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EUROPEAN DEFENCE INSIGHTS

VOL 1 | ISSUE 1 | JUL-SEP 2026

Launch **Issue** Special

COVER STORY

THE RECKONING: CAN EUROPE BUILD WHAT IT IS BUYING?



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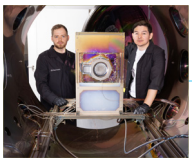
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EDITOR'S NOTE

EUROPE AT A STRATEGIC CROSSROADS



Sagar Singamsetty
Editor, European Defence Insights

Sagar Singamsetty

Welcome to the launch issue of European Defence Insights.

As we prepared this first edition, I kept returning to one question: can Europe turn strategic urgency into strategic capability?

At the NATO Summit in The Hague, Allies committed to investing 5% of GDP annually in defence and security by 2035. Since then, European Allies and Canada have increased core defence investment by more than US$139 billion, and at the Ankara Summit this summer the message sharpened further: Europe must now move from targets to delivering capabilities, industrial capacity and production. The question is no longer whether Europe will spend more. That debate is largely over. The challenge is what happens next.

The war in Ukraine has shown how fast warfare is changing. Drones have transformed the battlefield. Space has become integral to communications, intelligence and navigation. Cyber and hybrid threats sit alongside conventional ones, while energy, infrastructure, technology and supply chains have all become part of the security conversation. Defence is no longer a compartment of government policy. It is becoming an organising principle across much of the European economy.

This issue reflects that shift. Our cover story asks whether Europe can build what it is buying, tracing how the boundaries between aviation, space and defence are dissolving faster than the institutions meant to govern them. Elsewhere, we go inside the industrial base with Cedar Rapids and Anemo Engineering, look at Europe's expanding space ambitions with Leaf Space, NewOrbit and The Exploration Company, and examine the rapidly evolving counter-drone landscape through Leonardo and Echodyne. We speak with Colonel Ludovic Monnerat of Swiss Space Command, and close with Officina Stellare on the sovereign technologies Europe's future in orbit will depend on.

Strategic autonomy is, ultimately, a practical question: who controls the technology, data, infrastructure and supply chains that national security depends on? Europe has the scientific expertise, industrial capability and innovative companies. The task now is connecting them, and turning investment into lasting capability.

That is the perspective I want this publication to bring. We will not simply catalogue announcements. We will ask what policies actually change, which technologies are becoming capabilities, and whether Europe's investments are building resilience that lasts.

If you are shaping policy, building industrial capacity or researching these challenges, I want to hear from you.

Europe has entered a different strategic era. The question is no longer whether it recognises the need to act. It does. The question is whether it can turn recognition into capability, and capability into lasting resilience.

Welcome to our first issue.

BUILDING AMERICA'S NEXT AEROSPACE & DEFENCE POWERHOUSE



Juliet Adbel

President & CEO, Cedar Rapids Metro Economic Alliance

In this exclusive interview with Sony, Special Editor, European Defence Insights, Juliet Abdel discusses how Cedar Rapids is strengthening aerospace manufacturing, resilient supply chains, workforce development, and transatlantic collaboration to become one of North America's leading aerospace and defence ecosystems

Q The Cedar Rapids region is home to globally recognised aerospace and defence companies, including Collins Aerospace and BAE Systems. What factors have made the region a strategic hub for advanced aerospace manufacturing and defence innovation?

A Cedar Rapids has spent decades building an ecosystem where aerospace companies can succeed. Alongside Collins Aerospace and BAE Systems is a robust network of precision manufacturers, electronics suppliers, engineering firms and specialized service providers supporting both commercial aerospace and defense. Combined with a highly skilled workforce, strong engineering talent pipeline, multimodal infrastructure and a collaborative business environment, the Cedar Rapids Region has become a place where companies can design, manufacture, innovate and grow within an integrated aerospace value chain. It's an ecosystem intentionally designed not just for today's opportunities, but for the future of the industry.

Q The launch of the Ascentus initiative reflects a renewed focus on strengthening the regional aerospace ecosystem. How will this initiative enhance industrial resilience, workforce development, and international competitiveness?

A Ascentus recognizes that the future of aerospace competitiveness depends on strong regional ecosystems – from talent preparation to effectively bringing products to market. It convenes industry, education and economic development to expand the workforce pipeline, support suppliers, encourage innovation and attract new investment. As aerospace companies look for resilient supply chains and opportunities for long-term growth, regions with strong, collaborative ecosystems will have the advantage. Ascentus ensures the Cedar Rapids Region and the state of Iowa are positioned to meet that demand while supporting both existing and future employers at every phase.

Q As NATO allies seek more resilient and diversified defence supply chains, what opportunities do you see for deeper collaboration between the U.S. Midwest and European aerospace and defence industries?

A Aerospace has always been a global industry, and today's supply chains depend on trusted international partnerships. Europe and the U.S. Midwest share many of the same priorities: resilient supply chains, advanced manufacturing and trusted industrial partnerships. We see opportunities that extend beyond aircraft production into avionics, electronics, MRO, advanced materials, precision manufacturing and defense technologies. Those are all areas where the Cedar Rapids Region has established capabilities and where collaboration can strengthen innovation and supply chain resilience on both sides of the Atlantic.

Q Access to skilled talent remains a major challenge for aerospace manufacturers worldwide. How is Cedar Rapids preparing the next generation of engineers, technicians, and advanced





manufacturing professionals?

A Talent is one of our greatest competitive advantages. Through partnerships with the University of Iowa, Iowa State University, regional private and community colleges alongside industry leaders, we're aligning education with the evolving needs of aerospace manufacturers. Students have opportunities to gain hands-on experience, technical training and direct connections to employers throughout the region. Ascentus builds on that work by strengthening collaboration between employers and educators to prepare engineers, technicians and skilled trades professionals. As technologies evolve -- from advanced manufacturing and automation to next-generation avionics -- we're focused on ensuring our workforce evolves alongside them. That long-term investment gives companies confidence that they'll continue to find the skilled professionals they need here. The State of Iowa already boasts over 19,000 jobs in the aerospace and defense industries to date.

Q Recent global events have highlighted the importance of secure and resilient industrial ecosystems. How is your region supporting defence manufacturers in building more agile and sustainable supply chains?

A Resilient supply chains are built on strong regional ecosystems and trusted international relationships. We're helping companies diversify supplier networks, strengthen manufacturing partnerships and leverage Cedar Rapids' central location, freight access and strong industrial base to move products reliably while remaining closely connected to customers and suppliers across North America.

Equally as important is maintaining and expanding international relationships and driving our open for business message and supporting projects that see the stability and safety of operating directly in the United States. Through ongoing engagement with international partners across North America and European Markets, we're helping businesses identify new opportunities; building trusted commercial relationships that make supply chains more stable and adaptable; and leveraging our Export Import Bank partnership to support companies in our region enter international markets.

Q International investment and collaboration are becoming increasingly important for defence innovation. What message would you like to share with European aerospace companies considering partnerships or expansion into the U.S. market?

A I'd encourage companies to look beyond the traditional US markets. Some of the strongest opportunities for innovation and long-term growth are emerging in regional ecosystems like the U.S. Midwest that combine technical expertise, manufacturing capability and a collaborative, cost-effective business environment. Our approach is relationship-driven; we work closely with companies to connect them with talent, suppliers and resources that support their long-term success. That's increasingly important as companies seek stable, resilient locations for future investment.

> As aerospace companies look for resilient supply chains and opportunities for long-term growth, regions with strong, collaborative ecosystems will have the advantage

Q Looking ahead, what is your long-term vision for Cedar Rapids as a global aerospace and defence hub, and how do you see transatlantic cooperation shaping the future of the industry?

A Our vision is to establish Cedar Rapids, Iowa as one of North America's leading regional aerospace ecosystems -- known for innovation, workforce excellence and international collaboration. Transatlantic cooperation will be an important part of that future. Aerospace has always been a global industry, and the next generation of innovation will depend on stronger partnerships between companies, research institutions and regional economies. We want companies to see the region as a place where they can confidently invest, innovate and grow. By strengthening partnerships across industry, education and global markets, we're building an ecosystem that will support aerospace and defence companies for decades to come.

THE ROLE OF INTEGRATED COMMAND AND CONTROL SYSTEMS IN MODERN DEFENCE

Giacomo Feres Staniscia
Vice President of Defense at Atech

atech
EMBRAER GROUP



The contemporary operational environment is defined by increasing volatility, speed, and complexity. Modern Defence forces are no longer confined to traditional, isolated battlefields; they must operate seamlessly across multiple domains, including land, sea, air, space, and cyberspace. In this increasingly interconnected environment, success depends not only on tactical capabilities, but also on information superiority. At the heart of this transformation lies the Integrated Command and Control (C2) System, the essential nervous system of modern military operations.

Today's commanders face an overwhelming volume of data generated by a vast array of sensors, radars, unmanned aerial vehicles, satellites, and personnel in the field. Without a cohesive technological framework, this information can quickly become noise rather than a strategic asset. This is where integrated C2 systems become essential, fusing disparate data streams into a unified, real-time Common Operational Picture (COP). By transforming fragmented data into actionable information, these systems provide enhanced situational awareness, enabling Defence forces to understand the operational environment, identify emerging threats, and make informed decisions in rapidly changing circumstances.





Situational awareness, however, is only the starting point; it must ultimately translate into action. In high-stakes scenarios, time is one of the most critical resources. Modern C2 platforms combine advanced data processing, secure communication, and sophisticated analytics to filter, prioritize, and contextualize information. This technological foundation provides essential decision-making support, presenting commanders with clear and timely insights into complex situations. As a result, forces can coordinate faster and more effectively, optimize the allocation of resources, and reduce risks to both strategic assets and personnel.

Modern Defence operations also rarely involve a single service or organization. Effective missions increasingly depend on close coordination between different branches of the armed forces, multinational coalitions, and civil-military agencies. Interoperability is therefore a cornerstone of effective Command and Control. Through secure, standardized communication protocols and data links, modern C2 systems enable different platforms, systems, and units to exchange information and operate together effectively. Whether a frigate at sea is sharing tactical data with an aircraft overhead or a frontline operator is updating a mobile command centre, interoperability ensures that decision-makers and personnel across the operational chain are working from a common operational picture. This level of integration is essential for synchronized joint operations, particularly in contested and highly dynamic environments.



Looking ahead, the evolution of Command and Control systems will continue to be shaped by advances in Artificial Intelligence, machine learning, and resilient cybersecurity. Yet their fundamental purpose remains unchanged: to transform complexity into clarity and information into action. Achieving this level of integration is also a fundamental pillar of technological sovereignty. By investing in adaptable and resilient C2 architectures, nations can ensure that their forces remain fully interoperable with international allies while safeguarding their capacity for autonomous decision-making. Developing and maintaining highly integrated C2 capabilities is no longer simply a technological enhancement; it is a strategic imperative for maintaining operational effectiveness and national sovereignty.

In modern Defence, the ability to seamlessly integrate, understand, and act upon information represents a decisive strategic advantage.

ENGINEERING THE FUTURE OF DEFENCE MRO: PRECISION, READINESS AND OPERATIONAL RESILIENCE



BART VANDEZANDE

CEO, Anemo Engineering

In this exclusive interview with Sony, Special Editor, European Defence Insights, Bart Vandezande discusses how precision maintenance tooling, process-controlled repairs, and specialised engineering solutions are helping strengthen aircraft readiness, defence MRO capabilities, and Europe's long-term operational resilience



> Military readiness depends on performing repairs correctly the first time

Military aircraft readiness depends on precision maintenance and reliable repair processes. How are Anemo Engineering's Clinserts® tools helping defence operators improve safety, reduce maintenance risks, and enhance fleet availability?

Military readiness depends on performing repairs correctly the first time. Key-locking inserts are used in critical threaded connections, but their removal and replacement can become unpredictable when technicians rely on generic drills, punches or improvised installation methods.

Our Clinserts® tooling creates a controlled workflow for the complete repair: the Extrakt Tool supports repeatable removal, the RESISTEEL® Broaching Tool prepares the locking-key paths in hard materials, and the PRO Tool that installs the insert and locking-keys smoothly and controlled, and this by following the specific requirements from Boeing and Airbus in terms of installation depth, 0.01-0.03 inch sub-flush (under the surface). This helps reduce risks such as damaged parent threads, bent keys, misalignment, rework and loose metal debris that may fall into the engine of an aircraft. The PRO tool is furthermore the only tool on the market capable to install inserts sub flush, without damaging parent material.

The tools do not replace approved maintenance instructions, technician competence or final inspection. They give maintenance teams a more controlled and guided way to execute those instructions. By reducing avoidable rework and component damage, they can shorten maintenance cycles and support higher fleet availability. European military-airworthiness frameworks similarly place strong emphasis on controlled maintenance, approved organisations and continuing airworthiness



Aircraft engine maintenance often relies on conventional tooling that can introduce human error and damage critical components. What operational advantages do your dedicated extraction, broaching, and installation tools provide for military MRO organisations?

The main advantage is process control across all three stages of the repair. The Extrakt Tool provides a defined method for disengaging and removing an installed insert while helping preserve the original parent thread. This reduces reliance on uncontrolled drilling or manual manipulation. The RESISTEEL® Broaching Tool creates consistent locking-key slots in materials above 300 Vickers, where the keys cannot reliably form their own paths. Finally, the PRO Tool guides the insert and keys during installation, helping prevent bending, surface marking and inconsistent depth.

For an MRO organisation, this means less dependence on individual operator technique, clearer work instructions, more predictable repair quality and fewer repeat operations. It can also simplify training because technicians use tooling designed for the specific task rather than adapting general-purpose equipment.

As European defence forces focus on strengthening sovereign maintenance and sustainment capabilities, how can specialised engineering solutions support greater operational resilience and long-term equipment readiness?

Specialised engineering solutions strengthen sovereign maintenance and sustainment capabilities by enabling defence organisations to carry out more repairs locally. Dedicated tooling, documented processes, technical training and regional support reduce reliance on overseas repair centres, lengthy logistics chains and the costly replacement of high value components that could otherwise be restored.

For European defence forces, sovereignty extends beyond manufacturing or acquiring aircraft. It also requires the tools, expertise, skilled personnel and resilient supply chains needed to keep those aircraft operational throughout their service life.

Anemo Engineering supports this objective by developing specialised solutions in Belgium for both standard and application specific requirements. By working directly with OEMs, MRO organisations and maintenance technicians, Anemo helps improve repair capacity, shorten turnaround times and strengthen long term equipment readiness.

Modern military platforms require high levels of precision throughout their lifecycle. How do your patented Clinserts® tools help ensure OEM-compliant repairs while reducing the risk of foreign object debris and component damage?

Our objective is to help technicians execute approved repair instructions with greater control and repeatability.

The Extrakt Tool supports controlled removal while minimising unnecessary loss of parent material. The broaching tool prepares defined paths for the locking keys rather than forcing them into very hard material. The PRO Tool then maintains straight-line guidance of the insert and keys and supports controlled sub-flush installation, typically within the 0.01–0.03-inch below surface range, specifically used in

aerospace applications. Its guided motion and chamfered contact geometry help protect the counterbore and reduce the risk of bent or displaced keys.

It is important to distinguish between supporting OEM-compliant work and claiming that a tool alone makes a repair compliant. Compliance still depends on the applicable OEM maintenance data, approved procedures, correct tool selection, qualified personnel, cleaning and final inspection. Our tools help make those approved procedures easier to perform consistently.

By replacing uncontrolled drilling and hammer-based methods with dedicated operations, the tooling can also reduce, but cannot by itself eliminate, the risk of loose chips or fragments becoming foreign object debris.

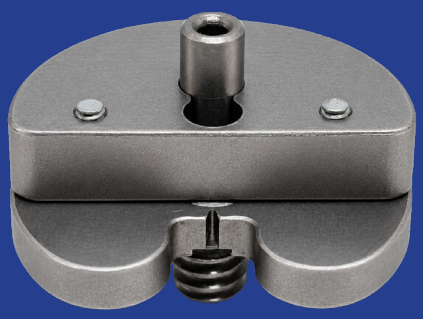
Q Defence organisations are seeking to improve maintenance efficiency while reducing aircraft downtime. What role do advanced tooling and engineering innovation play in supporting mission readiness across air forces and defence fleets?

