Lost in Space: Europe's Satellite Dependency

16 JULY 2026
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Satellites are among the most important and invisible parts of modern infrastructure. In everyday life, people often only associate them with GPS or weather forecasts. However, they form the basis for many other economic, social, and security-related processes. Many systems that we now consider normal would only work in a very limited way or would not function at all without satellites.

One of the most important areas is navigation. Global navigation systems, such as GPS or the European Galileo system, allow extremely accurate positioning and are not only used by private individuals. Shipping, aviation, logistics, and military operations also depend on satellite signals. In addition, satellite systems enable accurate time transfer. This is particularly important for many financial and communication service providers, as they require an extremely precise time reference.

Satellites also play a central role in the transfer of information. Especially in remote areas or crisis regions, satellite connections provide an alternative to traditional communication methods. Furthermore, satellite systems are increasingly being used for internet services, showing that not only traditional infrastructure, but also our digital infrastructure, is becoming dependent on satellite technologies in certain areas.

Satellites are also very important for science. They can collect important data about the weather, climate, environmental changes, and natural disasters. Through this data collection, extreme weather events can be predicted more reliably, and rescue operations can be planned more easily.

In addition to these civilian applications, there is also an important security aspect. Modern armed forces depend on satellites to communicate, navigate, and gather information about potential threats. At the same time, many satellite systems have a dual-use purpose, meaning that the same technology can serve both civilian and military functions. A satellite developed for weather observation, communication, or navigation can also support military operations, while systems originally designed for defence can also provide benefits for civilian users. Through these different uses of

satellites, space is becoming increasingly important and is turning into a strategic area that is becoming more and more politicised and militarised.

The issue is therefore not only whether a state uses satellite systems. More importantly, it is about who controls these systems. Overreliance on a small number of satellite systems or private space providers can create significant national security risks if access to these services is restricted or disrupted by the providers or external forces.

Europe's Satellite Infrastructure and Current Dependencies

The global satellite infrastructure consists of public and private players. No country or actor controls all parts of the global satellite infrastructure. Various satellite systems serve different purposes and sometimes compete with each other.

Some of the best-known examples of satellite systems are navigation systems. The United States operates GPS, Russia has GLONASS, China uses BeiDou, and the EU has developed Galileo. Even though Europe has already developed its own navigation system, it still remains dependent on external systems. Galileo is available, but both private users and military actors still rely on GPS. This is especially the case in NATO operations, where global deployability and interoperability with US armed forces are essential.

Dependence is also visible in space launch capabilities. The EU has its own launch systems through the Ariane rocket family, but in recent years it has at times relied on external providers. This became more relevant after access to Russian Soyuz rockets was lost in 2022 following Russia's invasion of Ukraine, and new European launch systems such as Ariane 6 were delayed.

During this period, commercial US providers became increasingly important, especially for launching smaller satellite constellations. This highlighted the EU's need to diversify its space launch capabilities and reduce dependence on external providers, as secure and independent access to space is a key element of both European and national security.

A large share of global satellite communication is controlled by a small number of private companies, with the United States dominating this market. This is particularly visible in large-scale internet constellations such as SpaceX's Starlink, which operates more than 7,000 satellites in orbit.

In contrast, the EU's planned IRIS² constellation is still under development and is intended to provide secure governmental communication services, but it will not yet match the scale of existing commercial systems.

EU systems are currently also distributed across different functions. Galileo provides navigation and precise timing services for both civilian and security users, while Copernicus satellites monitor the Earth's environment, climate, and natural disasters. These systems are highly advanced but are not designed as global communication networks.

In addition, there is another less visible form of dependence: key components of satellite technology. Many EU space programmes rely on components that are not fully produced within Europe, including semiconductors, advanced sensors, and specialised electronics.

A well-known example is high-performance chips designed by US companies such as NVIDIA or Intel, while manufacturing often takes place in Asia, for example at TSMC in Taiwan. This means that while the EU builds and operates satellites, it does not fully control all critical parts of the underlying supply chain, which can create vulnerabilities in times of crisis.

Risks of Europe's Dependence on Satellite Infrastructure

Europe's reliance on satellite systems controlled by external actors introduces structural vulnerabilities across three principal areas: exposure to political leverage, susceptibility to cyber disruption and signal interference, and dependence on non-European supply chains and launch capabilities.

The growing role of private satellite operators adds a further layer of complexity to this dependency. Companies such as SpaceX have demonstrated the capacity to make autonomous decisions regarding access to and use of services like Starlink, including the restriction of coverage in specific operational contexts — most notably through geofencing of frontline areas and the refusal to activate service over Crimea. While such decisions may reflect corporate or legal considerations, they also underscore a fundamental asymmetry: providers remain accountable to their own governance frameworks and strategic interests, which may not align with European security priorities. In scenarios where access to these services is constrained, Europe's existing capabilities would not be sufficient to compensate for the loss of large-scale low Earth orbit communication constellations.

