Elements on the Cooperation and Competition Dynamics in the New Space Environment

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A Transforming Landscape

The last two decades have witnessed the emergence of "New Space" actors, who have deeply transformed the space landscape. Historically, states have been the central actor for most space activities. Seventy years ago, the pursuit of national and strategic interests guided the early days of space activities, with two superpowers in a global contest backgrounded by the advent of the nuclear era. Rapidly, military satellite applications as well as the development of operational space launch systems proved to be essential in securing high-level strategic assets and in contributing actively to essential parts of mutual deterrence. Ensuing investments in Earth observation techniques, infrared early warning, electronic intelligence gathering, and even strategic communications have all constituted the main drivers for the development of a wide range of space applications, both in the military and civilian domains. Space was born from the Cold War and from the promotion of national interests with the prevalence of foreign policy considerations.

Since the 2000s, this unique role of states in the development of space activities has been jeopardized. The rise of new industrial actors, i.e., different from a traditional space industry born from huge public investments since the 1950s, has brought about new dynamics in space activities. New technological processes and innovative modes of industrialization and commercial exploitation characterize this "New Space" industry. It has also occasionally made use of new methods, technologies, or equipment developed outside of the space sector. More deeply, while renewing the industrial and programmatic culture at both government and industry levels, this emergence has consolidated the junction between space and information technologies that had already developed. Initial efforts made in the aftermath of the Cold War for commercializing satellite imagery or for developing precision navigation and timing (PNT) techniques paved the way for energizing an information-driven sector that found its interest in developing more affordable space applications. At a time when internet-based and artificial intelligence efforts were structuring into what would quickly appear as one of the most profitable 21st century industrial activities, this co-development led to the emergence of a new industrial culture in space. This notion of space as a "commodity" has embodied the last few decades and the way that space activity will be managed in the future.

A first tangible consequence is the skyrocketing number of satellites in Low-Earth Orbit (LEO). The ongoing so-called mega-constellation projects represented by (but not limited to) SpaceX's Starlink or Oneweb constellations, intended to bring low latency internet to users, has compounded this issue. Such projects have resulted in changing the number of objects in space by one order of magnitude, with, for example, more satellites launched in one month nowadays than in 12 months only six years ago. Nearly one launch per week has become routine in the U.S. or China. Accompanying techniques, such as

on-orbit servicing or refueling, satellite disposal management, or more simply increased maneuvers permitted by more affordable satellite electric propulsion, will contribute to changing the orbital situation.

The Need for Rules of the Road in Space as an International Relations Issue

The evolution of the space domain raises the challenge in making future space systems coexist safely in orbit. Non-state actors will sharply increase their use of space and populate orbits with many different satellites, mostly small-sized, some of them incapable of any control. This diversity of the orbital population will require stringent national control procedures before getting licensed at the national level. As states remain ultimately responsible for activities conducted in space, some of the main space-faring countries have their own national space legislation to regulate blooming private activity. However, this requires states to agree internationally on common norms regarding the management of those LEO satellite constellations. Disposal management success rate or collision avoidance techniques require coordination to harmonize and guarantee operational procedure success. Other new activities involving rendezvous and proximity operations (RPOs), such as the servicing or the refueling of satellites, will have to comply with universally agreed rules.

Space agencies throughout the world have already set up a sort of governance model through the Inter Agency Debris Committee (IADC) with procedures meant for ensuring a responsible management of satellite end-of-life. Of course, these rules may be adapted to new challenges. However, the advent of mega-constellations will create the need for more comprehensive principles. The need to share orbits (as well as radiofrequency resources) imply the collective adoption of international norms of good behavior beyond mere technical agreements.

For many years already, this has been the subject of high-level, often difficult, political discussions. For example, the European-led project of a Code of Conduct in space has not succeeded in gaining large support from the international community. Political differences on the nature of such an instrument as well as the security aspects induced by such a proposal have not allowed reconciling views in this domain. The simple need for so-called "Space Traffic Management" (STM) rules as rendered necessary by "New Space" programs has recently taken a rather high profile in international discussions. Suffice to quote a declaration made in February 2022 by Chinese Foreign Ministry Spokesperson Zhao Lijian, who recently announced that China informed the United Nations of a "Starlink satellites' dangerous approach to the Chinese space station that threatened the safety of in-orbit Chinese astronauts." He went on declaring that "in the incidents of preventive collision avoidance, the Starlink satellites were continuously maneuvering with unspecified maneuvering strategies and intentions while in-orbit Chinese astronauts were facing real and urgent safety threats. As a result, the Chinese side was forced to implement preventive collision avoidance control. After the incidents, China's competent authorities tried multiple times to reach the US side via e-mail, but received no reply."[1] While the U.S. authorities replied that no collision had been feared on their side, Zhao replied

that those authorities are "in no position to unilaterally set a threshold of emergency collision criteria." Beyond the expected political posture, this recent episode illustrated how space activities serves as a foreign policy issue, leading to high-level, possibly contentious, political debates.

