenda with record speed and is scheduled for commissioning in 2027,<sup>39</sup> illustrates both the extent and urgency of these issues.

Faced with the giants Starlink or Kuiper, this project aims to maintain the presence of Europe – which had no mega-constellation projects until now – over the long term, and to carry more weight in negotiations on the occupation and regulation of low Earth orbit.

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38. "European Union Space Strategy for Security and Defence" Joint Communication to the European Parliament and the Council, JOIN(2023)9, March 10, 2023, accessible at: [www.ec.europa.eu](http://www.ec.europa.eu).

39. D. Gallois, "Télécommunications : l'Europe va se doter de sa propre constellation de satellites ultrasécurisée, confrontée à l'urgence et à l'impératif de souveraineté", *Le Monde*, December 13, 2022.

The objective – and the “gamble”<sup>40</sup> – is also to guarantee Europe's digital sovereignty by bringing about an unprecedented convergence, based on the American model, between European political authorities and major private companies in the framework of a renewed public-private partnership around three parties:

- ▀ An upstream manufacturing sector recognized for its excellence in both satellites and launchers, but under pressure;
- ▀ A downstream services sector capable of developing and investing in the use of the constellation, but struggling to emerge due to the lack of a European, GAFAM-like, digital giant;
- ▀ An institutional actor capable of taking risks to make the project credible and viable, but which must reinvent its means of intervention (aggregating needs, procuring services, etc.).

## The Promise of New Complex Arrangements

In a context of innovation where equal performance can now be achieved at lower cost, where niche specializations are possible, and where the space domain is emerging as a particularly profitable investment due to its benefits for different communities (defense, commercial, civilian), combining efforts no longer seems to be the only possible option. While the trend so far was to further “Europeanize” space activities – via the European Space Agency (ESA) in the 1970s and more recently the European Union since the 1990s – the strategic move that Europeans are preparing to make could involve a paradoxical “renationalization” of the European space sector, with programs that are more national than truly collective. This is illustrated by the symbolic realm of access to space, now a sector in crisis, faced with the aggressive and long-underestimated competition from SpaceX, the termination of the Soyuz program and the sudden realization of the dependency it had created, not to mention recurring tensions over the development and operation of the future Ariane 6 and Vega C launchers. The recent failure of Vega C has only made matters worse. The arrival of many new entrants (micro-launchers) outside the framework of Arianespace and on a very narrow market segment, is further unsettling the European ecosystem, bringing fears of new competition. Whether the trend will be short-lived (maturing projects and players, creation of new power relationships and new balances) or durable, remains to be seen. From this perspective, the question of maintaining cooperation between France, Germany and Italy on long-term common interests despite the emphasis on short-term competition, is especially important.

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40. X. Pasco, “Faire converger Spatial et Numérique : quels enseignements pour la constellation satellitaire européenne”, *Défense & Industries*, FRS, No. 15, April 2021, pp. 21-26.

# Conclusion

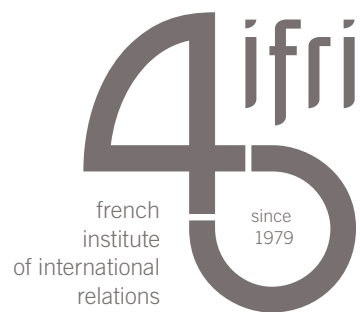
The conflict in Ukraine is revealing the transformations underway and announcing potential shifts in orbit usage, led mainly by the United States and China. At the same time, the new race to the Moon is mapping new scientific frontiers, and generating new competition.

If the emerging landscape takes root, it will present three paradoxical situations. First, despite the technological progress and the cut in costs heralding a democratization of space, the development of mega-constellations and their ecosystems require investments and a level of maturity that are within the reach of only a few states and operators. A two-speed space race could thus develop.

Second, the prospect of a congested but still fragile space domain requires an international consensus to coordinate activities, improve transparency and define shared norms of responsible behavior. However, global competition, both economic and geopolitical, currently leaves little room for dialogue and negotiation. Tensions and possible conflicts on Earth are increasingly likely to spread into space. While space is still widely regarded as a common good, there is a growing tendency toward “privatization” and “militarization”.

Finally, faced with the energy deployed by the U.S. and China to accelerate their efforts and widen the technological gap, Europe's position as a historical actor is under threat. It must quickly make choices and allocate the necessary resources. Otherwise, it could end up being a mere bystander to the new digital competition in space.

The solutions adopted to address these three situations will greatly influence the development of the new space age.



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