A Advanced tooling converts maintenance knowledge into a repeatable physical process. A well-designed tool controls alignment, depth, force and contact with the component, reducing the number of variables that depend entirely on operator judgement.

For defence organisations, this can mean:

- Fewer unsuccessful installations
- Less component rework
- More consistent repairs between technicians and locations
- Faster technician training
- Longer tool life in demanding materials
- More predictable maintenance turnaround times

The RESISTEEL® development illustrates this approach. In a documented Inconel 718 aerospace application on a CF34-10E engine, Anemo reports 156 successful cycles, compared with approximately one to three holes for conventional blades. Results will vary by material, geometry and operating conditions,



> We expect defence MRO to become more distributed, data-driven and process-controlled.



but the test demonstrates how material and tool innovation can materially improve process durability.

Mission readiness is ultimately built from many such improvements. A single tool will not determine fleet availability, but reducing recurring maintenance delays and avoidable component damage contributes directly to a more dependable sustainment system.

Q With growing investment in next-generation military aircraft and engine technologies, how is Anemo Engineering preparing its solutions to meet the future requirements of defence aviation and aerospace manufacturers?

A We are developing our tooling around three future requirements: harder materials, tighter process control and greater maintenance traceability.

New aircraft and propulsion systems increasingly use demanding alloys, high-value components and tightly controlled repair processes. Our RESISTEEL® range addresses tool life in materials such as Inconel, while the PRO Tool addresses controlled key guidance and installation depth. The Extrakt Tool extends this philosophy to removal, creating a complete workflow rather than treating extraction, preparation and installation as unrelated operations.

We are also expanding compatibility across different metric and imperial Clinserts® families, while using feedback from aerospace OEMs, MRO organisations and technicians to refine the tools. Future development should include clearer digital work instructions, tool-identification systems, inspection guidance and opportunities to record tool usage or maintenance data.

Our aim is to remain a specialised engineering partner that can respond quickly to new insert sizes, materials and platform-specific applications—not simply a catalogue supplier

Q Looking ahead, what is your vision for the future of defence MRO, and how do you see specialised maintenance technologies contributing to Europe's sovereign defence capability and operational resilience?

A We expect defence MRO to become more distributed, data-driven and process-controlled. Maintenance organisations will need to carry out more complex repairs closer to where aircraft operate, while still meeting strict airworthiness, traceability and quality requirements.

Specialised maintenance technologies will play an important role because sovereignty depends on more than owning aircraft. Europe must also possess the expertise, tooling, trained personnel and supply chains required to sustain those aircraft under normal and high-tempo operational conditions.

Our vision is that technicians should no longer need to improvise sensitive repairs on high-value components. They should have access to dedicated tools that translate approved engineering requirements into repeatable workshop processes. Combined with harmonised military-airworthiness standards, regional manufacturing and dependable technical support, these solutions can help European operators retain critical maintenance knowledge, reduce strategic dependencies and improve long-term operational resilience.

RESILIENCE IN ORBIT REQUIRES RESILIENCE ON THE GROUND



Jonata Puglia

Chief Growth Officer & Co-Founder – Leaf Space

Europe is entering a new era of space operations shaped by geopolitical tension, the growing strategic importance of satellites, and the increasing exposure of critical infrastructure to disruption. Space systems are no longer viewed simply as providers of imagery, communications or navigation services. They have become essential assets supporting defense, civil protection, security, crisis response and economic resilience.

Recently, sustained Russian GNSS jamming and spoofing over the Baltic Sea has degraded aviation and maritime navigation for months, including an incident that disrupted the GPS signal of an aircraft carrying the President of the European Commission, and has pushed the European Parliament and the Council of the EU to treat satellite interference as a standing item on the security agenda.

As a result, expectations towards space infrastructure are changing. Governments, defense organizations and commercial operators increasingly rely on satellites to deliver information and support decision-making in near real time, even during rapidly evolving situations. This shift is forcing a fundamental rethink of how space missions are operated.

Traditionally, satellites communicate with operators through dedicated ground stations. Unlike a mobile phone, a satellite cannot normally remain connected all the time. It exchanges data only during brief communication opportunities that occur when it passes over a ground antenna. These windows, often lasting only a few minutes, occur several times per day and are commonly known as "passes".

This model has been the foundation of satellite operations for decades and remains highly effective. Scheduled contacts are ideal for downloading large volumes of data, such as Earth observation imagery, and for carrying out routine spacecraft operations. They will continue to play a vital role in Europe's space ecosystem.

However, the operational environment is evolving. I have watched this gap between scheduled passes and the moment something needs attention become the defining operational problem for the operators I work with. The challenge is not the ability to transfer data. It is the ability to react. Modern missions increasingly require operators to know what is happening on a spacecraft and to intervene immediately when necessary, rather than waiting for the next scheduled communication opportunity.

In many operational scenarios, waiting hours for the next contact is simply not acceptable. A satellite supporting disaster response may need to adapt its activities as conditions change. A spacecraft operator may need to respond quickly to a technical anomaly. A satellite constellation may require immediate coordination between multiple assets. In these situations, responsiveness becomes just as important as data throughput.

This challenge is becoming increasingly relevant as Europe pursues greater strategic autonomy in space. Over the past decade, the continent has invested significantly in launch capabilities, satellite manufacturing, Earth observation systems and secure communications infrastructure. Yet true autonomy depends not only on the satellites themselves, but also on the ability to operate them effectively throughout their entire lifecycle. Space infrastructure is only as resilient as the connectivity that links spacecraft to operators. Without reliable and timely access to their assets, organizations cannot fully exploit the capabilities they have placed in orbit.

This issue is particularly important in the defense domain, where the EU's own 'Space Strategy for Security and Defence' identifies space as a contest strategic domain requiring resilience across the full lifecycle of assets. Modern resilience depends on maintaining operational awareness and control, even when systems are under pressure, communications are disrupted, or situations evolve unexpectedly, redundancy alone is not enough. Achieving this requires multiple communication pathways and a more flexible approach to satellite connectivity.

The answer is therefore not to replace the existing model, but to expand it. Scheduled ground station contacts remain essential for high-capacity data transfer. However, they should be complemented by an additional layer of connectivity that keeps satellites accessible between those contacts. Europe increasingly needs a layered space communications architecture that combines the efficiency of traditional ground station networks with the responsiveness required by modern operations.

This evolution mirrors the way terrestrial communication networks have developed over time. Different technologies complement one another to provide the right balance of performance, resilience and availability. Space infrastructure should evolve in the same direction. Continuous operational connectivity enables operators to monitor spacecraft health, receive alerts, coordinate activities and issue time-sensitive commands without waiting



leaf space

TreeNet

A New Era of Space Connectivity



for the next scheduled pass. The benefit is a fundamentally different operational model, built for real-time decision-making as opposed to periodic reporting.

This value compounds as satellite constellations expand and as Europe's role in space traffic management grows. Managing dozens or even hundreds of spacecraft simultaneously, and responding to collision risks and other expected events, requires levels of automation, coordination and visibility that traditional operating concepts were never designed to provide. Delays in communication can quickly translate into operational risk, whether the issue is fleet management or a fast-moving conjunction warning.

Commercial operators face similar pressures. Satellite services are becoming deeply integrated into critical infrastructure, and customers increasingly expect continuous, reliable service. Performance is measured by responsiveness, availability and operational agility, alongside mission success.

This is the gap Leaf have been building TeeNet to close. A persistent layer of connectivity operating alongside ground stations, so that continuity of contact no longer depends on the next scheduled pass.

TreeNet has been developed to complement existing ground station networks rather than replace them. It introduces an always-available communications layer that enables continuous spacecraft monitoring and immediate command capability between regular ground station contacts.

By separating operational continuity from high-capacity data delivery, operators gain greater flexibility while maximizing the value of their existing infrastructure. Large data transfers can continue to rely on traditional ground station networks, while critical operational communications remain available whenever needed.

More importantly, TreeNet reflects a broader shift in how space missions will be operated in the coming years. Future space systems will require infrastructure designed for persistence as much as for performance.

The implications go well beyond commercial operations. As Europe strengthens its defense capabilities and increases investment in dual-use technologies, resilience must be embedded across every layer of the space architecture — from launch and satellite manufacturing to mission operations and communications infrastructure. This is where cooperation between governments and industry becomes essential. Europe's commercial space sector is already developing technologies that can directly support strategic objectives. Integrating these innovations into future defense and civil space programs can strengthen operational resilience while reinforcing European technological sovereignty.

Europe's space ambitions will ultimately be judged by the satellites it launches, but by how effectively it can operate them throughout increasingly complex missions. Traditional communication windows will remain a cornerstone of satellite operations for many years to come. Yet on their own, they are no longer sufficient to meet the demands of modern defense, civil protection and commercial space activities.

The next generation of space missions will require a layered approach to connectivity, combining proven ground infrastructure with continuous operational access to spacecraft. Maintaining that connection whenever operations demand it is no longer simply an engineering challenge. It is becoming a strategic capability in its own right. Building that capability today will help define the future standard for European space operations.

UNLOCKING THE NEXT FRONTIER IN SPACE: ANATOLII PAPULOV ON THE FUTURE OF VERY LOW EARTH ORBIT

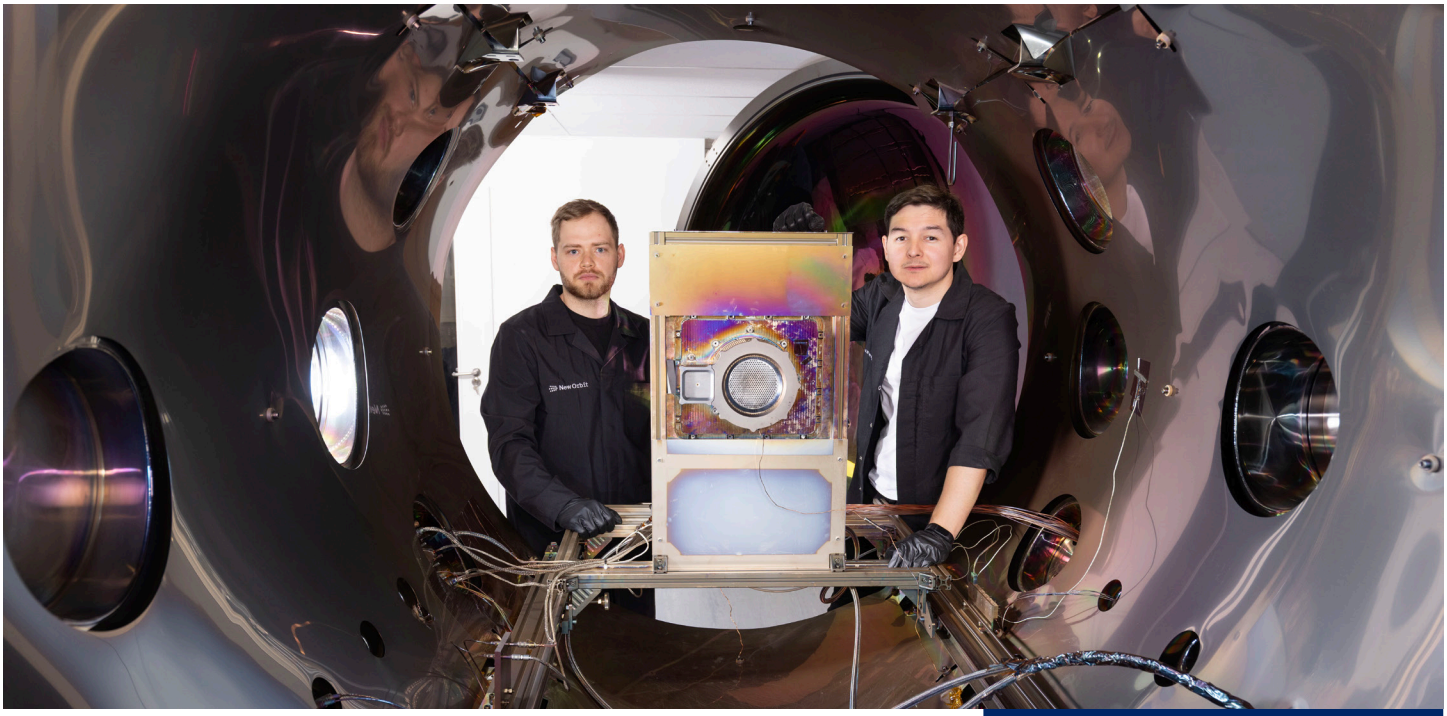


Anatolii Papulov

Founder, New Orbit

New Orbit

In this exclusive interview with Sagar Singamsetty, Editor, European Defence Insights, Anatolii Papulov discusses how NewOrbit is pioneering Very Low Earth Orbit (VLEO) satellites, advancing air-breathing electric propulsion, and enabling a new generation of sovereign Earth observation, resilient communications, and sustainable space infrastructure for Europe and beyond.



Q NewOrbit Space is pioneering satellites for very-low Earth orbit (VLEO). What inspired the vision to unlock this largely untapped region of space, and how transformative could it be for Earth observation and connectivity?

A The vision for NewOrbit is built on a straightforward commercial logic: the closer you fly to Earth, the better you can see and connect the world at a dramatically lower cost. We view Very Low Earth Orbit (VLEO) - the band between 200-300km - as "Earth's last empty orbit" and the most valuable empty real estate in space. Unlocking this region is transformative because it enables drone-resolution imagery and 5G direct-to-device connectivity that are technically impossible with today's higher orbital geometries.

Q Your company is developing air-breathing electric propulsion technology to operate at extremely low altitudes. What are the biggest engineering challenges in making sustained ULEO missions commercially viable?

A For decades VLEO has been considered too hostile for commercial satellites due to three primary physical forces:

- Aerodynamic Drag: Residual atmospheric drag causes unpropelled satellites to deorbit within weeks
- Atomic Oxygen: The highly corrosive environment causes fast material degradation
- Aerodynamic Torques: Destabilising forces makes it difficult to control the spacecraft's orientation during flight

NewOrbit has overcome these by building purpose-engineered satellites equipped with our proprietary in-house propulsion system, designed to operate reliably in these conditions for up to five years.

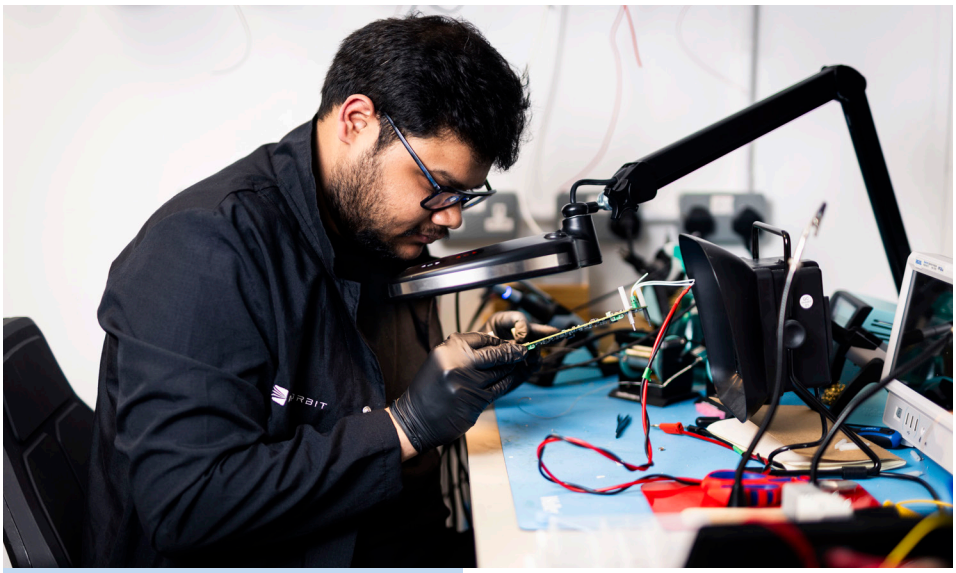
Q You've mentioned that flying satellites much closer to Earth could dramatically reduce mission costs while improving imaging quality. How do you see this reshaping the economics of the global satellite industry?

A By operating at 200–300km altitude, we can offer the highest-quality satellite imagery available today at a cost 20x lower than conventional satellites. This shift moves high-resolution space data from a premium, niche service to a foundational layer of global infrastructure. It effectively democratises access to elite-level space capabilities, forcing a rethink of the ROI for satellite constellations that currently rely on much more distant and expensive orbits.

