



## Galactic Formative Power

### Why Europe Must Be Present in Space to Continue to Have the Capacity to Act on Earth

*Alexander Badenheim, Jakob Kullik, Benjamin Thake*

- › In the space policy arena, there is an imminent threat that Germany and Europe will once again sleepwalk through crucial developments and shifts in power. Both players will remain largely insignificant if required measures are not taken.
- › It is essential to understand space as an extra-terrestrial zone of influence and frontline where Europe must be present and have the capacity to act as a political, economic and military player.
- › As a galactic formative power, Europe should develop space into a strategic realm for future endeavours and strive for a permanent presence in space.
- › Europe should also lead the way with its economic strength and initiate long-term economic and technological partnerships that offer both vision and planning security.

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In the space policy arena, there is an imminent threat that Germany and Europe will once again sleepwalk through crucial developments and shifts in power. Both players will remain largely insignificant if required measures are not taken. Today, our security already depends on the global satellite network in space, which ensures communication, navigation, observation, reconnaissance and surveillance for states, society and individuals. Europe, as a **galactic formative power**, should develop space into a strategic realm for future endeavours and strive for a permanent presence in space. This is important in order to guarantee the security of global satellite systems and prevent Europe from drifting into insignificance in this area.

The guiding principle is that Europe’s presence in space guarantees its own capacity to act and sovereignty both in space as well as on Earth, or in other words: **If Europe wants to have “global political capacity”, it should also have political capacity in space!**

**Premise 1:** Rivalries between the major powers and geopolitical competition for spheres of influence, markets and technologies will also be fought out in space and will increase in intensity. In view of the use of satellites and the presence of important raw materials in space, it is conceivable that conflicts will shift to near-Earth space, to celestial bodies such as asteroids, the Moon or even planets. It is therefore essential to understand space as an extra-terrestrial zone of influence and frontline where Europe must be present and have the capacity to act as a political, economic and military player.

**Premise 2:** Simply setting and defending rules and norms in space will no longer be enough to be a relevant player or to be perceived as such. Although international rules such as the Outer Space Treaty of 1967 are enormously important and the EU should push to maintain these rules, there is an imminent threat that other states will feel less bound by the now outdated rules in the future. Europe should therefore permanently secure and invest in its presence in space through space-based civil and military capabilities and infrastructure. After all, those who are physically present in space can also act on site. Therefore, the maxim should be: space infrastructure matters!

**Premise 3:** Space offers a future market with unimagined potential for growth and expansion. Even if many business and value creation models are currently difficult to imagine or realise, it would be negligent to underestimate the fundamental economic possibilities offered by space. After all, economic influence generates the ability to shape technological, military as well as political and systemic aspects. Therefore, Europe should lead with its economic strength and initiate long-term economic and technological partnerships that offer both vision and planning security. If European companies are not present in space, US, Chinese and others will certainly be.

## From Global Political Capacity to Political Capacity in Space: Europe Must Be on an Equal Footing With the Major Powers!

The EU is (still) one of the most important economic and scientific powers in the world. However, in the race for future technologies it has already lost ground to the US and China. With the exception of France and the UK, Europe does not play a leading role as an independent security and military power. Due to limited capabilities and possibilities for influence, this situation on Earth is also currently reflected in space. Europe is a leading player and contributor when it comes to the civil exploration and exploitation of near-Earth space. In military, strategic and geo-economic terms, however, the Europeans play only a secondary role. It is above all the old space power, the US, and the new space power, China, that see space as the predominant arena for markets and wars of the future.<sup>1</sup> Geopolitical developments on Earth are forcing Europe to rethink and realign its political coordinate system in several dimensions. Two aspects are particularly affected by this: on the one hand, the previous notion that Europe can limit itself to the role of peaceful economic power and rule-maker; on the other hand, the fact that Europe's future global political capacity does not end in the stratosphere, but must be capable of acting beyond it. In (almost) all these policy arenas, Europe's normative compass shifts between multilateral cooperation demands and military restraint. The extent to which Europe's member states think and act in geopolitical categories varies considerably, and this approach has been present at the EU level for only a few years. The EU's declared "geopolitical commission" (Ursula von der Leyen) or its desired "global political capacity" (Jean-Claude Juncker) exists in political discourse, but so far not in practice on the world stage.