At the same time, satellite systems are increasingly exposed to hybrid threats. The inclusion of space as a highly critical sector under the NIS2 Directive reflects the systemic importance of these infrastructures. Disruptions to commercial satellite networks can generate cascading effects across multiple sectors, including aviation, financial services, emergency response, and connected devices, often with cross-border implications. Recent incidents underscore that these risks are not hypothetical. In 2024, several European states, alongside Ukraine, submitted formal complaints to the International Telecommunication Union regarding cases of peacetime signal interference. In 2025, reports of Russian electronic warfare activity affecting signals in Romanian territory further illustrated how interference originating in conflict zones can spill over into neighbouring countries. Subsequent reporting has reinforced the need for enhanced situational awareness and coordinated mitigation efforts at the European level.

Persistent dependencies in upstream technologies compound these vulnerabilities. A joint assessment by the European Commission and the European Defence Agency identified 47 critical space technologies for

which Europe relies on external suppliers, in some cases from geopolitically sensitive jurisdictions. Delays in the development of Ariane 6 have further exposed these constraints, necessitating temporary reliance on external launch providers, including SpaceX. In parallel, Europe's launch infrastructure remains heavily concentrated in Kourou, limiting redundancy and surge capacity compared to more diversified systems such as those of the United States. This concentration creates a potential single point of failure and reduces operational flexibility in the event of disruption.

Satellite Dependence and Europe's Strategic Autonomy

The issue of satellite dependence is closely connected to the EU's broader debate on strategic autonomy, which has gained importance in recent years as outlined in the European Commission's approach to a more autonomous Europe in space and defence policy. In an increasingly competitive international environment, control over critical technologies and infrastructure is becoming a key factor in political influence. Strategic autonomy in this context does not mean full independence, but rather the ability to make sovereign decisions and maintain essential capabilities even under external pressure.

Satellite infrastructure plays a central role in this discussion, as space-based systems support a wide range of critical functions. Defence, intelligence, border management, communication networks, economic activity, and crisis response all increasingly rely on secure access to satellite services. This makes control over space infrastructure directly relevant for political decision-making and the ability to act effectively in crisis situations.

At the same time, studies show that Europe faces a structural dependency in this sector despite having developed important EU systems such as Galileo and Copernicus. As analysed in policy research by CSIS, Europe's space capabilities are strong in some areas but remain dependent on external actors in others, particularly in launch services, private satellite infrastructure, and key technological components. This means that while the EU can operate significant satellite systems, it does not fully control the broader ecosystem required to guarantee long-term autonomy.

These dependencies also have direct implications for political decision-making. If access to satellite services depends on non-European governments or private companies, the EU's ability to act independently during crises may be limited. This is especially relevant in the field of security and defence, where timely access to communication, navigation, and intelligence can influence operational outcomes. As highlighted in academic literature, space infrastructure therefore represents not only a technical system but also a governance and sovereignty issue within EU law and policy frameworks.

In parallel, space is increasingly becoming a strategic domain of global competition. The United States, China, and Russia are investing heavily in

their space capabilities, treating satellite infrastructure as a core element of national security and geopolitical influence. In this environment, technological sovereignty is gaining importance because dependence on external systems can translate into political vulnerability and reduced strategic flexibility.

However, achieving greater autonomy in space remains a complex and long-term objective for the EU. It requires significant investment, coordinated industrial policy, and sustained cooperation between member states and EU institutions. Space technology is highly specialised and globally interconnected, making full supply chain independence difficult. At the same time, cooperation within frameworks such as NATO remains essential to ensure interoperability and shared security capabilities.

Policy Options and Recommendations

Addressing these challenges requires a combination of regulatory, industrial, and strategic measures. Greater harmonisation and enforcement of cybersecurity and resilience standards across member states would reduce fragmentation and strengthen collective security. Information-sharing mechanisms, including the EU Space Information Sharing and Analysis Centre, should be further institutionalised to improve coordination.

Operational resilience can be strengthened by reducing reliance on single providers and ensuring redundancy across critical services. This could involve a European framework requiring access to multiple independent satellite systems for essential government and defence functions, including at least one EU-controlled capability. Complementary measures include stress-testing, clearer escalation protocols, and closer cooperation with NATO.

In parallel, long-term initiatives such as IRIS² and secure communication technologies remain important but will take time to mature, requiring near-term measures to address existing vulnerabilities.

Ultimately, strengthening Europe's position will depend not only on infrastructure investment but also on governance capacity, including the ability to enforce access conditions, coordinate across member states, and leverage regulatory and market power in engagements with commercial providers.

Conclusion

Europe faces a structural challenge in its reliance on satellite systems essential to navigation, communication, defence, and crisis management, with much of the underlying infrastructure remaining outside its control. This creates a persistent tension between dependence and sovereignty, with direct implications for security and resilience.

The war in Ukraine illustrates these risks: satellite infrastructure has become a key vector of military capability and strategic leverage, cyberattacks

on commercial networks can trigger cross-border disruptions, and reliance on private providers does not ensure guaranteed access.

While initiatives such as IRIS², GOVSATCOM, and NIS2 signal growing awareness, their implementation remains uneven and slow relative to the scale of the challenge.

Addressing this imbalance requires not only investment, but stronger governance, coordination, and effective use of regulatory and market power to secure Europe's position in the space domain.

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