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Introduction

The space sector in the EU has long been geared toward civilian, scientific, and commercial use. Accordingly, private companies and scientific associations have played a substantial role in space technology innovation (Kriege & Russo, 2000, p.34). However, space is becoming increasingly securitised and militarised, and armed forces are investing more consistently in space assets (Calcagno et al., 2022). Moreover, space technology's dual-use and slow-to-develop nature leads to a tendency to adapt existing space products and assets to military use and the direct involvement of private and non-defence space companies in military operations. SpaceX, in particular, has become central to several states' militaries through Starlink, a large-scale low-orbit satellite internet and communication service (Rousselle, 2024). After seeing widespread Ukrainian civilian and military use of Starlink, SpaceX services have been considered by several governments and regional organisations. The EU itself has recently turned to SpaceX to launch four of its Galileo satellites. However, planned and ongoing American military use of SpaceX technologies and assets raises questions over how appropriate EU reliance on SpaceX for rocketry and connectivity would be. First, the agreement with SpaceX undermines the EU's strategic autonomy, as it delegates fundamental launching services to a private company outside EU jurisdiction. Secondly, it increases dependence on the US both because it is the country that has jurisdiction over SpaceX, and because the launching operations take place from American soil. Thirdly, relying on SpaceX and on the US undermines the autonomist intent of the EU Space Programme, especially of the Galileo project which was meant to become a European alternative to the American navigation system. Fourthly, increasing SpaceX's involvement in US military operations entails broader implications for European defence by increasing the risk of an orbital arms race.

SpaceX involvement in military operations in Ukraine and beyond

SpaceX is a space company founded in 2002 and owned and operated by Elon Musk. Military use of the company's products is primarily Ukraine's use of Starlink, a low-orbit satellite-based internet service, in defending against Russia's 2022 invasion (Bryant, 2023). Since 2019, SpaceX has launched rockets into space nearly every week, delivering dozens of satellites into orbit, creating a network of more than 4,500 Starlink satellites that account for more than 50 per cent of all active satellites (Satariano et al., 2023) and covering potentially every corner of the planet. In February 2022, Ukrainian Minister of Digital Transformation Mykhailo Fedorov asked SpaceX CEO Elon Musk to replace disrupted or severed Internet services with Starlink. SpaceX obliged by donating hundreds of terminals and activating their satellite internet service for Ukraine's territory (Khaled, 2022). Since then, the service has been used for both civilian and military purposes, permitting Ukrainian forces "to share real-time drone feeds between units, and communicate in areas where combat has disrupted cellphone service" (Walsh et al., 2024).

Over time, military use of SpaceX products has become more explicit. In October 2022, SpaceX announced it would no longer bear the costs and asked the Pentagon to contribute as financiers (Marquardt, 2022). SpaceX warned the Pentagon it might cut off service to Ukraine if the US would not contribute tens of millions of dollars per month and estimated operations to cost \$400 million over 12 months (Marquardt, 2022). Asking the US military to contract SpaceX raised doubts over the company's neutrality and questioned Starlink's civilian nature. Director General Dmitry Rogozin of Russia's space agency Roscosmos claimed that Starlink could no longer be considered purely civilian, thus alluding to its targetability (Goines et al., 2022). On 8 February 2023, Starlink President Gwynne Shotwell asserted that Starlink was "never meant to be weaponized" (Hitchens, 2023) and announced that SpaceX had taken measures to prevent Starlink from being used to control combat drones. This announcement came after several Russian statements that they could target US commercial satellites deployed in Ukraine (Simmons & Maidenberg, 2022). Nevertheless, in June 2023 SpaceX signed a contract with the US Department of Defence (DoD) to continue providing the company's Starlink satellite communications service to Ukraine (Stone & Roulette, 2023). The Ukrainian armed forces are still benefitting from this network (Mozur & Satariano, 2024).

Besides Ukraine, SpaceX is a major partner for US military satellite launches. In 2020, in the cadre of National Security Space Launch Phase 2, the US Space Force awarded launch service contracts to United Launch Alliance (ULA) and SpaceX for launch service orders starting in the 2020 fiscal year through 2024 (United States Air Force, 2020). While the share of launches was initially supposed to be 60% to ULA and 40% to SpaceX, based on the latest assignments for 2024, ULA ended up with 54% and SpaceX with 46% (Erwin, 2023), Musk's company scoring a better result than expected. The military equipment launched by SpaceX is mainly missile detection and data communication satellites (Erwin, 2024). Moreover, in 2022, the US Air Force awarded SpaceX a \$102 million five-year contract to demonstrate technologies and capabilities to transport military cargo and humanitarian aid worldwide using heavy rockets (Erwin, 2022). To this end, the Starship mega-rocket might be chosen because of its reusability, rapid turnarounds, and payload capability of over 100 tons (Decker, 2024). The "Rocket Cargo mission", with the goal of Earth-to-Earth transportation via rocket through space, is slated to have its first demonstration flight in 2026 (Erwin, 2024). There are also reports that SpaceX is deepening its ties with U.S. intelligence and military agencies through classified contracts ranging in the billions of dollars (Hagstrom, 2024). According to some authors, those contracts concern a "secretive company satellite program called Starshield for national security customers" (Maidenberg & FitzGerald, 2024). Others speculate that the Pentagon might want to fully own and operate SpaceX Starships for military missions instead of contracting the company every time a rocket is needed (Tingley, 2024).

EU contracts with SpaceX and the US

The US is not the only spacefaring nation that reached out to SpaceX for fundamental space services with remarkable security implications. In 2022, the European Space Agency (ESA), which includes most EU member states, used SpaceX-made Falcon 9 rockets to launch its Euclid space telescope designed to find evidence of dark matter and energy. Moreover, in 2024, SpaceX will launch the ESA's Hera probe, a follow-up mission to NASA's DART spacecraft, which was the first test of a future planetary defence system (Hepher, 2023).