Germany and Europe will not be able to reverse the trend towards an increasing geopolitisation of international relations along with simultaneous weakening of international law and continuing paralysis of international organisations by their own efforts. Even though it is important to strengthen international norms, rules and regimes, it is also essential to adapt to the global political realities and strategic lines of conflict. This requires the consistently joined-up consideration of political, economic and technological relationships, dependencies and risks. The shift in these developments and problems will not be limited to Earth, however. Europe's geopolitical emancipation will also have to take place in space, which is why the same maxims should apply there as on Earth. This means that only those who have considerable economic and military power at their disposal, and who have – and consistently pursue – a political and strategic vision of their own role in the competitive rivalry between the major powers, will remain relevant and be taken seriously.

The likelihood that things will become more confrontational in space seems very high at present. This learning process is particularly challenging for Germany and Europe if the three normative imperatives of recent decades – multilateralism, juridification and value orientation – are to endure. These have by no means become obsolete. However, these imperatives must be expanded to include the aspect of geopolitical resilience if they are to assert themselves in the long term in their own well-understood self-interest. This new role-finding in the wake of the proclaimed *Zeitenwende* (historical turning point) is necessary for Europe to be able to maintain its position as the other major powers compete for dominance on Earth as well as in space. To stay with the *Zeitenwende* metaphor: Europe must learn to understand and shape space anew in the sense of a *Raumwende* – a turning point in how space is exploited and explored.

Grasping the  
geopolitical  
significance of space

## From Global Gateway to Cosmic Gateway: Civil and Military Infrastructure Ensures Future Capacity to Act

Civil space technology is now a key part of Europe's activities for addressing global megatrends and helping to make the future of our planet more digital, greener and more resilient. Although the European Union already successfully operates and uses civil satellite infrastructure, such as in the Galileo and Copernicus Earth observation programmes, three key developments indicate that current activities in space need to be strengthened and supplemented to ensure the EU's future capacity to act.

Firstly, the war in Ukraine has shown that Germany and the EU are still too dependent on Russian components for producing the carrier rockets essential for satellite launches. The termination of the cooperation means that in the event of technical defects or destroyed satellite infrastructure, the satellites essential to the EU from an economic and social perspective cannot be replaced in the short term. European companies from the New Space ecosystem can potentially fill this gap. Accelerating the process requires, however, extensive political and financial support in the form of European anchor contracts for the industry, which is mainly dominated by start-ups. In view of the current European rocket launches from the French overseas territory of Kourou, efforts should also be made to establish a spaceport in continental Europe. This could be done by expanding the rocket launch sites at Esrange in Sweden and Andøya in Norway, to reduce distances and provide low-threshold opportunities for rocket launches for the New Space industry.

Secondly, there is a growing need to combat climate change, thus increasing the pressure to take action in terms of observing Earth. The satellites of the Copernicus programme currently intended for monitoring climate change cannot meet the requirements of the Climate Commission and the European Green Deal, as the resolution of the data provided does not meet the demanding climate policy requirements and no longer represents a state of the art solution from a technical point of view. To achieve the ambitious climate policy goals and be perceived as a normative role model in meeting global challenges in times of increasing systemic competition, expanding Earth observation provides an integral component in monitoring climatological changes. The EU should work with the traditional space industry to accelerate the launch of planned missions and harness the potential for innovation offered by the New Space industry through faster and more flexible European procurement.

Thirdly, the European Union remains disproportionately dependent on often private-sector US connectivity systems for satellite communications and the internet, which, like Chinese technology solutions, potentially threaten the data sovereignty of European institutions, businesses and citizens.<sup>2</sup> The autonomous provision of critical infrastructure using innovative alternatives is therefore required to ensure secure communication and resilience, especially in times of crisis. The Near-Earth Stationary Internet envisaged in the EU's Secure Connectivity Initiative offers an approach to building a European communications system for ensuring uninterrupted access to secure and cost-effective satellite communications and high-speed internet worldwide. If implemented quickly, efficiently and with added value, this European flagship project can reduce both dependencies and a power shift in space in favour of the US and China.

Driving forward  
the development  
of satellite  
infrastructure

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Expanding Earth  
observation as an  
important element  
for climate change

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Europe's own satellite  
communication is  
indispensable in  
the long term

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The EU's civil satellite infrastructure therefore represents a gain in strategic autonomy and capacity to act in space. At the same time, these areas for action should also be understood as a **cosmic gateway** in the sense of a pragmatic, technology-based foreign policy in space. This policy aims to be perceived, especially by partners on the strategically important African continent as well as the less developed parts of the Indo-Pacific region, as an alternative to in particular China's sometimes aggressive economic, technological and thus also geopolitical policies.