> Very Low Earth Orbit represents the next frontier of space innovation, enabling unprecedented Earth observation, resilient connectivity, and strategic advantages for governments and industry alike.

Q NewOrbit is positioning itself at the intersection of advanced propulsion, Earth observation, and next-generation satellite systems. Which applications or sectors do you believe will benefit most from ULEO capabilities over the next decade?

A Over the next ten years, we believe the greatest benefits will be seen in:



- Telecommunications: Enabling 5G direct-to-device connectivity and exponentially faster satellite internet.
- Earth Observation: Delivering drone-like resolution imagery and live HD video for climate monitoring, disaster response, and urban planning.
- National Security: Providing sovereign, resilient VLEO capabilities for critical infrastructure and defence missions.

Q Space sustainability has become a major concern globally. Could ultra-low Earth orbit help address challenges such as orbital congestion and space debris compared to conventional satellite constellations?

A VLEO escapes the issue of space debris, making it inherently more sustainable than traditional orbits. At these low altitudes, satellites that reach the end of their life or experience a failure will naturally de-orbit and burn up in the atmosphere within weeks instead of decades due to atmospheric drag. This prevents the build-up of "zombie" satellites and long-term space debris that plagues higher, more congested orbits.

Q Europe's space ecosystem is evolving rapidly with increasing private-sector innovation. How do you assess Europe's competitiveness in the global NewSpace economy, and where does NewOrbit fit into that future?

A NewOrbit is a European space tech champion intended to anchor the continent's sovereign VLEO capability. While Europe has historically relied on American launch and infrastructure, NewOrbit is building a globally strategic asset from Europe. With validation from Germany's SPRIND and our NEO Production Complex in Reading - which will be Europe's largest dedicated VLEO facility - we are ensuring that Europe leads, rather than follows, in this next foundational shift of the space industry.

Long-Term Vision

Our goal is to commercialise VLEO at scale, making it the primary orbit for high-performance Earth observation and connectivity, and establishing NewOrbit as the leading provider of commercial VLEO satellites globally.

Q Looking ahead, what milestones should the industry watch for from NewOrbit Space in the coming years, and what is your long-term vision for the company's role in shaping the future of space infrastructure?

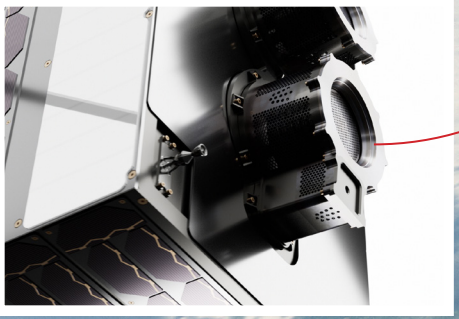
A The key milestones on our roadmap include:

2027

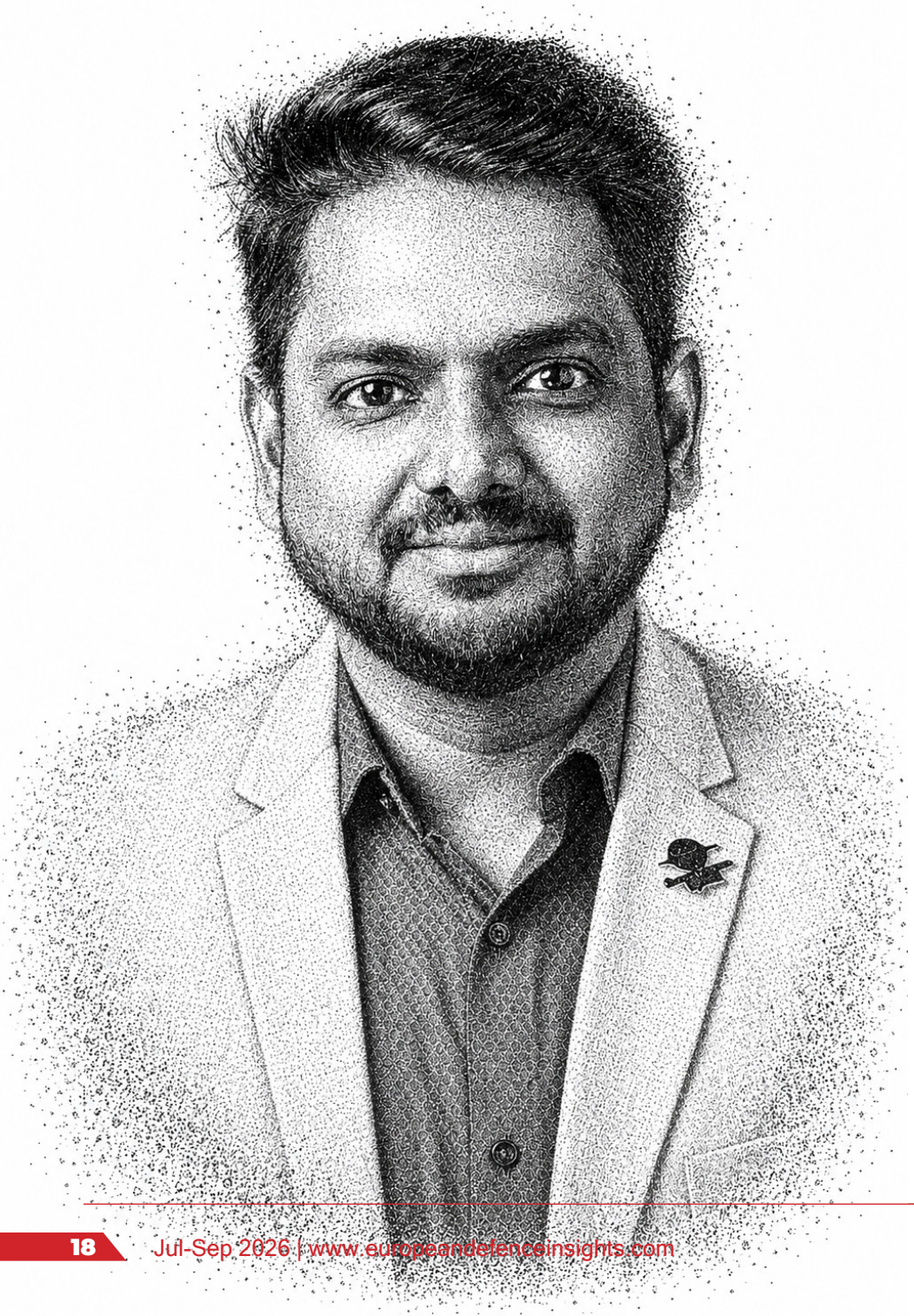
The opening of our NEO Production Complex in Reading, scaling to a capacity of several satellites per week.

2028

The launch of our first commercial satellite, marking the first time commercial customer payloads have ever been flown at 200–300km.



INDIA'S BOLD MISSION TO CLEAR ORBITAL DEBRIS AND BUILD A SAFER, SUSTAINABLE FUTURE IN SPACE



Chiranjeevi Phanindra

Founder & CEO
Cosmoserve Space

Cosmoserve

Q Vikram-1 marked a major milestone for India's private space sector. What did it mean for Cosmoserve to have Embrace fly on this historic mission, and what does it say about India's growing role in the global space industry?

A Vikram-1's maiden flight, Mission Aagaman, gave a young company like us, one that only began operations in August 2025, the opportunity to conduct a space mission within our first year. There are very few to no launch opportunities available globally until early 2028, so this was a rare window for us. It allowed us to build our technologies and test them on the ground and in space, and to learn directly from the flight. Unless launch opportunities are available, technology development remains limited to ground testing alone. With the successful maiden flight of Vikram-1, the whole world is now watching India.

Q Orbital debris is becoming one of the biggest challenges facing the space economy. How is Cosmoserve's technology helping make space operations safer and more sustainable?

A Thousands of dead satellites and millions of fragments are already posing a serious threat to operational satellites. With close to a million more satellites proposed for launch over the next decade, this situation is expected to get only worse. Unless we address this problem now, future generations will not have a safe and secure environment in orbit, leading to no navigation, no communication, no disaster warning, and no rescue operations. At Cosmoserve Space, we are building active space debris removal solutions to clear the junk from space and create a sustainable environment for future generations.

Q The proposed EU Space Act and the ESA Zero Debris Charter are setting new expectations for responsible space activities. How is Cosmoserve aligning its technologies with these emerging global sustainability standards?

A Cosmoserve welcomes the EU Space Act and the ESA Zero Debris Charter. Under these frameworks, satellite operators will not be allowed to leave their dead or defunct satellites in space for long durations. They will either need to use their own deorbiting systems to comply with the regulations or use the services of companies like ours to help remove their dead satellites. At Cosmoserve Space, we are building a capture system that does not require any compatible adapters on customer satellites, meaning we will be able to capture almost anything in space, whether it's a future dead satellite, a legacy object such as a rocket body, or a fragmented piece of debris.

Q Space sustainability requires international cooperation. What role can Indian companies like Cosmoserve play in shaping global standards and working with international partners?

A Before a customer's object can be approached in space, there needs to be a contract between the customer and the service provider to conduct the capture and removal. In addition, the two countries involved need an agreement or MoU to permit such operations in space. This makes international cooperation all the more important for space sustainability. We are working with space-faring nations around the world, and we are also a member of the International Organization for Standardization (ISO), where we advocate for standardization in future satellites to help create a sustainable space environment.

Q India is known for innovation and cost-effective engineering, while Europe is leading on space governance and sustainability. Where do you see the biggest opportunities for India-Europe collaboration in areas such as in-orbit servicing and active debris removal?

> At Cosmoserve Space, we are building active space debris removal solutions to clear the junk from space and create a sustainable environment for future generations.

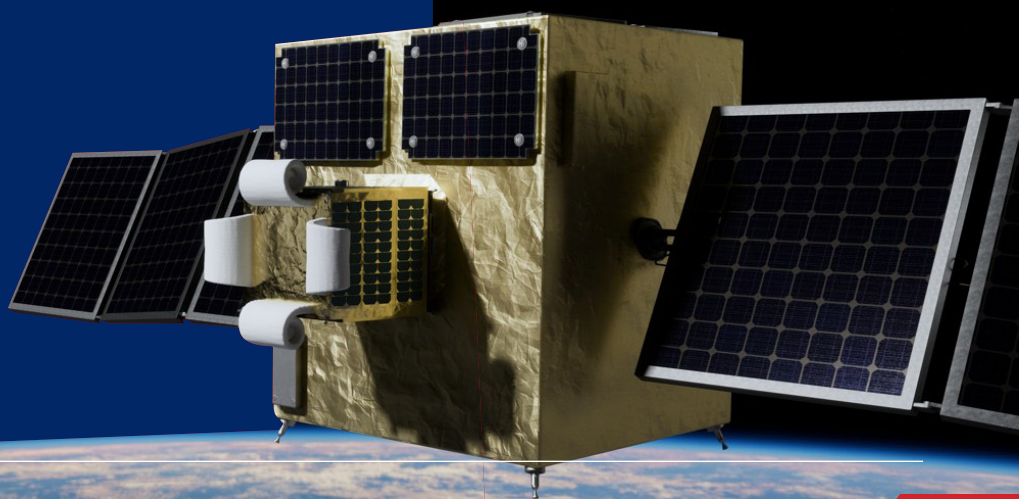
A ISRO and ESA have collaborated on several space missions, proving that cost-effective engineering combined with cutting-edge technology can deliver great missions for humankind. Europe's focus on space sustainability opens the door to further collaboration between the two regions.

Q As governments and satellite operators place greater emphasis on sustainability, do you see it becoming a competitive advantage as well as a regulatory requirement? How is Cosmoserve preparing for this shift?

A Space sustainability has become an essential regulatory requirement. Given the scale of satellite launches projected in the coming years, we anticipated this shift early and have aligned our technologies accordingly.

Q Looking ahead, what is your vision for Cosmoserve's contribution to the global space economy, and how do you see India's private space sector helping build a safer and more sustainable future in space?

A The projected $1.8 trillion space economy by 2035 will only be possible if there is room for new satellite operators to launch their satellites, and that requires removing space debris. Like rockets, debris removal is an essential technology for the continuity of space operations and the space economy. The space debris removal market is expected to take off by 2030, and by then our technology demonstrations in space will be complete, positioning us to capture a major share of that business.



BERLIN-BRANDENBURG IS EMERGING AS A KEY EUROPEAN SPACE HUB

Nico Knobel

M.Sc, Aerospace Engineering - Project Manager Space Berlin International

BBAA Berlin-Brandenburg Aerospace Allianz e.V.

Berlin-Brandenburg is emerging as a key European space hub. In this interview, Nico Knobel discusses its NewSpace ecosystem, global ambitions and collaboration opportunities with India. Speaking with Sagar Singamsetty, Editor, Europe Defence Insights, he shares the vision for its future growth.



Q Berlin-Brandenburg is home to more than 90 aerospace and space stakeholders. What makes the region particularly attractive for international space companies, startups and technology partners looking to establish a presence in Europe?

A Berlin-Brandenburg combines a strong scientific and technological foundation, an established industrial ecosystem, a dynamic New Space community and the international character of a capital city.

A key pillar is Technische Universität Berlin. Berlin has more than 35 years of continuous experience in satellite development at TU Berlin. The university developed Germany's first university satellite, TUBSAT-A, launched in 1991. Since then, TU Berlin has developed and launched 32 satellites and today ranks among the world's leading universities in student and research-led microsatellite development. This creates technological expertise and a steady pipeline of highly qualified engineers and researchers.

Around this scientific foundation, a diverse industrial ecosystem has developed. Exolaunch has grown into a globally active space company from Berlin, providing launch, deployment, mission management, satellite integration and in-space logistics services. Berlin Space Technologies is developing industrial-scale satellite manufacturing capabilities in Berlin.

Further down the value chain, Astro- und Feinwerktechnik Adlershof has more than 30 years of experience in aerospace components and systems. LiveEO develops AI-based solutions using satellite data. Younger companies such as Quantum Galactics and NEUROSPACE add capabilities in secure satellite communications, robotics and satellite technologies for terrestrial, lunar and deep-space applications.

International companies also see Berlin as an attractive base. Planet, for example, has established Berlin as the centre of its European operations, including space systems, engineering, product development and mission operations.

Finally, For an international company, Berlin-Brandenburg is therefore not just a place to locate an office. It is an ecosystem where you can develop technology, recruit talent, find industrial partners, access research capabilities and connect to international markets.

Q SPACE Berlin International was created to strengthen the international profile of the Berlin-Brandenburg space ecosystem. What gaps or challenges are you trying to address through the initiative, and how do you measure whether these international activities are creating real business opportunities?

A The biggest gap is simple: Berlin has a stronger space ecosystem than its international visibility would suggest. Within Germany, the region is increasingly recognised as an important space location. But outside Germany, many companies and institutions still do not immediately associate Berlin with a strong space industry. SPACE Berlin International addresses this gap. The project is carried by the Berlin-Brandenburg Aerospace Allianz and funded by the Berlin Senate Department for Economics, Energy

and Public Enterprises and the European Union. Its purpose is to strengthen international visibility, connect regional companies and research institutions with international partners and help them access new markets.

India is currently a major priority. In September, we will travel to Bengaluru and Hyderabad with a delegation from the Berlin space ecosystem, including participation in the Bengaluru Space Expo, company visits, matchmaking and meetings with industry, research and political stakeholders. We are also preparing activities with Poland. Networking is a long-term process. A contact made today may lead to a technology partnership, investment, market entry or joint project years from now.

Q We therefore look at several indicators: Are companies asking for follow-up meetings? Are international partners approaching the Berlin ecosystem? Are concrete business discussions developing? Are relationships continuing after a delegation or trade fair? Are institutions and political stakeholders becoming interested in deeper cooperation?

A For a project that only started at the beginning of 2026, we already see encouraging signs. We are not interested in collecting contacts for their own sake. The real measure of success will be whether today's international contacts become tomorrow's projects, investments, technology partnerships and market opportunities.

Q India has become a major focus of SPACE Berlin International, including your engagement with the Indian NewSpace ecosystem. What have you learned from your interactions with Indian companies, and where do you see the strongest opportunities for collaboration between Berlin-Brandenburg and India?