The regulation of behaviors in space as well as their influence on the future of space activities at large has propelled STM-related issues at high-level political levels. The European Commission jointly with the High Representative of the Union for Foreign Affairs and Security Policy issued a declaration on Space Traffic Management[2] after declaring it a "Flagship programme." Interestingly enough, among many different aspects, the EU declaration addresses high-level international and security aspects of STM: "In a context of an increasingly contested space environment, Space Traffic Management (STM) will contribute to the security and defense dimensions of the EU in space. Space services are key enablers for defense and civilian capabilities. Because of their strategic nature, space assets are thus becoming targets of various kinds of threats. . . . A global STM effort would also contribute to transparency and confidence building in general, and help avoid misunderstandings and deescalate tensions in case of incidents. Since the orbital environment is a globally shared resource, space operators worldwide are to varying degrees interdependent. Consequently, the establishment of STM requires a buy-in by all space-faring actors."[3]

The EU Commission generally avoids directly mentioning security issues in this way. It is usually rather cautious about approaching issues regarding the competence and responsibility of Member States. Given the constant fight waged by the European Commission to improve its standing on the international scene, this certainly shows how much importance the political nature of STM (and of the discussions about the future of space rules and activities) is in this respect. Logically enough, the joint declaration states:

"The Commission and the High Representative, depending on the EU competence involved, in close cooperation with the Member States will:

- promote a regional approach on STM with third countries and relevant regional fora partners in order to prepare the future establishment of a global STM system based on regional contributions,
- further engage with the US with a view to ensuring closer cooperation and mutual interoperability on STM related matters,
- systematically address STM in the space dialogues with third countries."[4]

A Mounting International Competition that Calls for Enhanced and Renewed Transparency Rules and Mechanisms?

These deep transformations in space have also had consequences on the way that states have approached space security. States have created a number of new national military structures in the recent years to face these transformations. "Space Forces" or "Space Commands" have now become part of this "New Space Age." While not often mentioned, the connection between the emergence of

such structures and the development of the "New Space Age" is real. In part, the creation of these new military commands has stemmed from a fear that by becoming more populated, more complex, and less predictable, the space environment would potentially become more challenging or even more hostile. This prompted a perceived need for the military to possibly intervene in space, to defend assets, or to face intentional threats. In one of its headlines, the Space Defence Strategy published by France in 2019 clearly affirms: "Strategic competition is heating up, [and] operational contexts are evolving."[5] Then, "French actors in both the public and the private sector must guard against more recent threats, such as the proliferation of space debris, jamming, blinding and directed-energy weapons."[6] In a speech, French Minister of Armed Forces Florence Parly insisted on what she called a "ramping up weaponization" in space: "Today, our allies and our adversaries have been militarizing space. And as the time for resilience is becoming ever shorter, we have to act. We must be ready. Indeed, tomorrow is already yesterday. . . . Satellites spied on, jammed or blinded; means to disturb, neutralize or destroy space capabilities exist and they develop: we know it, the shadow of the threat is real for sure."[7]

As shown by such statements, often supported by analysis from military experts, increased militarization, even by a weaponization of space, will characterize the new space environment. The creation of new military structures has tended both to legitimize (it is deemed legitimate to protect space assets) and prepare for such contingencies. As regrettable as it may appear, experiments of orbital maneuvers or even of weapons in space are no longer considered exceptional activities. It is almost considered as a normal result of the mounting uncertainties in the space environment—risks and threats combined.

In this context, the future of cooperation and competition in space could well depend on the collective capacity to anticipate the inevitable rise of new confrontations and to impose in advance the principles of collective responsibility and increased transparency. To begin with, this will require a burst of diplomatic creativity (leading to a new international forum?), which must urgently focus on the international obligation of transparency of military activities in space.

Endnotes

1. See, http://www.china-embassy.org/eng/lcbt/wjbfyrbt/202202/t20220210_10640952.htm

2. See, An EU Approach for Space Traffic Management, An EU contribution addressing a global challenge, JOINT COMMUNICATION TO THE EUROPEAN PARLIAMENT AND THECOUNCIL, Strasbourg, 15 February 2022, Join (2022), 4 Final. (Bold characters kept from the original document).

3. Ibid, p. 1.

4. Ibid, p.15.

5. Space Defence Strategy, French Ministry of Armed Forces, p.9 and 21.

6. Ibid, p. 9.

7. See, https://www.defense.gouv.fr/content/download/563595/9727199/Discours de Florence Parly%2C présentation de la stratégie spatiale de défense à Lyon%2C le 25 juillet 2019.pdf