The dependencies on civilian satellite infrastructure in our everyday lives also apply to the military sector. In addition to communication and navigation, the satellites play a key role there, especially for monitoring and surveillance (including weather and risks to satellites in space caused by space debris) as well as reconnaissance. The Bundeswehr (German Armed Forces) currently has six satellites in low-Earth orbits. Successful anti-satellite missile tests by several countries – including the US, Russia, China and India – have now shown that these are potentially exposed to physical attacks from Earth.<sup>3</sup> The US Army's Defence Intelligence Agency believes that China's anti-satellite missiles can reach not only the reconnaissance and surveillance satellites orbiting in low-Earth orbits, but also the GPS satellites in medium-Earth orbit and even the commercial and military communications satellites deployed in geosynchronous orbit at an altitude of about 35,000 kilometres.<sup>4</sup> In addition to ground-based missiles, however, airborne anti-satellite weapons and radio jamming systems already pose a real threat to satellites. Last year, the US also expressed concern about China's *Shijian-17* satellite, which is allegedly equipped with a robotic arm that, according to the US military, could be used to grab and thus disable satellites belonging to other states.<sup>5</sup> For targets on Earth, so-called hypersonic gliders could become a currently unstoppable danger from space. Russia and China already developed this weapon system, which could theoretically also deliver nuclear warheads to its target.<sup>6</sup>

Keeping the military aspect in mind and exploiting the potential for deterrence

For Germany, on the other hand, space operations have always been of defensive nature. In view of the activities of other states described above, there should, however, be a rethinking on this point.<sup>7</sup> Given that at least three states – the US, China and Russia – now have the capacities to wage war in space, Germany should lobby the EU to build up its own capacities so that it is not completely dependent on the US in matters concerning space security. France is already taking the lead here by designing the next generation of its *Syracuse* satellites so that they can be equipped with defensive weapons.<sup>8</sup> In order to build up a potential deterrent, corresponding defensive weapons should, at least in theory, also be capable of being used offensively. Even if there is a risk that this will further fuel the arms build-up in space, the EU should recognise that this process has already been in full swing for years without its intervention, and that extensive inactivity in this area will only set the EU further back in the race for military supremacy in space.

## From Moon Mining to “Moonhattan”: Value Creation and Supply Chain Security Will Play a Significant Role in Space

Economic policy in the EU is currently focused on gradually reducing the energy and raw material supplies from Russia and on managing the numerous supply and delivery difficulties caused by the war in Ukraine. The coronavirus pandemic has already highlighted the complexity and vulnerability of global supply chains. In addition, there is a worldwide increase in protectionist tendencies in numerous countries along with the Chinese econo-

my's shift towards more self-sufficiency while maintaining dependencies of foreign companies on the Chinese market.

Should space become more economically attractive and important in the coming years, two aspects will be of key importance. Firstly, the economic conflicts and spheres of interest will not be limited to Earth, but will almost certainly also be fought out in space. Economic and trade conflicts could become space-based economic conflicts. Secondly, if there is going to be permanent value creation in space, this will raise questions about the local extraction and processing of raw materials and the associated necessary construction of infrastructure. The EU, the US and all major industrialised countries are dependent not only on fossil fuels, but also on mineral and metallic raw materials. The more digitalisation progresses along with the transformation of energy systems, the more important the so-called critical or strategic metal raw materials will become. Without the critical metals, there will be no green energy transition and digitalisation. Germany, the EU and other states are dependent on these metal raw materials to varying degrees. They currently have to import between 80 and 100 per cent of these raw materials, which include rare earths, lithium and cobalt. The EU Commission has classified 30 minerals and metals as critical raw materials on its current Critical Raw Materials List.<sup>9</sup> That is why raw material companies and countries are searching for deposits all over the planet – ranging from exploiting reserves near the surface to exploring the deep sea.

Until now, space has not played a central role in the international commodity markets or in the supply security of companies and states. All raw material activities, from the exploration to the further processing and manufacturing of end products, are still limited to planet Earth. In future, however, near-Earth space could also become part of the raw material supply. Large deposits of metals such as copper, iron ore and rare earths are suspected on asteroids, the Moon and other planets. Some of these celestial bodies mainly consist of these elements. The prospect of commodity deals has already encouraged companies (mostly from the US) to take a look at future commodity extraction. In addition, states such as the US and Luxembourg have also passed laws to create legally secure opportunities for investing in future markets (New Space Economy).