A What has impressed me most about the Indian NewSpace ecosystem is its willingness to move quickly and take calculated risks.

There is a entrepreneurial mentality in India. Companies are often prepared to test an idea, build something and go to market rather than waiting



> Berlin-Brandenburg has the technology, talent and industrial ecosystem. The next challenge is ensuring that the rest of the world recognises its true capabilities.

until euncertainty has been eliminated. I think that is something Germany can learn from.

Germany has enormous technological knowledge, industrial experience and highly qualified people. But we have also benefited from the success of previous decades. The risk is becoming too comfortable with what we have already achieved. In space, New Space, innovation is accelerating. We need more speed, willingness to experiment and more courage to take risks.

India is demonstrating exactly that. The Indian government has also significantly opened the space sector to private participation. The FDI framework allows up to 100% foreign investment in the space sector, with different automatic-route thresholds depending on the activity.

The relationship is genuinely reciprocal. Indian companies looking towards Europe can benefit from Berlin's established industrial and research structures, specialised engineering capabilities and highly qualified workforce. The European single market offers access to a huge economic area.

Conversely, European companies can benefit from India's rapidly growing market, engineering capabilities, cost competitiveness and increasingly sophisticated New Space ecosystem.

I do not see this as one side providing technology and the other a market. I see significant potential for both sides to contribute technology, capital, talent and market access.

Q Your team has already participated in activities involving Indian space companies at ILA Berlin and is preparing a delegation to Bengaluru and Hyderabad in September 2026. What concrete outcomes would you like to see from this delegation beyond networking and meetings?

A First, we want to make Berlin visible as a space location in India. We will have a dedicated Berlin presence at the Bengaluru Space Expo and want to present the Berlin-Brandenburg ecosystem: satellite manufacturing, Earth observation, launch and mission services, components, research capabilities and a strong New Space community.

Second, we want to create company-to-company relationships that can develop into actual cooperation. That could mean technology partnerships, supplier relationships, joint development projects, market access or investment.

Third is institutional cooperation. In addition to company-level meetings, we would like a productive exchange with the Department of Scientific and Industrial Research, DSIR, and explore opportunities for a more structured basis for cooperation. DSIR promotes industrial R&D, technology development and technology transfer and works at the interface between industry, academia and research institutions.

Finally, we want the delegation to be the beginning of something, rather than a five-day trip that disappears into everyone's calendars afterwards.

Our objective is to return with clearly identified follow-up opportunities, assign responsibilities and build relationships that can develop over the following months and years.

Q Berlin and India have complementary strengths across areas such as satellite technologies, Earth observation, propulsion, space applications and NewSpace. Where do you see the greatest potential for joint ventures, technology partnerships, investment or market

access between the two ecosystems?

A I see opportunities across almost the entire space value chain. Satellite manufacturing is one obvious area. Berlin has strong capabilities in satellite systems, components and industrial production. Berlin Space Technologies, for example, is developing mass-manufacturing capabilities for satellites in the 50–500 kg class, while Berlin's wider ecosystem covers components, subsystems, structures, testing and mission services.

India has a dynamic private space sector and a growing number of companies working on satellites, launch vehicles, propulsion and space applications. That creates opportunities for joint development and supply-chain partnerships.

Earth observation is another strong field. Berlin has companies such as LiveEO that specialise in turning satellite data into commercial intelligence using AI, while Planet has made Berlin a major European centre for its space systems and operations. India has a rapidly developing Earth observation ecosystem of its own. Combining Indian capabilities in satellite and data infrastructure with European markets and applications could create interesting opportunities.

Propulsion and launch technologies are another area where I see potential. India has developed considerable capabilities and a growing private launch sector. Berlin-Brandenburg has a strong network of aerospace engineering companies and research institutions.

We should not approach this as a generic "Germany meets India" exercise. We need to identify where the technological capabilities, commercial interests and market requirements actually fit together.

Q For international startups and SMEs, entering a new European market can be difficult. How can SPACE Berlin International and BBAA help foreign companies navigate Germany's business environment, research ecosystem, funding opportunities and industrial partnerships?

A A strong regional partner network is essential. SPACE Berlin International and the BBAA can provide the industry-network and orientation. We know the regional space ecosystem and can connect international companies with relevant companies, universities, research institutions and other stakeholders.



> The real measure of success will be whether today's international contacts become tomorrow's projects, investments, technology partnerships and market opportunities.

We cannot do everything ourselves. We have a strong partner in Berlin Partner for Business and Technology, which has extensive experience supporting international companies with market entry and establishment in Berlin. It provides support ranging from location decisions and funding information to access to qualified personnel, research institutions, technology transfer and business networks.

If an Indian startup tells us, "We are looking for a German industrial partner for our satellite technology," we can identify relevant companies and make introductions. If the question becomes how to access European research programmes or funding, we can bring in the appropriate regional and European partners.

Our role is not to replace existing economic development structures. Our role is to act as a bridge into the space ecosystem and make the right connections happen faster.

Q Looking toward 2030, what role do you want Berlin-Brandenburg to play in the European and global space economy, and what would success look like for SPACE Berlin International in building lasting international partnerships?

A My ambition is straightforward: I want Berlin-Brandenburg to have the international reputation that its technological capabilities already deserve.

By 2030, I would like the region to be recognised internationally as one of Europe's leading locations for satellite development, satellite manufacturing and Earth observation.

We already have the scientific foundation, companies, engineers, research institutions and an increasingly strong New Space ecosystem. The challenge is to turn that technological strength into international visibility and sustained economic impact.

I would like Berlin-Brandenburg to be a place where international companies do not come because Berlin is an attractive city, but because they specifically need the capabilities that exist here. If a company or a government says, "We want to build a satellite or a satellite constellation. Where should we go in Europe?", Berlin should be one of the first answers.

For SPACE Berlin International, success would not mean having a large international contact database or participating in a certain number of trade fairs.

Success would mean lasting partnerships. It would mean Berlin companies entering new markets, international companies establishing relationships in Berlin, joint technology projects being created, investments being made, research collaborations developing and international institutions actively seeking cooperation with the Berlin-Brandenburg ecosystem.

I would like the region to be able to say, without hesitation: we are one of the world's leading locations for satellite technology and Earth observation. And, perhaps most importantly, I want the rest of the world to know it too.

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THE RECKONING: CAN EUROPE BUILD WHAT IT IS BUYING?

Europe is spending more on defence than at any point since the Cold War. Factories are expanding, new funds are being launched and governments are rediscovering the language of sovereignty. Yet the recent wave of drone incidents across European airspace and critical infrastructure has exposed a more complicated problem. The technologies and threats are converging faster than the institutions designed to respond to them. For Europe's defence industrial ecosystem, the question is no longer whether it can mobilise capital. It can. The harder question is whether it can organise that capital around the realities of modern conflict, where a small uncrewed aircraft can be a consumer product, a commercial tool, a surveillance platform, an aviation safety risk or a weapon, often within the same supply chain.

Sagar Singamsetty
Editor, European Defence Insights



When the Sky Becomes a Jurisdiction Problem

In October 2025, Munich Airport shut down twice within twenty-four hours. Not because of weather or industrial action, but because of drones that could not be positively identified. Copenhagen and Oslo had already experienced similar disruption. Vilnius would follow. Across Europe, what initially looked like isolated incidents raised a more uncomfortable question. When an unidentified drone appears over or near critical infrastructure, who is actually responsible for dealing with it? The answer is not always straightforward. An airport operator may detect the drone. Civil aviation authorities may be responsible for the safety of the airspace. Police may investigate a criminal offence. Intelligence services may be required to work out who is behind it. The military may hold the capabilities needed to respond to a sophisticated threat. And if the infrastructure has strategic significance, NATO has an interest too.

That complexity became even more apparent with the incident at Leipzig/Halle Airport in August 2026, where an explosives-carrying drone was discovered near a Ukrainian cargo aircraft. German authorities, backed by a US intelligence assessment, have since attributed the attempted attack to Russia's GRU military intelligence directorate; Moscow rejects the allegation. Leipzig/Halle is not simply another civilian airport. It is a major European freight hub and a logistics node NATO relies on to move armaments toward Ukraine. The distinction matters. A drone disrupting an airport is an aviation and security problem. A drone carrying explosives near strategically significant infrastructure belongs to a different category altogether. It raises questions of sabotage, critical infrastructure protection, national security and military defence all at once.

This is increasingly the challenge confronting Europe. The continent does not simply have a drone problem. It is watching the boundaries disappear that once separated aviation from defence, civilian infrastructure from military infrastructure, commercial technology from strategic capability, and internal security from collective defence. The technology has converged. The threat has converged. Europe's response is still catching up.

The Money Is Moving

That is the tension at the centre of Europe's strategic reset. Brussels rarely uses the word rearmament. Its preferred vocabulary is sovereignty, resilience, strategic autonomy and readiness. Yet the scale of what Europe is now attempting is unmistakable. The EU's Readiness 2030 agenda aims to mobilise up to 800 billion euros in additional defence spending, anchored by the Security Action for Europe (SAFE) instrument, which offers up to 150 billion euros in loans for joint



procurement of drones, counter-drone systems, air and missile defence, maritime security and space capabilities. EU-wide defence expenditure reached 418 billion euros in 2025, a twenty percent rise on the year before, and is projected to hit 454 billion euros in 2026. Germany alone has allocated roughly 82.7 billion euros to the Bundeswehr for 2026, topped up by its Zeitenwende special fund. The first SAFE disbursements have already reached member states, with Bulgaria, Latvia and Romania receiving their initial tranches this year. This is not a Europe that has failed to grasp the scale of the challenge. On the contrary, the past two years have seen an extraordinary acceleration in defence spending, industrial policy and security legislation.

The harder question is whether Europe is organising these efforts around the realities of modern conflict. For European defence primes and SMEs, these instruments create a larger, more predictable demand signal, but only if procurement pathways can translate budget envelopes into deployable capabilities at speed.

The drone is perhaps the clearest illustration of the problem. A small uncrewed aircraft can be a consumer product, a commercial tool, a surveillance platform, an aviation safety risk or a weapon. The same underlying technologies increasingly rely on artificial intelligence, satellite communications, navigation systems and cloud infrastructure. A drone attack on an airport can therefore expose vulnerabilities extending far beyond the runway. Europe's response has begun to reflect this reality. The EU's Drone and Counter Drone Security Action Plan recognises that the threat extends across airports, borders, public spaces and critical infrastructure, and calls for stronger detection, preparedness and civil-military coordination. But recognising convergence and governing it are different things. The difficulty is not simply technological. Europe has sophisticated radar systems, sensors, electronic warfare capabilities, aerospace companies and a rapidly growing dual-use technology sector. The more fundamental problem is one of authority and organisation.

Who has the legal authority to act against a drone over civilian infrastructure? Under what circumstances can a counter-drone system interfere with communications or navigation? How are police, military and aviation authorities supposed to coordinate during a fast-moving incident? What happens when a civilian airport is also a strategic logistics hub? These questions get harder still when the threat cannot immediately be classified. Europe's institutional architecture was largely designed around distinctions that made sense in an earlier era. Aviation safety was one domain. Internal security was another. Defence and collective security ran through different institutions. Space, digital infrastructure and industrial policy developed along separate tracks. Modern threats are not respecting those boundaries.

The Leipzig/Halle incident turns a familiar aviation security scenario into a hybrid attack template. Dual-use logistics hubs become high-value targets. Civilian airframes support military supply chains. Small, commercially available drones carry military-grade explosives. For European OEMs and dual-use startups, this widens the market for counter-drone systems, hardened infrastructure and resilient command and control links, but only if certification, cross-border qualification and civil-military coordination can keep pace with how fast the threat is evolving.

Governing a World Without Clean Boundaries

The same convergence runs through the wider European security agenda. Military mobility increasingly depends on civilian infrastructure. Moving equipment and personnel across Europe requires airports, ports, rail networks and roads that were not really built for a sustained military tempo. The EU's Military Mobility 2.0 initiative aims to fix fragmented national procedures and speed up cross-border movement. The strategic logic is clear. The implementation timeline is longer.

The EU Space Act presents another version of the same challenge. Europe wants a more coherent regulatory framework for commercial space activity while strengthening security, resilience and strategic autonomy in orbit. At the same time, IRIS^2 is meant to give Europe more secure communications infrastructure. But space is no longer a domain that can be considered separately from events on the ground. Satellite communications, positioning and Earth observation increasingly support both civilian and military operations. Autonomous systems, logistics networks and modern intelligence all depend on space-enabled infrastructure. The same is true of artificial intelligence and cloud computing. Europe's worry about relying on a handful of non-European hyperscalers is not simply a question of digital industrial policy. Data processing and computing capacity increasingly underpin satellite ground segments, intelligence analysis, autonomous systems and counter-drone technologies.

"What we are watching is not three sectors developing in parallel, it is one continuum. Aviation safety, space infrastructure and defence procurement now sit on the same technology stack, and the EU's own institutional response, from the Space Act to Military Mobility 2.0 to the Drone and Counter Drone Action Plan, is quietly admitting as much. The next flashpoint, whether in orbit, over a runway or on a factory floor, will not respect the lines that separate these institutions. If Brussels keeps funding convergence while governing

through separation, the actors testing Europe's seams will keep finding the gaps faster than the EU can close them."

— Sagar Singamsetty, Editor, European Defence Insights

The conclusion is uncomfortable but hard to avoid. Strategic sovereignty cannot be built one sector at a time. Europe is starting to understand this. Its policies increasingly connect defence, technology, industrial capacity, space and infrastructure. What is less certain is whether the institutions responsible for implementing those policies can move at the same speed.

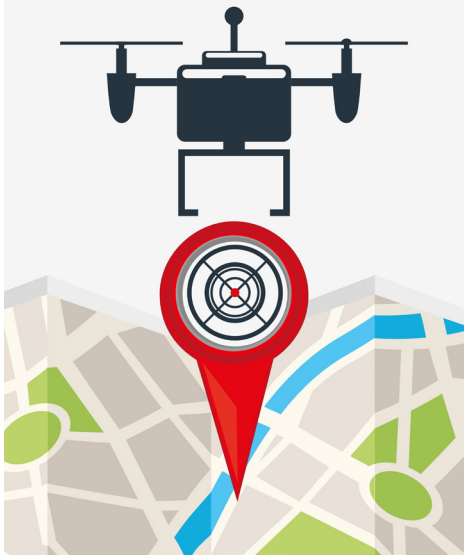
Germany's own response offers an interesting contrast. Its new Bundeswehr innovation centre near Munich was built to shorten the distance between technological development, testing and deployment. Unlike a European legislative initiative, it did not need years of negotiation between multiple institutions and governments; it was an organisational answer to an operational problem. That distinction may matter more than it first appears. Europe's problem is not that it moves slowly across the board; its recent spending decisions prove otherwise. The real challenge is knowing when a problem needs a new legal framework and when it needs an institution that can act within months rather than years.

Industry, meanwhile, is already adapting. The line between civilian aerospace and defence keeps blurring. Airbus Defence and Space has backed a major dual-use technology fund. European companies are expanding production of drones and autonomous systems. Rheinmetall's order backlog has reached unprecedented levels. Companies such as Croatia's Orqa are scaling up manufacturing as demand for uncrewed systems grows. The industrial opportunity is real: Europe has established aerospace and defence companies, a sophisticated engineering base and an increasingly active ecosystem of startups working on artificial intelligence, autonomy, sensing and surveillance.

The challenge is connecting these capabilities to procurement systems that have historically been slow, fragmented and organised along national lines. For European primes and emerging dual-use firms, the opportunity is clear: a growing pipeline of programmes in drones, counter-drone, air and missile defence, secure communications and space-based services. The bottleneck is just as clear: certification timelines, fragmented national qualification regimes and procurement processes that still reward the lowest price over speed, resilience and interoperability. Companies that treat regulatory engagement, cross-border certification and civil-military integration as part of their competitive strategy will be best placed to turn Europe's spending surge into lasting industrial capability.

Learning to Move Faster

Ukraine offers an important lesson. Necessity has produced one of the fastest innovation cycles in modern military history. Drones are designed, deployed, modified and redesigned in response to changing battlefield conditions faster than traditional defence procurement can keep up with. Europe cannot and should not try to recreate the circumstances that produced this environment. But it can learn the underlying principle: the distance between spotting a problem, building a solution, testing it and using it has shrunk dramatically. That is the lesson worth borrowing.



