Access to Space: Challenges and Policy Options for Europe

by Jean-Pierre Darnis

Strong of its successful launchers Ariane and Vega, Europe faces important challenges in a complex environment that characterizes the space rocket industry. The Ariane and Vega rockets are key to boosting Europe's bourgeoning space launcher industry, the topic of a high-level seminar among experts and practitioners organized by IAI's Tech-IR Programme.[1]

While there is still a certain degree of uncertainty surrounding US space policy, the sheer amount of federal funding approved for the sector (19.5 billion dollars is NASA's budget for fiscal year 2019[2]) seems to indicate a strong US public demand for launch services. On top of this, the "new space race" triggered mainly by private US Internet billionaires such as Elon Musk and others, with projects of private trips to Mars and a return to the moon, are attracting increasing interest in the sector.

Access to space is no longer limited to satellites and other technologies, but is developing towards the key capacity for more complex and challenging space operations. On another hand, satellite based Earth Observation (EO), positioning and telecommunications services are increasingly integrated into value-added data chains where large Internet companies are able to provide products based on data-fusion, acting as a very profitable incentive for market entry.

This link between successful applications and the capability to provide satellite data is so important that major global Internet companies are investing in satellite constellations, another indication of how the market

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[1] For more information on the Technology and international relations (Tech-IR) programme, see IAI website: http://www.iai.it/en/node/8798.
[2] See National Aeronautics and Space Administration (NASA), *FY 2019 Budget Estimates*, 12 February 2018, p. 1, https://www.nasa.gov/news/budget.

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is evolving. This creates a potential for the enlargement of the spectrum of launching needs, from micro satellite constellations to the possible return of human flight and space stations.

These two tendencies may appear contradictory, but they also pinpoint the fact that access to space is, more than ever, a key capability not only for the sake of "space autonomy", but also to maintain some governance over extremely valuable pieces of the modern data value-chain.

This shift in the US market sector has disruptive consequences, both from a technological and a financial point of view, with a mix of investments coming from private capitals and large orders from state funded budgets. Over the last decades, Europe has developed a complete set of launching capabilities, building upon the success of a very reliable Ariane launcher family started in 1973: the most recent addition, the Ariane 5 launcher, has scored an impressive series of 82 successful launches. It has recently been joined by the smaller Vega launcher, which has preformed in a very reliable fashion too (11 successful launches).

The high reliability of the Ariane launcher has been key to its commercial success, built on customer trust. Good results in terms of launches should not overshadow the reality that launching business models worldwide were – and are – driven first and foremost by governmental needs. "Commercial" viability in these sectors would be impossible without strong direct/ indirect public support, for example through the procurement of a large number of launchers for institutional payloads.

This need for public funding has fostered some debate in Europe about the sustainability of launching sector and the need to develop "affordable" access to space capabilities. During the first decades of the 20th century, the European Commission has assumed a growing role on space policy, with two flagships programmes, Galileo and Copernicus, driven by a service approach and the fostering of new market-oriented applications.

This approach can be also observed in the 2016 "EU space strategy" document where access to space is highlighted as a priority, with the European Commission and the European Space Agency (ESA) pushing for cost-effective and competitive launchers. Indeed, recent years have been characterized by budget difficulties and needs to contain public expenses, but also by competition within the commercial market coming from new players, such as Musk's Space X.

Relying on strong and well paid public demand in the US, the Space X company is able to propose launch services on the commercial market for around half the price of the "public market". Ariane 5, which has a price per kilo in line with the US's "public market", is therefore facing strong competition.

For this reason, Europe has begun development of a new European launcher, Ariane 6, which aims to drastically reduce costs while maintaining a high level of reliability. On another hand, the development

of the Vega launchers, with the Vega C version on the way, reinforces the policy of strengthening a European family of launchers. The Ariane launchers have been developed with strong Franco-German involvement and Italian contributions mainly in solid propulsion. More recently, Vega has been developed under Italian leadership, with a sound French contribution. Vega has built up a strong case in favour of Italian space policy, but also stands to prove the continuity of Italian efforts within ESA.

In light of the limitations contained in the "Buy American Act", which limits US federal funds from supporting the European market, a dissymmetry in competition will be sustained as long as European public needs are procured through worldwide open tenders. This has led to an ongoing discussion about a "European Preference" for meeting the launch service needs of all European public players such as the Commission, ESA, Eumetsat and national governments'.

Adopting a similar approach to that present in the US, Russia or China and ensuring governmental commitments to buy European made launchers, combined with a minimum number of yearly launches for Ariane 6 and Vega C, is one way to create a level playing field and provide the basis to amortize investments and keep technology and prices competitive.

Such action would represent a key step towards securing a high technology industrial sector with very skilled employees. It would also represent an important political commitment,

with both the European Commission and governments pooling their needs as buyers, facilitating a long-term strategy.

This would definitely help European producers, Ariane Group and Avio, to mitigate current risks. But would it be enough? There is some debate on the technological but also the financial benefits that could stem from enhancing the reusability of launchers and engines. Some US players are pushing in that direction but they can access much larger demands, meaning higher launch frequencies, a key criteria for making such re-use beneficial.

The European launch sector does represent a key set of technological capabilities, not only for the interest in mastering the different aspects of the launch, but also to prepare for the important advances of the future of space flight. Even if Europe might not consider entry into a space race to Mars, maintaining a launching capability is key to keeping a number of policy options open for Europe, from satellite constellations to science and exploration.

While the "new space" paradigm connects all data gathering and transmitting capabilities in a holistic Information Technology driven model, it is strategic for Europe to keep and develop its access to space capabilities. Being able to master an important piece of the whole space data chain autonomously, a key element not only for the ability to create added value in the economic chain, but also for important political and ethical reasons. Indeed, Europe's access to space is also

a necessary guarantor for ensuring a "European approach to global data" is considered in international debates.

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Istituto Affari Internazionali (IAI)

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