Extracting raw  
materials from  
near-Earth space

This touches on the immediate question of how raw materials in space should be appropriated, utilised and transferred. Although the existing rules and regulations – in particular the Outer Space Treaty of 1967 and the Moon Treaty of 1979 – provide some initial indications of what is currently legally possible and what is not, many areas are no longer up to date, not sufficiently clearly regulated, and not adequately defined and thus leave room for interpretation.<sup>10</sup> Besides the legal consideration of the barely developed space governance regime, it is above all the specific interests of the leading states that determine the development. It is doubtful whether the US and China have any interest in being restricted in their political, economic and military activities. Instead, the interplay of power politics, weak rules and lack of enforcement as well as the diverse market potential could lead to near-Earth space becoming a highly contested geo-economic zone for new space companies. With the support of their respective governments, these companies could divide up territories and raw material deposits and create rules that favour exclusively themselves. Should space ever be commercially exploited, Europe needs to be able to pursue its own interests from a position of strength and unity.

The next steps would then be to exploit and colonise the objects closest to Earth that are potentially suitable for life (Moon, Mars). New chains for utilising raw materials would then be established. These would not only need to be further developed and maintained, but also secured, which once again raises questions about the resilience of supply chains from space

to Earth. It is currently both economically and technically unrealistic to extract raw materials from celestial bodies and subsequently transport them to Earth. Before so-called **space mining** can be carried out, numerous challenges still need to be solved.

However, once this step has been successfully taken, it would seem reasonable to think about establishing a permanent presence in space on a celestial body. These facilities could be used for scientific and (raw material-based) economic purposes in the long term. The availability of a **European lunar base**, for example, would enable the European Union to conduct space-based research and economic activities. This would lay the foundation for further economic activities, the testing of new technologies and future space operations.

Making the European  
lunar base the basis  
for research and  
economic activities

As is the case with satellite infrastructure, the question of securing civilian structures against possible attacks should always be taken into account when constructing stationary infrastructure in space – including by building military infrastructure on celestial bodies. Although this is prohibited by the Outer Space Treaty, it cannot be ruled out that this aspect of the Outer Space Treaty will one day be disregarded by individual actors. The EU should at least be prepared for such a scenario and not just rely on being able to enforce the law. All considerations of the scientific, technological and economic potential of near-Earth space should therefore always encompass the military aspect as a requisite for power projection and conflict resolution. Without appropriate military considerations and means for action, all civilian activities could not be adequately secured. Europe would then also be vulnerable to attack and blackmail in space. Should there ever be a progression from **Moon mining** to the establishment of a larger presence (“**Moonhattan**”), the imperatives guiding action on Earth would remain the same as in space: **without any presence there’s no relevance, and without security there’s no existence.**

## Conclusion and Outlook

Even processes in near-Earth space seem far away from our life on Earth. Yet our everyday lives would be almost inconceivable without the technological achievements of the last few decades, which orbit dozens to thousands of kilometres above us every day. Communication, navigation, data transfer, weather observation and numerous military and intelligence applications are inconceivable without satellites. Given that our security, society and economy are already dependent on satellites, and the increasing threat that other states’ military attack capabilities now pose for their smooth operation, both, our military and commercial capacities in space should be further expanded. This also includes expanding the infrastructure for putting satellites into space. To achieve this goal, a networked approach between politics, science and commerce – especially start-ups in the New Space sector – is required. In order to guarantee the security of our satellites in space in times of growing competition and inter-state tensions, the military capabilities for protecting this critical infrastructure need to be stepped up. In this context, offensive approaches aimed at deterrence should not remain taboo.

In terms of securing raw materials, politics, research and companies need to focus more strongly on space. This is already the case in other countries. Germany and Europe need to make sure that they do not lose touch in this regard. Germany has numerous established commercial enterprises and innovative start-ups that are internationally competitive. However, politics should be more supportive in shaping the regulatory framework and provide more capital for civil and military space missions. In addition, the German government

needs to better coordinate intra-European procedures for planning and deploying satellites. Here, the EU member states still act quite independently of one another, which means that important potential is being wasted. The EU is still too timid in many areas related to space. The EU needs to invest more in strategic space projects and bundle its capacities in order to keep pace with the US and China. **Europe's geopolitical role in this century depends largely on whether it can become a galactic formative power.**

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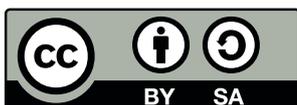
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