The United States has pursued a similar approach through initiatives such as Replicator, which aimed to accelerate the fielding of large numbers of low-cost autonomous systems. That programme has also shown that money and political attention alone do not remove bureaucracy. Fast programmes need clear ownership, sustained leadership and institutions that stay focused on delivery long after the initial announcement. India offers a different example: its defence modernisation is closely tied to Atmanirbhar Bharat and the drive to build greater domestic industrial capability. Europe and India approach the problem differently, but the underlying logic is familiar; depending on outside suppliers can become a vulnerability. Yet industrial sovereignty and speed are not the same achievement. Europe's model is arguably harder than either the American or Indian approach because it seeks to coordinate 27 national systems through collective financing, common rules, and shared industrial priorities. That fragmentation is also its political reality. So the question is not whether Europe can simply copy another model. It is whether it can shorten the distance between recognising a strategic problem and delivering an operational capability.

For industry, the implications are significant. Companies that treat certification, cross border qualification and regulatory engagement as part of their competitive strategy are likely to come out ahead. For dual-use startups, the task is no longer just building innovative technology but proving it can move from prototype to deployment. For policymakers, the challenge may be even more basic. Europe does not necessarily need another major strategy. It needs clarity about who acts, under what authority and how quickly. It needs testing and certification pathways that can keep pace with fast evolving technologies. It needs stronger links between civilian infrastructure operators, security authorities, armed forces and industry. And it needs to recognise that some of the most important vulnerabilities are emerging exactly where these systems intersect. Airports are one example. Ports are another. Energy infrastructure, communications networks, data centres and satellite ground stations all sit in the same increasingly blurred space between civilian life and strategic security. The new front line is not necessarily at Europe's borders. It can run through the infrastructure that modern economies and armed forces depend on.

The Real Question

That is why the recent drone incidents matter beyond aviation. They reveal something larger about

the nature of security in Europe. A threat can emerge in civilian airspace and quickly become a question of national security. Commercial technology can become military capability. Digital infrastructure can become strategically indispensable. A logistics hub can become a target because of the role it plays in supporting allied operations.

Here is a forward bet worth making. The next jurisdictional crisis will not happen over an airport. It will happen in orbit. Europe has spent the past year building emergency architecture for drones largely because ground-based incidents are visible, attributable and politically legible; a downed aircraft, a shut runway, a piece of wreckage on a tarmac. Space offers none of that legibility. A jamming or spoofing incident against a dual-use satellite, one carrying both commercial and military payloads, would strip away the fiction that the EU Space Act, IRIS² and Europe's defence institutions can be governed on separate tracks. When it happens, expect the same confusion that followed Munich and Leipzig/Halle: an operator without clear authority to act, a Commission service without an explicit mandate to respond, and member states waiting for someone else to move first. The difference is that in orbit there is no black box to recover and no wreckage to point to. Just degraded signals and quiet outages, explained away individually until they no longer can be.

Europe's strategic reset is real. The money is real. The industrial mobilisation is real. The political language of sovereignty is no longer confined to speeches. But the next phase will be harder. It will require Europe to stop treating convergence as a future trend and start organising around the reality that already exists. The drone is simply the clearest symbol of that reality; it sits at the intersection of aviation, technology, security, infrastructure and defence. So do many of the other systems Europe now considers strategically indispensable. The question facing Europe is not really whether it can build what it is buying. It can. The harder question is whether its institutions can become as interconnected, adaptable and responsive as the technologies and threats they are now expected to govern.

For European Defence Insights readers, ministers, generals, CEOs and innovators, the task is clear: match institutional design to the converged threat environment that already exists, and turn Europe's financial mobilisation into operational resilience.



COUNTERING TOMORROW'S DRONE THREATS REQUIRES SPEED, INTEGRATION, AND COLLABORATION



Paul Norry

from Leonardo's Falcon Shield Team

LEONARDO

Q **The rapid proliferation of uncrewed aerial systems has fundamentally changed the threat landscape. From your perspective, what are the biggest Counter-UAS challenges facing armed forces today?**

A There are four main challenges that face armed forces trying to counter the threat that drones pose:

1. Pace of change: Drone technology is constantly being adapted and re-adapted to keep ahead of developing counter drone capabilities. Those of us in the 'C-UAS battle' must out-pace this adaptation, anticipating future developments. To do this, the operational feedback loop must be as short as possible; that means having our engineers as close to operators as possible - even if that means having to



deploy alongside them. This is something that we have pioneered; our engineers and field service representatives (FSRs) have routinely deployed alongside our armed forces partners, not only to ensure optimal system performance, but also to make upgrades in the field as drone technology develops and requirements change.

2. Proliferation: The relative low cost and low tech of UAS mean that they can be produced in huge numbers in a dispersed network of manufacturers. This makes targeting the supply chain more problematic. Additionally, mass drone attacks of mixed capability including intelligence, surveillance and reconnaissance (ISR), command and control (C2), ground attack, and decoy aim to confuse operators and overwhelm C-UAS systems. Being able to distinguish and prioritise accurately and efficiently is the key to effective defence against such threats.

3. Integration: Given the pace of change and the proliferation of drones in the modern battlespace – whether at home or overseas – rapid integration of new sensor and effector technology through open architecture C2 software is essential to staying ahead of and defeating the threat. There is no single solution to the 'drone dilemma', and no single manufacturer has all the answers. C2 software, such as Falcon Shield's UK HYAS system must be open by design, able to facilitate integration of new tech in hours – not days or weeks – without any fuss.

> There is no single solution to the drone dilemma. Open architecture, rapid integration, and close collaboration with operators are essential to staying ahead of evolving threats.

4. Attribution: The Russo-Ukraine conflict offers us many lessons, but not all conflicts will have the same characteristics. For example, adversaries may look to shape the battlespace through sub-threshold, 'grey-zone' tactics. Small drones provide an ideal platform to create havoc in 'peaceful' airspace by interrupting civil air traffic, undermining public confidence and costings tens of millions of pounds in lost revenue. This type of interference is designed to be non-attributable meaning that governments and militaries cannot react overtly at anything other than the tactical level.

Q Leonardo's Falcon Shield has been operationally deployed by the Royal Air Force and the Canadian Armed Forces. What key capabilities differentiate Falcon Shield from other Counter-UAS solutions currently available in the market?

A The first differentiator is Falcon Shield's 'brain', the C2 system. The RAF and Canadian Armed Forces use HYAS, which fuses data from all its sensors to provide a single, very precise geo location. HYAS then turns this information into targeting data, which is fed into whichever effectors are connected. These effectors could be kinetic ("hard kill") and

non-kinetic ("soft kill"), offering operators a prioritised target list and suggesting the optimal effector to defeat the threat most efficiently. At the recent NATO Technical Interoperability Exercise (TIE), Falcon Shield was declared the overall winner. During NATO TIE, HYAS was able to integrate 46 new 'sense, effect and C2 edge nodes' – essentially integrating new complementary systems seamlessly into the Falcon Shield ecosystem. The ever-evolving UAS threat means that rapid integration is they key characteristic that enables operators to stay ahead of the threat. Through HYAS, Falcon Shield evolves with the threat by integrating the latest capability developments and advanced technologies.

Second, Falcon Shield's electrooptical and infrared (EO/IR) capability, NERIO Ultra Long Range (ULR), offers unrivalled range and clarity, enabling commanders and operators to positively ID targets at increased ranges, affording them more decision-making time. The UK military version of Falcon Shield operated by the Royal Air Force is called Orcus. For the football fans amongst us, Nerio ULR has been nicknamed by its RAF Regiment operators as the 'Harry Kane' ('the superstar') of the Orcus C-UAS capability.

Finally, the C-UAS team at Leonardo has been working in partnership with armed forces' operators since 2012. These partnerships are invaluable in shortening the feedback loop and updating the system; not only to keep up with the threat, but also to reduce cognitive burden on the end user. A lot of our recent developments have been aimed at making Falcon Shield even easier to use, reducing stress on the operator, essential during the intensity of operations they have been experiencing in recent months.



> Collaboration between governments, industry, armed forces, and academia is critical. To keep pace with evolving drone threats, continuous long-term investment is essential.

Q Recent conflicts have demonstrated the growing use of low-cost drones in contested environments. How has operational experience influenced the evolution of Falcon Shield to address emerging and increasingly sophisticated drone threats?

A The Falcon Shield team has the privilege of working extremely closely with the end user community. In fact, some of our UK team members are former RAF Regiment operators and planners, bringing with them a vast amount of operational experience. This strong relationship enables an open, honest and short feedback loop which means that our team can rapidly introduce technological upgrades and conceptual developments. Much of our Test and Evaluation activity is undertaken in partnership with our end users; operators and engineers working hand-in-glove. It also serves as a reminder to those of us in industry that the work we're doing really does make a difference!

Q Modern Counter-UAS operations require the seamless integration of sensors, command-and-control systems, and effectors. How does Leonardo's layered approach help military operators detect, identify, track, and defeat a wide range of aerial threats?

A Falcon Shield is a sensor and effector agnostic ecosystem that provides and enables the full C-UAS kill chain; Detect, Track, Identify and Defeat (DTID). It is configurable to suit the environment, geography, budget and, of course, threat. Integration is the key to an effective layered defence against hostile UAS. Falcon Shield's C2 system is the key enabler for integration meaning that a wide range of sensors can all be integrated with relative ease. This includes 14 different radars so far, as well as non-kinetic effectors such as RF jammers, protocol manipulators, GNSS denial, and kinetic effectors from canons to interceptors and missiles. At Leonardo, we believe in the 'golf bag approach', giving operators the tools, time and capacity to select the most appropriate effector to defeat whatever threat they face.

Q NATO nations are placing greater emphasis on protecting critical infrastructure, military bases, and deployed forces from drone attacks. How do you see Counter-UAS requirements evolving across Europe and allied nations over the next five years?

A The proliferation of low-cost drones means that effectors must address the cost imbalance. In the homeland environment, non-kinetic ("soft kill") effectors will continue to have primacy and must offer assurance to the civil



authorities that any effectors are safe to use in cluttered and congested environments without causing collateral damage. During outright conflict, non-kinetic effects will still have their place – particularly when considering magazine depth, but sensors and kinetic effectors ("hard kill") will need to have increased ranges. The sheer scale of the drone threat will see increased use of autonomy in C-UAS capabilities, although legal and societal considerations mean that a human is always going to be making the final engagement.

Q Artificial intelligence, electronic warfare, and autonomous technologies are reshaping modern air defence. How is Leonardo integrating these advanced technologies into its Counter-UAS ecosystem to stay ahead of evolving threats?

A At its core, Leonardo is a technology company with a long history of developing cutting-edge technologies and integrating them into existing systems to create novel and innovative capabilities. The C-UAS marketplace is still in its infancy, but Leonardo has been part of it from its inception. The company has a strong pedigree in providing electronic warfare (EW) capabilities to armed forces around the world, and it has applied this expertise and adapted its technology for the 'C-UAS fight'. Falcon Shield harnesses Artificial Intelligence (AI) to continuously improve detection, tracking and identification success rates, significantly reducing 'false-positives' and enhancing targeting data. The Falcon Shield ecosystem has autonomy built into its C2 software, providing commanders with the flexibility to tailor the system's operational footprint based on the threat at hand. In short, this autonomous functionality enables operator numbers to be scaled back or increased dependent on the operational context at the time. Ultimately, integrating these advanced technologies requires a robust and open system architecture, allowing smooth and rapid introduction of new subsystems and software enhancements; and Leonardo's C2 system gives us that.

Q Looking ahead, what is Leonardo's long-term vision for Counter-UAS capability, and what message would you like to share with European defence organisations as they prepare for the next generation of uncrewed aerial threats?

A Leonardo's long-term vision for C-UAS remains unchanged since we entered this capability area: we strive to offer the most effective, reliable, full C-UAS kill-chain (Detect, Track, Identify, Defeat). We will continue to integrate new, advanced technologies while understanding that we cannot do it all on or own, which is why we partner with numerous SMEs from the UK, Europe and beyond. Our message to European defence organisations would be that collaboration – between governments, industry, armed forces and academia – is critical. To keep pace with evolving drone threats, long-term, continuous, steady investment is required, and industry will respond.

SWITZERLAND'S SPACE ECOSYSTEM: INNOVATION BEYOND NEUTRALITY

Colonel Ludovic Monnerat

Commander - Swiss Space Command

In this exclusive interview with European Defence Insights (EDI), Colonel Ludovic Monnerat, Commander of Swiss Space Command, speaks with Sagar Singamsetty, Editor, about Switzerland's evolving space strategy, the changing balance of power in orbit and the growing importance of space capabilities for defence and national resilience.



Q Space has become a strategic domain for security, resilience, and economic growth. How is Switzerland positioning itself within the rapidly evolving European and global space ecosystem?

A Since the 1960s, Switzerland has been committed to international cooperation and to developing key capabilities, high-performance subsystems, and innovative technologies in order to play a significant role in the European space ecosystem. The rapid evolution of this ecosystem, driven in particular by the ever-increasing role of space in military operations and national defense, has also had an impact on our country. Beyond its significant participation in ESA programs, of which it is a co-founder, and the renowned companies that have benefited from the "geographic return," Switzerland has seen the



emergence in recent years of new companies developing solutions tailored to contemporary needs, including full-fledged satellite manufacturers. The Swiss Armed Forces have played a role in this effort by encouraging the creation of dual-use systems that can contribute to its defense capabilities. With the creation of our Swiss Space Command, we now intend to further build and deploy space capabilities to ensure our country's security and resilience, while promoting the development of solutions with strong commercial potential, and thus capable of generating economic growth in this sector.

Q Space capabilities are increasingly critical to defence, supporting communications, navigation, intelligence, and situational awareness. How do you see the role of space evolving in strengthening Europe's security and resilience?

A Yes, those capabilities have become critical. But to consider them through the prism of security and resilience is not the right perspective, in my personal point of view. Space is currently undergoing a phase of conquest, a race to occupy orbits, driven by increasing launch capabilities and satellite production. The operational capabilities currentlybeingdeployed, particularlyin the areas of telecommunications, Earth observation, and data centers, are profoundly altering the balance of power in other operational domains: on the ground, in the air, and at sea. I am convinced that the center of gravityof armedforces and nations, thatis, the source of their strength and balance, is shifting from the ground to space. From this perspective, security and resilience are not being strengthened but, on the contrary, are diminishing due to the increasingly unbalancedpowerdynamics in orbit. Spacesuperiority, already an official objective of the U.S. Space Force, will become an essential criterion for freedom of action and efficiency in other operational domains. The United States has more than 12'000 satellites in lowEarth orbit,and China has more than1300; these are the players dominating this space race unfolding before our eyes. Europe defines its needs in order to derive projects from them, rather than embracing the dynamics of space conquest. We must therefore expectseriousconsequences as a resultof this strategic retreat.

Q Switzerland is renowned for innovation, precision engineering, and research excellence. What are the country's key strengths in space technologies, and where do you see the greatest growth opportunities?

A Yes, Switzerland is known for precision engineering, structures, sensors, atomic clocks, and top quality scientific instruments, which make it an indispensable partner for many programs in Europe. The key to the future, however, lies in mass production, and that is something the Swiss industry also knows how to do. Space is evolving into a permanent infrastructure that is ever larger, more efficient, more interconnected, and also more interdependent; therefore, significant growth potential now lies in the tools used to develop, monitor, maintain, and protect this infrastructure, with dual use capabilities designed to ensure the availability of satellite based services under all circumstances.

Q As more countries and private companies enter the space sector, legal and regulatory frameworks are becoming increasingly important. How do you see the role of national space legislation and international space law in fostering innovation while ensuring the safe, secure, and sustainable use of outer space?

A It seems particularly difficult to me to talk about "fostering innovation" and, at the same time, to talk about "legal and regulatory frameworks." I am not aware of any example in history where a phase of expansion has been compatible with a legalistic, sustainability oriented approach. Given that private companies are primary drivers of disruptive technological advancements and innovations, it is, on the contrary, important not to hinder ourselves with overly restrictive frameworks, while other countries, on the other hand, grant their companies a great deal of freedom. The key question is whether we participate in the space race or choose to follow from a distance and relinquish our sovereignty in space.