In addition to supporting the ESA's scientific missions, SpaceX has become a key enabler in delivering fundamental EU satellite services due to the EU – and the ESA - currently lacking an autonomous capacity to access space. The EU has opted to make arrangements with SpaceX and the US due to significant delays in developing and deploying of the Ariane-6, Europe's next-generation rocket system. Another important factor in Europe's turn toward SpaceX is the Russian invasion of Ukraine, which effectually removed the option of continuing to use Russian-made Soyuz rockets.

In April 2023, the European Commission obtained permission from Member States to negotiate an ad-hoc security agreement with the US, allowing US rocket companies to launch new Galileo satellites (Posaner & Cerulus, 2023). This followed the Commission acknowledging that, in lieu of the Ariane-6, only SpaceX's Falcon 9 and United Launch Alliance's Vulcan system are able to launch the 700kg Galileo geo-navigation satellites into orbit (Posaner & Cerulus, 2023). In November 2023, the Commission signed a €180 million deal with SpaceX to get four of EU's satellites into orbit (Posaner, 2023). However, before scheduling launch dates with SpaceX, the EU wanted to close a security deal with the US that guarantees European access to the Galileo satellites at any time and rights to retrieve technological components should the rocket fail and the payload end in the sea. This agreement was finalised on 19 March 2024, allowing the EU to launch its satellites with SpaceX launchers, and, if necessary, retrieve and store debris in the US. (Posaner, 2024). On 27 April 2024, a SpaceX Falcon 9 rocket launched the first two Galileo satellites into orbit, with a second SpaceX launch scheduled for July 2024 (Weltman, 2024).

Implications for European security and defence

This reliance on SpaceX for space access and the EU-US-SpaceX nexus has several implications for European security. First, it undermines the EU's strategic autonomy by putting sensitive Global Navigation Satellite System (GNSS) and potentially Satellite Communications (SatCom) services in the hands of a private contractor wholly outside the EU's jurisdiction. Second, reliance on an American space company carrying out activities from American territory necessitates cooperation with the US, thus involving a third country in the Union space policy and increasing the EU's dependence on the US. An agreement with the US was needed because of the American jurisdiction over SpaceX and over the territory from where the SpaceX rocket will be launched. As SpaceX's state of registry, the US has unilateral jurisdiction and control over SpaceX objects according to Article VIII of the Outer Space Treaty (Van Eijk, 2020). Therefore, only the US could presumably directly prosecute SpaceX if it failed to honour its commitments with the EU. Moreover, since the EU satellites will be launched from American soil, the US must be entrusted "to protect the integrity of the Galileo satellites on United States' territory and the confidentiality of EU classified information" (Pugnet, 2024). Third, since Galileo was originally designed to provide an EU alternative to the American Global Positioning System (GPS) (European Parliament, 2013), the agreement with the US has a reputational cost for the EU. Therefore, deferring essential services for Galileo's functioning to the US is embarrassing and contradictory to the programme's point. Lastly, the militarisation of space wrought by American military use of SpaceX services undermines European security by fomenting the risk of an orbital arms race. This might be a problem for the EU, which is interested "in avoiding an arms race in space, given its growing dependency on space-based assets but lag in offensive and defensive space capabilities" (Taylor, 2022, p. 6).

To face such security concerns, the EU seeks to counteract current – and avoid further – dependency on other states' space infrastructure. Regarding satellite communications, the European Union is building up the Union Secure Connectivity Programme IRIS², a new constellation of around 170 mixed-orbit communication satellites to provide Starlink-like services with enhanced encryption, security, and a clearer military perspective. After Galileo and Copernicus, IRIS² is the intended Satellite Communications component of the EU's strategic space infrastructure. IRIS²'s aim is explicitly to diminish dependencies on the US and SpaceX to avoid replicating what is happening with the GNSS in Satellite Communications. IRIS² is meant to secure the Union's autonomy by avoiding dependencies on third-country infrastructure and by providing "secured telecommunications services for EU governments in critical scenarios where terrestrial networks are absent or disrupted, as observed, for instance, in the unfolding war in Ukraine" (Cuenca Vilches, 2023).

Conclusion

SpaceX is an increasingly important partner for the US when it comes to both civilian and military space services. In collaboration with the US military, SpaceX is currently providing communication services for Ukrainian troops, launching military satellites, planning military cargo missions through space, and possibly considering a sale of SpaceX assets to the US DoD. The EU, faced with significant delays in Ariane-6's development and unwilling to continue operating Soyuz rockets, have used SpaceX to launch services essential to Galileo's functioning. Given Galileo's sensitivity, the EU concluded a security agreement with the US, which has jurisdiction over SpaceX and all the operations collateral to launch which are occurring in its territory. However, as it was discussed in this analysis, the reliance on SpaceX and the US for fundamental launching services has serious implications for the EU, as it diminishes the EU's strategic autonomy, increases its dependence on the US, contradicts Galileo's autonomist intent, and confronts the EU with two actors that are increasingly militarising space. Therefore, this partnership has severe security and reputational implications for the EU. To avoid a similar situation also in satellite communications, the EU has started setting up IRIS² as a rival service to Musk's Starlink. The EU might replicate the IRIS² model, namely a project leveraging on the innovative European space Small and Medium Enterprise (SME) ecosystem, also in the launching sector. For example, the EU could gather ideas from SMEs on how to temporarily guarantee the functioning of Galileo through smaller satellites that can access space through micro launchers, without the need to rely on SpaceX for mega-rockets. This kind of initiative would greatly enhance European strategic autonomy.

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