Q International collaboration is essential to the future of space. Where do you see the greatest opportunities for cooperation between Switzerland, the European Union, ESA, and emerging space nations such as India?

A We have an excellent opportunity thanks to the framework provided by the ALPSTAR project, which Switzerland launched last year at the ESA ministerial conference: this dual use project, combining a federated, agnostic network of ground stations and Earth observation satellites, enables the sharing of resources without any





> I am convinced that the center of gravity of armed forces and nations—the source of their strength and balance—is shifting from the ground to space.

loss of sovereignty and without any orchestrator. It is the ideal platform for bringing together a wide variety of stakeholders, both public and private, civilian and military, to ensure synergies in the acquisition and distribution of information. This model, currently being developed as part of the European Resilience from Space program, could, however, be used to ensure close and equitable cooperation with other parts of the world. And this is an approach that independent and neutral Switzerland will continue to pursue, thereby opening up considerable opportunities in this area.

Q Looking ahead, what role do you see Switzerland playing in shaping the future of Europe's space ecosystem, and what lessons from the space sector could inform innovation and resilience across other operational domains?

A Switzerland continues to be characterized by a strong capacity for innovation, and we are currently see in growing interest from the non space private sector in space derived applications. Switzerland has the critical mass to develop sovereign solutions for both ground based and space based systems. We can therefore expect targeted yet significant contributions from the Swiss ecosystem in the European context. In any case, we at Swiss Space Command clearly aim to develop the startup incubator and accelerator we've launched in recent years into a "Swiss Space Factory," that is, a tool capable of harnessing innovation from our universities and our companies to develop dual use space solutions that serve both our country's defense and its prosperity.

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STORM AND EUROPE'S NEXT SPACE RACE: BUILDING THE CAPABILITIES FOR COMPETITIVENESS AND STRATEGIC AUTONOMY

By Sagar Singamsetty, Editor



Europe's space sector is entering a defining period. As geopolitical competition intensifies and the global space economy expands, access to space is increasingly being viewed not only as a scientific or technological ambition but also as a matter of economic competitiveness, industrial resilience, and strategic autonomy.

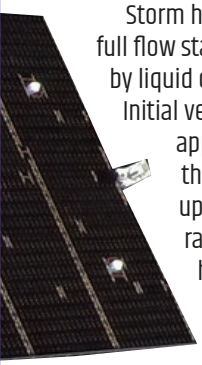
For decades, Europe has demonstrated world class capabilities in satellite manufacturing, scientific missions, launch services, and research. Yet the global space landscape is evolving rapidly. Commercial actors are reshaping the economics of space transportation, governments are recognising space as critical infrastructure, and demand for launch services continues to grow as satellite constellations, commercial space stations, orbital logistics networks, and lunar exploration programmes move from concept to reality.



Against this backdrop, the unveiling of the Storm rocket engine by The Exploration Company is significant not simply because it introduces a new propulsion system. Rather, it offers a glimpse into the capabilities Europe is seeking to build if it wishes to remain a competitive and autonomous space power in the decades ahead.

Why Storm Matters

Propulsion rarely attracts the same public attention as rockets or spacecraft. Yet engines remain one of the most critical technologies in the entire space value chain. They determine performance, reliability, scalability, reusability, and ultimately the economics of access to space.



Storm has been designed as a reusable full flow staged combustion engine powered by liquid oxygen and bio methane. Initial versions are expected to deliver approximately 120 tonnes of sea level thrust, with future variants targeting up to 180 tonnes. If realised, it would rank among the most powerful high thrust rocket engines ever developed in Europe.

What makes Storm particularly noteworthy is not simply its projected thrust level but the propulsion architecture behind it. Full flow staged combustion is among the most demanding engine cycles in modern rocketry. It offers significant gains in efficiency and performance but requires advanced turbomachinery, sophisticated thermal management systems, and precise control of combustion processes. Mastering such technologies is often regarded as an indicator of propulsion maturity and industrial capability.

At a time when future launch systems are increasingly expected to be reusable, scalable, and commercially competitive, investments in advanced propulsion are becoming strategically important for Europe.

From Space Missions to Space Transportation

Europe's achievements in space have traditionally been associated with scientific missions, Earth observation programmes, telecommunications satellites, and launch vehicles. The next phase of the space economy, however, will depend increasingly on transportation.

The emergence of commercial space stations, growing satellite constellations, in orbit servicing, manufacturing in space, and future lunar logistics will require reliable systems capable of transporting larger payloads more frequently and at lower cost.

This shift is changing how policymakers and industry leaders view access to space. The objective is no longer simply reaching orbit. It is creating a transportation ecosystem that can support sustained economic activity beyond Earth.

Storm represents one part of that broader transition. High thrust propulsion systems will be essential for future heavy launch capabilities and the transportation architectures needed to support an expanding space economy.

As Europe seeks greater autonomy in access to space, the development of these foundational technologies becomes increasingly important.

Building European Sovereignty Through Capability

The debate surrounding strategic autonomy has become a defining feature of European industrial policy. Whether discussing semiconductors, artificial intelligence, energy systems, or defence technologies, the underlying question remains the same: can Europe retain the capabilities necessary to compete and act independently in critical sectors?

Space is no exception.

Europe possesses the scientific expertise, engineering talent, and industrial heritage required to develop world class space technologies. The challenge is not capability itself. The challenge is converting that capability into competitive industrial programmes at a time when demand is growing faster than Europe's current supply.

Storm reflects an effort to address that challenge. It is not merely an engine programme. It represents an investment in the technologies, skills, infrastructure, and industrial know how required to support future European transportation systems.

In that sense, the significance of Storm extends well beyond propulsion. It reflects a broader ambition to ensure that Europe remains capable of designing, building, testing, and operating critical space technologies within its own ecosystem.

THRUST! and the Importance of European Cooperation

Storm also highlights the importance of Europe's collaborative innovation model.The development of advanced propulsion systems



requires specialised testing infrastructure, highly skilled talent, long term investment, and institutional support. No single company or country can easily provide all these elements independently. This is where initiatives such as THRUST! play an important role.

Led by the European Space Agency and involving organisations such as the German Aerospace Center (DLR), THRUST! is helping strengthen Europe's propulsion ecosystem by supporting testing, validation, and technological development. Through specialised facilities and collaborative testing campaigns, critical engine subsystems can be evaluated and refined before full scale integration.

While THRUST! and Storm are distinct programmes, they are connected by a common objective: strengthening Europe's long term propulsion capabilities.

Together, they demonstrate how cooperation between industry, research institutions, public agencies, and governments can create strategic technological capabilities that would be difficult to achieve independently. They also illustrate how Europe can combine entrepreneurial agility with institutional expertise to accelerate innovation.

In many respects, Europe's future competitiveness in space will depend on how effectively it can continue building such collaborative ecosystems.

Beyond Propulsion: Building Industrial Competitiveness

Perhaps one of the most overlooked aspects of programmes such as Storm is their contribution to Europe's broader industrial base.

Developing advanced rocket engines requires expertise that extends far beyond propulsion itself. New manufacturing techniques, additive manufacturing processes, advanced materials, precision engineering, digital design tools, and specialised testing capabilities all form part of the development cycle.

These capabilities often generate benefits that extend into other industrial sectors, strengthening Europe's wider innovation ecosystem. The programme also reflects a broader shift in thinking within Europe's space sector. Historically, European programmes often prioritised technical excellence and reliability. While those strengths remain essential, competitiveness today also requires speed, scalability, cost efficiency, and the ability to industrialise innovation.

Reusability is central to that evolution. Engines designed for multiple missions have the potential to reduce lifecycle costs, improve operational cadence, and support more sustainable launch architectures. Combined with manufacturing approaches that allow future performance growth and higher production rates, such technologies are becoming increasingly important in the global launch market.

Looking Ahead

The first major demonstrator tests for Storm are currently planned for 2028. As with any advanced propulsion programme, significant technical challenges remain. Success will ultimately be determined not by announcements or exhibitions, but by hardware performance, testing results, and operational reliability.

Yet the significance of Storm already extends beyond its future test campaigns. It represents a broader shift taking place across Europe's space sector. The focus is increasingly moving beyond individual missions and towards the capabilities that enable sustained access to space. Transportation, logistics, propulsion, and industrial capacity are becoming as important as satellites and spacecraft themselves.

Whether Europe succeeds in capturing a larger share of the rapidly expanding global space economy will depend on decisions being made today. Investments in propulsion, transportation infrastructure, advanced manufacturing, and collaborative innovation ecosystems are ultimately investments in Europe's long term competitiveness.

The question facing Europe is no longer whether it can innovate. The continent has repeatedly demonstrated that it can. The more important question is whether Europe can transform innovation into industrial leadership and strategic autonomy.

Storm may be only one programme, but it provides a useful indication of the direction in which Europe's space ambitions are heading. More importantly, it reminds us that the future of space competitiveness will be determined not only by missions and destinations, but by the capabilities that make them possible.



ECHODYNE: REDEFINING RADAR FOR THE ERA OF AUTONOMOUS AND COUNTER-UAS WARFARE

Leo McCloskey

VP of Marketing at Echodyne

ECHODYNE



Echodyne adapting its radar technology to meet the growing demand for reliable detection and tracking in these complex environments?

Q Echodyne has developed a distinct approach to radar using metamaterials electronically scanned array technology. What was the core technological challenge the company set out to solve, and how does MESA® differentiate Echodyne from conventional radar systems?

A Echodyne was founded to address a longstanding radar trade-off: how to deliver the precision and rapid beam steering of an electronically scanned array in a system compact and affordable enough for broad deployment. MESA uses a metamaterials-based antenna architecture to produce electronically steered beams from a small, solid-state platform. The result is high-fidelity detection and tracking without the size, weight, power demand and mechanical complexity traditionally associated with high-performance radar. This is particularly relevant to counter-UxS missions, where forces need rapid updates, precise tracks, mobility and the ability to deploy sensors in quantity. MESA is therefore not intended simply as a smaller version of a conventional strategic radar; it brings ESA-class attributes to tactical missions and distributed architectures that previously could not support them.

Q Modern battlefields are increasingly characterised by drones, autonomous systems and low-altitude threats. How is Echodyne adapting its radar technology to meet the growing demand for reliable detection and tracking in these complex environments?

A These environments demand more than initial detection. Operators need persistent tracks, reliable classification and precise positional data quickly enough to support decisions and effectors. MESA radars combine rapid electronic scanning with software-defined processing, enabling capabilities to evolve through software updates as threats and operating conditions change. Machine-learning-assisted classification helps distinguish relevant targets in congested airspace, while single- and multi-target tracking supports weapon systems evolution to effective counter-UAS platforms. Echodyne is also advancing meshed radar architectures so that data from multiple compact sensors can be combined and delivered to command-and-control systems, mobile platforms and personnel at the tactical edge. The objective is consistent: turn difficult low-altitude activity into actionable information while reducing operator burden and shortening the response timeline.

Q Counter-UAS has become a major priority for defence forces worldwide. What role do high-performance radar systems play in building an effective layered counter-drone capability?

A Radar provides a foundational sensing layer because it detects the physical target rather than relying on a control link, cooperative identification or favorable lighting. That matters against autonomous, pre-programmed or emissions-controlled drones that may be difficult for radio-frequency sensors to detect. High-performance radar can also exploit fine motion, including propeller signatures, to help classify a small aircraft and maintain a track through complex maneuvers. In a layered architecture, radar works with radio-frequency detection, electro-optical and infrared sensors, command-and-control software and an appropriate effector. The quality of the radar track influences every subsequent step: how quickly an optical sensor acquires the target, whether it can maintain lock, and whether a weapon system receives sufficiently accurate range, position and velocity data to calculate a firing solution. Layering adds resilience, but its effectiveness depends heavily on the fidelity and continuity of the underlying sensor data.

Q Echodyne serves defence, government and commercial markets. How do the requirements of these different sectors influence your product development and technology roadmap?

A The missions differ, but the underlying requirement is similar: trusted, real-time awareness of activity in the air and on the surface. Defence customers place particular emphasis on performance in contested environments, mobility, ruggedness, interoperability and support for effectors. Government and critical-infrastructure users often prioritize persistent coverage, low operator burden and integration with existing security systems. Advanced Air Mobility adds requirements for affordability, scalability and safe

operation in increasingly busy low-altitude airspace. These demands reinforce one another and shape a common technology roadmap built around precise data, software-defined capability and open integration. They also reflect a broader shift from a small number of large, centralized ground-based air-defence sensors towards distributed networks of high-fidelity sensors. The aim is to place useful information closer to the point of decision, extending situational awareness from command centers to vehicles, small units and individual personnel at the tactical edge.

Q Artificial intelligence and software are becoming increasingly important in sensor systems. How is Echodyne combining radar hardware, software and machine learning to improve situational awareness and decision-making?

A We treat radar hardware, software and machine learning as a single, integrated system. The antenna and radio-frequency hardware create precise measurements; the software controls how the radar searches, revisits targets and maintains tracks; and machine-learning models help classify objects from their observed characteristics. That combination enables the sensor to provide more than plots on a screen: it can deliver structured, actionable track data to command-and-control networks, optical sensors and weapon systems. Open interfaces are equally important because no radar operates in isolation. Data must be fused with other sensors and presented in the context of the mission. Echodyne's engineering and field teams work closely with customers and integration partners to understand emerging threats, operational conditions and workflow constraints. That feedback informs the development pipeline, allowing software, classification models and interfaces to evolve without requiring a complete redesign of the underlying radar.

Q As defence customers look for systems that are more mobile, scalable and easier to integrate, what are the key requirements shaping the next generation of radar and sensor solutions?

A The defining requirements are mobility, scalability, interoperability and ease of use, without sacrificing track quality. As sensors move from fixed sites to vehicles, uncrewed platforms and small tactical units, they must offer low size, weight and power; withstand demanding environments; and operate with limited specialist support. They must also provide the update rate, accuracy and track continuity needed by electro-optical systems, command-and-control networks and effectors. Open, well-documented interfaces are essential so integrators can add radar data without creating a bespoke architecture for every deployment. Defence customers are also looking increasingly to commercial off-the-shelf and modified commercial solutions that can be fielded, replaced and upgraded more quickly than traditional programs. This is particularly important for robotic and autonomous systems, where compact commercial platforms equipped with radar and optical sensors can create mobile sensing nodes and extend awareness without placing personnel at unnecessary risk.





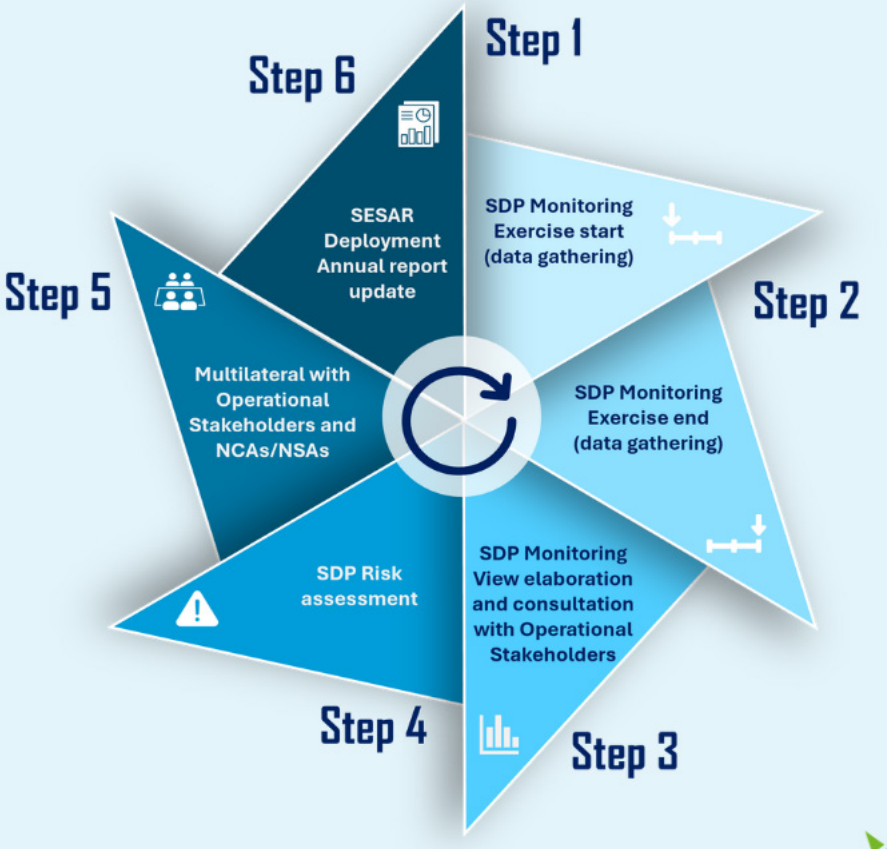
> The objective is consistent: turn difficult low-altitude activity into actionable information while reducing operator burden and shortening the response timeline.

Q Looking ahead, where do you see the biggest growth opportunities for Echodyne, particularly in areas such as counter-UAS, autonomous systems, force protection and integrated air defence?

A Counter-UAS is the most immediate growth area because the threat is expanding across the battlefield, military installations, borders and critical infrastructure. Providing a best-in-class sensor integrated into a cost-effective system, with the flexibility to incorporate different interceptor technologies, enables the solution to address both existing and evolving threats. Beyond that mission, autonomous systems require dependable perception for navigation, deconfliction and operation in complex environments. Force protection is moving towards distributed sensing, with compact radars deployed on fixed sites, vehicles and uncrewed platforms to provide persistent local awareness. In integrated air defence, these sensors can complement longer-range systems by improving coverage of the low-altitude layer and supplying precise tracks to command-and-control and effector networks. The common requirement across these markets is high-fidelity data on movement in the air and on the surface, delivered at operational speed and at a scale customers can sustain. Meeting that demand is now as much an industrial challenge as a technical one, which is why Echodyne has opened a manufacturing facility designed for capacity of up to 30,000 radars per year.

FROM REGULATION TO OPERATIONAL REALITY: HOW THE SESAR DEPLOYMENT MANAGER SHAPES EUROPEAN ATM

Modernising European air traffic management (ATM) takes place in three phases: definition, development, and deployment. Legislating, innovating, and fostering partnerships towards common goals are intertwined processes: they nurture from each other to navigate complex scenarios and overcome all sorts of challenges on the road to a Single Digital European Sky.



ATM operates beyond national borders, but regulatory responsibilities remain distributed among European institutions, national authorities and operational stakeholders. Airlines, airports, air navigation service providers (ANSPs), the Network Manager, military authorities and industry all have different responsibilities, investment cycles and operational priorities, but their decisions are interdependent.

This is precisely the environment in which the SESAR Deployment Manager (SDM) was established and has developed its strategic value. Since 2014, SDM has operated at the management level of the SESAR deployment governance framework, translating European policy and regulation into coordinated, synchronised implementation and, eventually, operational reality.

Its experience with the Pilot Common Project (PCP) and, subsequently, Common Project One (CP1) regulations, demonstrates that regulation alone can't modernise a network as complex as European ATM on its own; it requires a

SESAR Deployment Programme Monitoring View

sesar DEPLOYMENT MANAGER



mechanism capable of turning legal obligations into a coherent, synchronised, and achievable deployment roadmap.

CP1 establishes six ATM functionalities, sets forth implementation requirements and specific mandatory deadlines at European level to comply. For an operational stakeholder, however, the regulatory text needs to be understood in terms of systems, procedures, investments, responsibilities, dependencies, milestones, and interactions with other actors. The SESAR Deployment Programme (SDP) breaks the regulatory requirements down into coherent deployment families.

SDM success among the European aviation industry lies in turning regulatory complexity into operational clarity. While regulations define what has to happen and by when, successful deployment also requires stakeholders to understand how they need to get there.

This approach reduces uncertainty for stakeholders, while the European Commission and regulatory bodies can oversee the implementation progress in a smoother, more structured manner. Such coordination between all involved actors is what builds the so-needed deployment synchronisation.

The need for coordination becomes clearer when considering the nature of ATM regulation. Many regulatory requirements cannot be implemented effectively by one organisation acting alone, or by a Member State on its own. Their benefits depend on interoperability and synchronisation between multiple stakeholders spread across Europe.

While one stakeholder may technically fulfil its own obligation, the network could remain unable to materialise the foreseen benefits if other stakeholders are not ready. The SDM model thrives at providing expertise and guidance beyond compliance deadlines by combining stakeholders' local deployment with the wider, network-oriented, collective implementation. Its role in identifying gaps, facilitating dialogue, synchronising projects and providing visibility of implementation across the network has made CP1 a case study for other transport industries.

The first SESAR Deployment Programme was launched in 2015 to support the implementation of the Pilot Common Project. The experience generated through that first phase subsequently led the deployment framework to the development of CP1. Close contact with operational stakeholders, consultation with implementing partners, and thorough monitoring have been at the core of SDM's existence since day one, generating a solid feedback loop by which ATM actors feel listened and understood, a vital exercise to keep them onboard through the whole ATM modernisation journey. Stakeholders can identify practical challenges, dependencies and potential implementation risks, translating into valuable insights that shape the deployment fra mework and set clear basis for planning their investments.

Regulations, as well as support and funding from the European Commission, shall act as a catalyst towards a bigger objective: making EU skies smarter, more digital, more resilient and more sustainable. Sitting at the intersection between legislation and operational reality, the committed, constant labour of SESAR Deployment

Evolution of benefits

	2023	2024	2025
Closed projects	271	300 (+29)	323 (+23)
Passengers time (minutes)	239.9 million	359.6 million (+119.7)	390 million (+30.4)
Fuel saved (tons)	2.5 million	5.9 million (+3.4)	7 million (+1.1)
CO_2 saved (tons)	7.9 million	18.4 million (+10.5)	22.1 million (+3.7)
Total operational benefits (€)	13.9 billion	23.1 billion (+9.2)	26.5 billion (+3.4)



Manager experts has been praised for its effectiveness in finding viable solutions and mediating between implementing stakeholders.

To complement the grounds laid by the SESAR Deployment Programme (SDP), SDM experts produce the accompanying document SDP Monitoring View, the sole reference for CP1 deployment status. The latest Monitoring View shows the results of the work performed so far: by early 2026, 343 of the 359 implementation projects coordinated by SDM were completed and operational, while 95% of the CP1 scope was either implemented or under implementation.

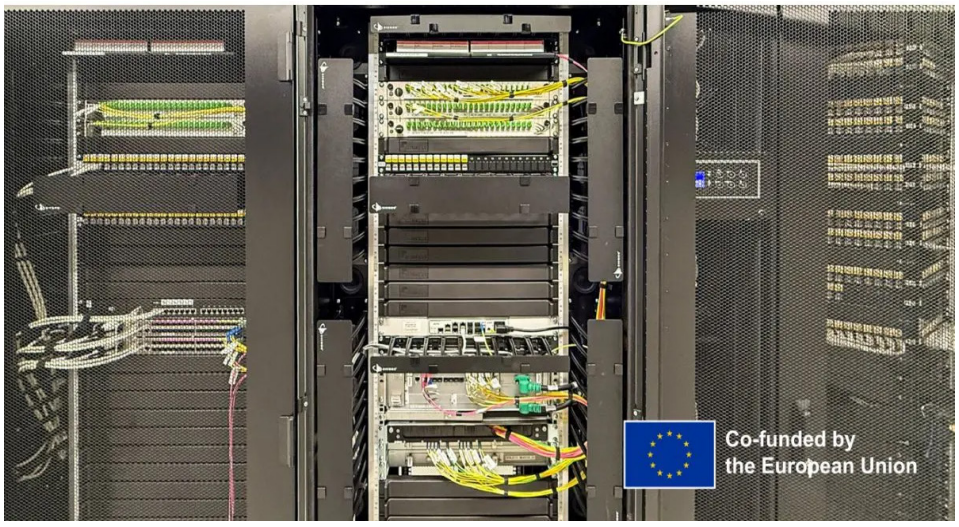
Europe's ambitions and objectives concerning smart, sustainable air travel and, subsequently, ATM modernisation do not end with CP1. Given the current increases in traffic, European airspace will require more capacity, without compromising safety and sustainability. To accomplish such task, ATM systems must become fully digital, interoperable, and resilient. A scalable, service-oriented approach would provide the necessary elements to quickly adapt to the industry's rapidly evolving needs and demands.

SDM deployment immediate priorities and objectives already point towards the next stage in ATM modernisation: accelerating the adoption



of System-Wide Information Management (SWIM), advancing Flight and Flow Information for a Collaborative Environment (FF-ICE), and stimulating the transition towards Trajectory-Based Operations (TBO).

The stakeholder-centred modus operandi established by the SESAR Deployment Manager, which has delivered substantial benefits for the European passengers, the environment, and the industry, shall continue in the future, maintaining two fundamental ties behind the synchronised SESAR deployment: the partnership model, and public funding support for implementation.



The SESAR Deployment and Infrastructure Partnership (SDIP), the industry partnership behind SESAR Deployment Manager, brings together organisations directly involved in the transformation of European ATM. In several occasions in the recent months, the 21 Members of the Partnership (EUROCONTROL Network Manager, four major EU-based airlines, fifteen major ANSPs and ACI Europe in representation of more than 500 airports) reaffirmed their joint commitment to continue the work of SDIP even beyond the current mandate ending in 2027. The support of operational stakeholders demonstrates that the need for coordinated deployment is recognised not only by European institutions but by the organisations that ultimately invest in and operate the system.

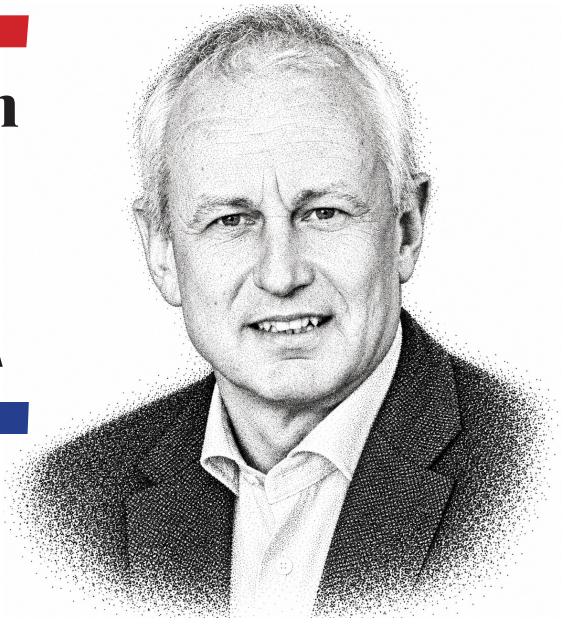
In parallel to a function that supports coordinated deployment, funding and support from European institutions is equally important: mandatory investments for stakeholders require public support up and assistance to overcome hesitancy and favour early movers, not just during industrialisation but very well into implementation and operational uptake.

BELGIUM'S DEFENCE EDGE: SPECIALISED TECHNOLOGY, INDUSTRIAL RESILIENCE AND GLOBAL COOPERATION

Frédéric Givron

General Manager
BSDI

AGORIA



In Conversation With Frédéric Givron, General Manager, Agoria-BSDI, discusses Belgium's evolving defence industry, specialised capabilities and its role in Europe's defence ecosystem.

The conversation explores industrial resilience, emerging technologies and international partnerships, including opportunities with India.

— Sagar Singamsetty, Editor, European Defence Insights

Q Belgium has a strong industrial base in areas such as aerospace, defence technologies, cybersecurity and advanced manufacturing. How would you describe the current strengths and priorities of the Belgian security and defence industry?

A Belgium's security and defence industry is compact, highly specialised and strongly export-oriented. Its strength lies less in large-scale platform production and more in high-value technologies, subsystems, components and services that are essential to modern defence capabilities. Belgian companies are active across aerospace, land systems and ammunition, multi-domain robotics, cybersecurity, advanced manufacturing, sensors, secure communications, mechatronics, space-related technologies and digital monitoring and response systems.

A key feature of the Belgian ecosystem is the large number of SMEs and technology-driven companies. This gives Belgium agility, innovation capacity and deep niche expertise. At the same time, Belgium also has larger industrial players and research organisations that are well connected to European and NATO programmes. The sector is therefore well positioned as a reliable Tier-1 or Tier-2 partner in multinational capability programmes.

The priorities today are clear: increase visibility, enable companies to increase their footprint in the defence ecosystem, strengthen access to European and NATO programmes, support exports, and ensure that Belgian industry is seen as a credible, sustainable and strategically relevant part of Europe's defence industrial base.

Q European defence spending and industrial cooperation are undergoing significant changes. What major opportunities do you see for Belgian defence companies in the evolving European defence market?

A The European defence market is changing rapidly. Increased defence spending, the need for faster capability development, and the focus on European industrial resilience create important opportunities for Belgian companies. Belgium can benefit from this shift by positioning its companies as specialised and reliable partners in European and NATO supply chains.

The strongest opportunities are linked to multinational R&D and procurement programmes, the European Defence Fund, future European defence industrial instruments, NATO-related initiatives, and large collaborative capability programmes. These programmes increasingly require cross-border cooperation, trusted suppliers, technological maturity and secure supply chains. That fits well with the Belgian industrial profile.

The challenge is to make our companies visible early enough to prime contractors, programme managers and government stakeholders.

Q How is AGORIA-BSDI helping Belgian SMEs and emerging technology companies gain greater visibility and access to international defence programmes and supply chains?

A AGORIA-BSDI acts as a central platform for Belgian companies that provide technology solutions and services for defence and security. A major part of our work is to help SMEs and emerging technology companies



understand the defence market, become more visible, and access the right networks at national and international level. We do this through four complementary activities.

First, we represent and advocate for the sector towards Belgian Defence, federal and regional authorities, and international organisations.

Second, we connect companies to multinational R&D and procurement opportunities, including European and NATO-related programmes.

Third, we support key defence projects and innovation initiatives, including links with the Defence Innovation and Research Strategy.

Fourth, we organise and support participation in major exhibitions, international missions and matchmaking events.

For SMEs, this is particularly important because they often have excellent technology but limited visibility, limited resources to follow complex procurement processes, and limited access to prime contractors. AGORIA-BSDI helps lower those barriers by creating a collective Belgian presence, facilitating introductions, sharing opportunities, and helping companies become more export-ready.

Q Emerging technologies including AI, autonomous systems, cybersecurity, space and advanced sensors are increasingly shaping defence capabilities. Which technology areas do you believe offer the greatest growth potential for Belgian industry?

A The greatest growth potential for Belgian industry is in technology areas where Belgium already has credible expertise and where future defence programmes will require trusted, specialised partners. These include cybersecurity, AI-enabled systems, autonomous and unmanned systems, counter-UAS, advanced sensors, optronics, secure communications, space applications, advanced manufacturing & materials, electronics and mission-critical services.

Belgium should focus on high-value niches rather than trying to cover the full defence value chain. For example, Belgian companies can contribute to autonomy through software, sensors, control systems, simulation, testing and integration.

> Belgium may be a compact market, but it is a highly connected and technology-rich ecosystem at the heart of Europe and NATO.

In space, there are opportunities in satellite technologies, payloads, data processing and secure communications. In cybersecurity, Belgium can support both military capabilities and the protection of critical supply chains and infrastructure.

The most promising areas are those that combine defence relevance with dual-use technology. This is important because many Belgian companies come from the broader technology and manufacturing sector. Their solutions may not have been developed exclusively for defence, but they can become highly relevant when adapted to defence-grade requirements such as security, resilience, interoperability and certification.

Q Collaboration between governments, large prime contractors, SMEs and research institutions is becoming increasingly important. How does AGORIA-BSDI facilitate this ecosystem and strengthen Belgium's defence industrial capabilities?

A AGORIA-BSDI's role is to bring the Belgian ecosystem together and make it easier for different actors to cooperate. Defence innovation and industrial capability cannot be developed by companies alone. It requires interaction between government, Defence, regional agencies, prime contractors, SMEs, research centres, universities and financial actors.

AGORIA-BSDI facilitates this ecosystem by acting as a bridge between these stakeholders. We help translate defence needs into industrial opportunities, inform companies about programmes and requirements, and create platforms where Belgian companies can meet national and international partners. We also support coordination around major projects, innovation priorities and international events.

This ecosystem approach is essential for Belgium. Our strength lies in the density and diversity of our industrial and research base. By connecting specialised SMEs with larger companies, research organisations and public authorities, we can build stronger consortia, improve access to funding, and increase Belgium's contribution to European and NATO capability programmes.

Q Europe is seeking to improve its defence industrial resilience and reduce critical dependencies. What role can Belgian companies play in strengthening Europe's strategic autonomy and supply-chain security?

A Belgian companies can play an important role in strengthening Europe's strategic autonomy by providing trusted, high-quality technologies and services in critical parts of the defence value chain. Strategic autonomy does not mean that every country must produce everything itself. It means that Europe must have reliable access to the technologies, industrial capacity and supply chains needed to act when required.

Belgium can contribute in areas such as cybersecurity, secure communications, sensors, aerospace, space, advanced materials, electronics, precision manufacturing, maintenance, critical services and dual-use technologies. These are domains where resilience, trust and security of supply are increasingly important.



Because many Belgian companies are SMEs, they can also add flexibility and innovation to European supply chains. However, to fully play this role, they must be visible, compliant, financially robust and able to meet defence-grade standards. AGORIA-BSDI supports this by helping companies connect to European and NATO programmes, understand requirements, and position themselves as reliable partners in multinational supply chains.

If we look to Belgium's wider industrial fabric, we see many opportunities for Belgian companies to play an important role in strategic autonomy and supply chain security, for instance in critical raw materials, energy production, digital sovereignty, etc.

Q What are the biggest challenges currently facing Belgian defence and security companies, from funding and regulations to exports, skills and access to major procurement programmes?

A Belgian defence and security companies face several important challenges. The first is recognition. Defence must increasingly be understood as a sector that contributes to security, resilience and strategic autonomy. This is important for public perception, for investment decisions and for access to finance.

A second challenge is financing. Many SMEs need capital to scale, certify, internationalise and meet defence-grade requirements. Yet defence-related activities can still create hesitation among financial institutions or investors. A third challenge is the transition from R&D to industrialisation. Many companies are strong in innovation, but the step from prototype to qualified product and recurring defence contracts remains difficult. Other challenges include export regulations, procurement complexity, access to large prime contractors, skills shortages, security requirements and the need for stable and harmonised import and export frameworks.

Addressing these challenges requires close cooperation between industry, government, Defence, regional agencies and financial actors.

Q India is rapidly expanding its domestic defence manufacturing capabilities under initiatives such as Make in India and Atmanirbhar Bharat. Where do you see the strongest opportunities for collaboration between Belgian and Indian defence companies, particularly in technology partnerships, joint development and industrial cooperation?

A India is an important and growing defence market, but also a country with a clear ambition to strengthen its domestic manufacturing and technology base. This creates opportunities for Belgian and Indian companies to work together in ways that go beyond traditional buyer-seller relationships.

The strongest opportunities are in technology partnerships, joint development, supplier development, manufacturing cooperation and integration into wider European and Indian supply chains. Belgian companies can bring specialised expertise in areas such as aerospace, land systems and ammunition, multi-domain robotics, cybersecurity, advanced manufacturing, sensors, secure communications, mechatronics, space-related technologies and digital monitoring and response systems.

Indian companies, in turn, offer scale, manufacturing capacity, market access, technological knowhow and growing defence industrial capabilities.

Belgium and India both have an interest in diversification, industrial resilience and strategic autonomy. That creates common ground. Opportunities may emerge around drones and counter-drone systems, aerospace components, optronics, ammunition-related technologies, advanced materials, secure digital systems, MRO, and dual-use innovation. The key is to identify practical partnerships between companies, supported by trusted local networks, clear regulatory understanding and long-term industrial commitment.

Q Looking ahead over the next five years, what is your vision for the Belgian security and defence industry, and what message would you like to share with international companies interested in partnering with Belgian defence innovators?

A Belgium has the potential to turn its industrial density into international market power by focusing on areas where it is credible and competitive.

My vision is for Belgian companies to be recognised as trusted, innovative and collaborative partners. We should build stronger industrial champions, help SMEs scale into defence markets, strengthen our role in critical technology niches, and support participation in multinational consortia. This also means improving coordination between industry, Defence, diplomacy, regional export agencies, research organisations and financial actors.

To international companies, the message is simple: Belgium may be a compact market, but it is a highly connected and technology-rich ecosystem at the heart of Europe and NATO.

Belgian companies are open to cooperation, strong in niche technologies, and used to working internationally. For partners looking for innovation, reliability and access to European defence networks, Belgium is a valuable place to start.

OFFICINA STELLARE'S VISION FOR EUROPE'S NEXT GENERATION OF SPACE TECHNOLOGIES

Lisa Maretto

Marketing & Communication Manager, Officina Stellare



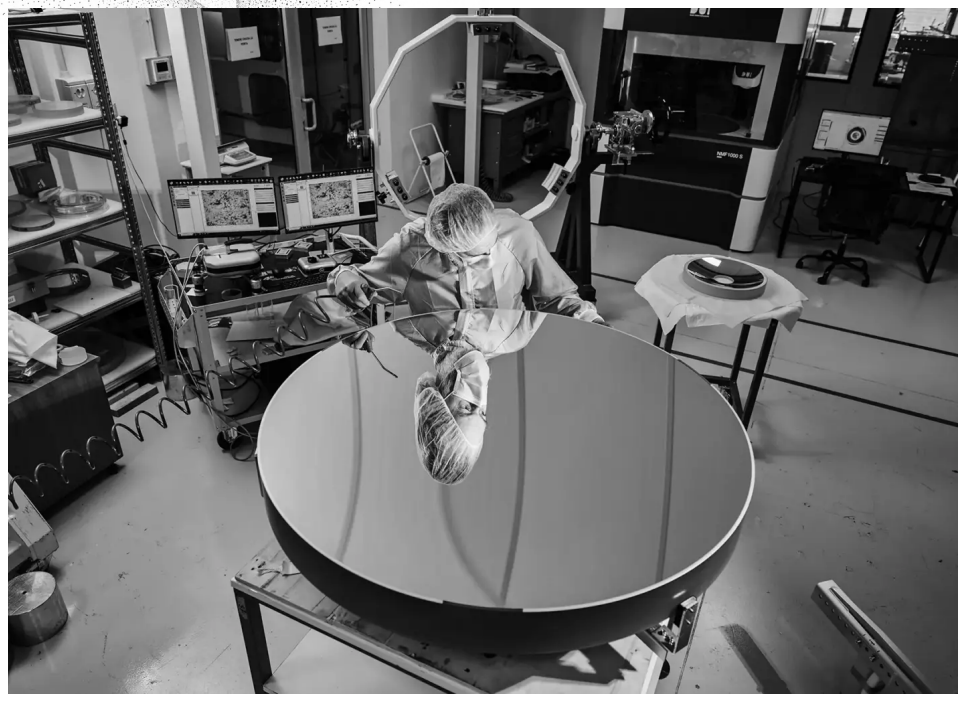
Lisa Maretto, Marketing & Communication Manager at Officina Stellare, discusses the company's evolution from a specialist in high-performance optical systems into a broader mission-critical space technology provider. In this conversation with Sagar Singamsetty, Editor, European Defence Insights, she shares insights into Earth Observation, Laser Communications, Optical Ground Stations, Space Situational Awareness and Europe's growing need for sovereign space technologies.

Q Echodyne has developed a distinct approach to radar using metamaterials electronically scanned array technology. What was the core technological challenge the company set out to solve, and how does MESA® differentiate Echodyne from conventional radar systems?

A Echodyne was founded to address a longstanding radar trade-off: how to deliver the precision and rapid beam steering of an electronically scanned array in a system compact and affordable enough for broad deployment. MESA uses a metamaterials-based antenna architecture to produce electronically steered beams from a small, solid-state platform. The result is high-fidelity detection and tracking without the size, weight, power demand and mechanical complexity traditionally associated with high-performance radar.

Q Officina Stellare has evolved from an advanced optical-system company into a broader space technology provider covering Earth Observation, Space Situational Awareness, Laser Communications and Optical Ground Stations. What are the company's strategic priorities for the next phase of growth?

A Over the last few years, Officina Stellare has evolved from a specialist in high-performance optical systems into a broader mission-critical technology provider serving the space, aerospace, defense, maritime and security sectors. This evolution reflects our ambition to play an increasingly strategic role in markets where technological excellence, reliability, and operational performance are essential.



Our strategic priority is to strengthen our position as a vertically integrated provider of advanced optical, electro-optical and electronic solutions across both the space and ground segments. In space, we are expanding our capabilities in Earth Observation, Laser Communications, Optical Ground Stations, Space Situational Awareness and next-generation optical payloads for institutional and commercial programmes. At the same time, the broader capabilities of the Officina Stellare Group allow us to address opportunities in aerospace and maritime applications, leveraging a combination of precision optics, high-reliability electronics and mission-critical technologies.

A key focus for the coming years will be the industrialization and scaling of technologies that are becoming increasingly important for the future of space infrastructures, particularly optical communications, quantum-enabled secure communications, advanced Earth Observation systems and Space Traffic Management solutions. Through continuous investment in innovation, manufacturing capabilities, and vertical integration, we aim to support the growing demand for sovereign and resilient technologies in Europe and internationally.

Looking ahead, we see strong growth opportunities at the intersection of Earth Observation, secure communications, defense, and critical infrastructure. Our ambition is to be recognized as a leading European technology partner capable of delivering integrated solutions across space, aerospace, defense, maritime and cybersecurity domains, enabling customers to address increasingly complex operational and strategic challenges.

Q Earth Observation remains one of Officina Stellare's key areas, with the company contributing optical payloads to major programmes such as IRIDE and PLATiNO. How is the company responding to the growing demand for higher-resolution, multispectral and hyperspectral imaging?

A Earth Observation is one of our core markets; we have continuously evolved our technologies to meet increasingly demanding mission requirements. Our involvement in strategic programmes such as IRIDE, PLATiNO and multiple commercial constellations reflects our ability to support customers across the full spectrum of Earth Observation applications, from environmental monitoring and scientific research to security and defense.



The market is rapidly moving toward higher-resolution imagery combined with richer spectral information, and Officina Stellare has evolved accordingly. While our heritage lies in the design and manufacturing of high-performance optical systems, we are increasingly positioning ourselves as a provider of complete electro-optical payloads. Today, our capabilities extend beyond the telescope itself to include focal plane assemblies, proximity electronics, Instrument Control Units (ICUs), and the full integration of payload subsystems. This enables us to offer customers a comprehensive end-to-end solution while ensuring optimal performance, reliability, and system-level control.

This evolution is particularly relevant for multispectral and hyperspectral missions, where the interaction between optics, detectors, electronics, and onboard processing has become a key factor in overall mission performance. By mastering these critical technologies and integrating them within a single industrial framework, we can support increasingly sophisticated Earth Observation missions capable of delivering higher-quality data and more actionable insights.

What differentiates Officina Stellare is our ability to manage the entire value chain internally, from optical design and manufacturing to payload integration, testing and qualification. Combined with our heritage in mission-critical optical technologies and our growing experience as a payload provider, this allows us to support both institutional and commercial customers with solutions that meet the most demanding performance requirements while reducing technical and programmatic complexity.

Q Optical communications and LaserCom are becoming increasingly important as satellite data volumes grow. What opportunities does Officina Stellare see in space-to-ground and inter-satellite optical communications, and how does the company differentiate its solutions in this emerging market?

A We believe optical communications represent one of the most transformative technologies, shaping the future of space infrastructure. As Earth Observation constellations generate exponentially larger volumes of data, traditional RF systems alone will not be sufficient to support future bandwidth requirements. LaserCom offers significantly higher data rates, enhanced security, lower latency and greater scalability, making it a key enabling technology for next-generation space networks.

Officina Stellare is uniquely positioned because we operate across the entire optical communications ecosystem. We develop Optical Ground Stations for satellite-to-ground communications while also expanding our capabilities in space-based optical communication terminals designed for both inter-satellite and satellite-to-ground links. This dual expertise allows us to address the growing need for high-capacity, resilient and secure communications architectures that will support future commercial, institutional and defense space programs.

Another important differentiator is our

ability to combine LaserCom technologies with quantum-secure communications. Through ThinkQuantum, our subsidiary specialized in quantum technologies, we possess in-house expertise in Quantum Key Distribution (QKD), quantum communication systems and secure data transmission architectures. This creates a unique synergy between optical communications and quantum technologies, positioning Officina Stellare among the few European players capable of addressing both conventional high-speed optical communications and the future requirements of quantum-secure space networks.

As the market evolves toward sovereign and ultra-secure communication infrastructures, we see significant opportunities in optical terminals capable of supporting future space-based cryptography and quantum communication services. The integration of LaserCom and QKD technologies is expected to play a crucial role in protecting critical data and enabling highly secure communications between satellites, ground stations and strategic infrastructure.

Our differentiation comes from the combination of precision optics, in-house manufacturing, systems engineering and quantum expertise. Rather than assembling third-party components, we design and manufacture many of the critical building blocks ourselves, including telescopes, optical terminals, opto-mechanical systems and advanced photonic subsystems. By combining expertise in optical payloads, laser communication terminals, Optical Ground Stations and quantum technology, Officina Stellare is uniquely positioned to contribute to the next generation of secure, high-capacity space communications.

Q Officina Stellare combines space-qualified optical payloads with Optical Ground Stations and Space Situational Awareness systems. How important is this ability to provide solutions across both the space and ground segments to the company's competitive strategy?

A This is a key element of our competitive strategy and one of the company's strongest differentiators.

Many companies specialize either in space payloads or in ground infrastructure. Officina



Stellare has developed expertise in both domains, allowing us to understand and optimize the complete mission architecture from end to end. This includes space-borne optical payloads, LaserCom terminals, Optical Ground Stations, laser ranging systems and Space Situational Awareness infrastructures.

The convergence of these capabilities enables us to address emerging requirements in Earth Observation, secure communications, Space Traffic Management and national security applications. It also allows us to better support customers seeking integrated solutions rather than individual products.

As the space sector increasingly moves toward interconnected ecosystems and sovereign infrastructures, we believe the ability to operate across both the space and ground segments will become an even more important competitive advantage.

Q In August 2026, Officina Stellare announced a new Leonardo contract for optical systems for the PRISMA Second Generation hyperspectral Earth Observation mission. What does this programme mean for the company's capabilities and its position within Europe's Earth Observation supply chain?

A PRISMA Second Generation is a highly significant programme for Officina Stellare because it builds upon capabilities we have developed over many years in advanced Earth Observation optics and confirms our role in some of Europe's most strategic institutional missions.

Under the contract, we will participate in the co-engineering of optical systems with apertures of up to 700 mm before assuming responsibility for their manufacturing across the programme's qualification and development models. This represents a demanding technical challenge that further strengthens our expertise in high-performance hyperspectral instrumentation.

More broadly, the programme reinforces our long-standing relationship with Leonardo and further consolidates our position as a trusted supplier of advanced optical systems within the European institutional space sector. It demonstrates our ability to contribute to next-generation Earth Observation missions where performance, reliability and precision are critical.

Q Through ESA BIC Padua, Officina Stellare is also directly involved in supporting the next generation of space startups. What role does the company see for itself in developing Italy's and Europe's wider space ecosystem, and what kinds of technologies or business models are you looking to see emerge from the startup community?

A Innovation has always been at the heart of Officina Stellare's growth story, and ESA BIC Padua provides a powerful platform to help accelerate the next generation of space entrepreneurs. As the manager of ESA BIC Padua, we see our role not only as an industrial partner but also as an ecosystem enabler that helps transform innovative ideas into scalable businesses.

We are particularly interested in technologies that can strengthen Europe's strategic autonomy in areas such as advanced optics, photonics, quantum technologies, Earth Observation analytics, secure communications, artificial intelligence for space applications and next-generation satellite infrastructures. These are all areas where Europe can create significant technological and commercial value.

From a business perspective, we are also keen to see new service-oriented models emerge around data exploitation, in-orbit services, digital infrastructure and dual-use applications that can serve both commercial and institutional markets. Ultimately, the success of Europe's space sector will depend on the ability of established companies, startups, research institutions and public agencies to work together, and we are committed to playing an active role in building that ecosystem.

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