SERAPHIM

WHITEPAPER: THE ROLE OF SPACETECH IN SOLVING EUROPE'S SECURITY DILEMMA

APRIL 2025

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ABOUT SERAPHIM

Founded in 2016, Seraphim Space is the world's leading investment group focused on the space sector's $trillion investment opportunity. Seraphim Space has pioneered 'SpaceTech' as an investment category, having launched both the world's first private and first public SpaceTech focused VC funds.

Through its combined offering of accelerators, VC funds and a listed growth fund, Seraphim Space provides the fuel to help the sector's most ambitious entrepreneurs skyrocket – from pre-incorporation right through to pre-IPO.

Across its operations, Seraphim Space has been backed by leading space corporates and international space agencies, including the UK and European Space Agencies, Airbus, SES, Teledyne, MDA, Telespazio, Inmarsat, Eutelsat, NEC and SKY Perfect JSAT.

With a combined portfolio of more than 130 companies in 30 different countries, Seraphim Space is the most prolific investor in SpaceTech globally and recognised as a leading defence investor. Post Seraphim's initial investment, portfolio companies have raised more than US$ 5.5 billion. Four portfolio companies have attained unicorn status (>US$ 1 billion enterprise value) and five companies have become public-listed companies.

In Europe (including the UK), Seraphim's portfolio of defence-related SpaceTech companies includes: All.Space, Arqit (NASDAQ: ARQQ), Atmos Space Cargo, D-Orbit, Iceye, Quadsat, SatVu, Spire Global (NYSE: SPIR).

Outside of Europe, defence-related portfolio companies include: Ascend Arc, Array Labs, AST Space Mobile (NASDAQ: ASTS), Astroscale (TYO: 186A), Auriga, Edgybees, Hawkeye 360, Hubble Network, LeoLabs, Pixxel, Privateer, Skylo, Tomorrow.io, Voyager, Xona Space, Zeno Power.

Introduction: The End of Pax Americana?

"Europe is at crossroads in history."

"This is a watershed moment for Europe."

"Europe is entering a new era."

"This is really five minutes to midnight for Europe."

The geopolitical events of March 2025 have the potential to reshape the world order that has been in place since the end of WWII. 'Pax Americana' is no longer a given, and there is now a widespread recognition that Europe will no longer be able to rely so heavily on the US for its security.

There is consequently an urgent need to dramatically increase pan-European levels of defence spending, as evidenced by the recent announcement by the EU of an €800bn defence initiative, of which €650bn would be targeted to be spent over the next four years. The likes of Germany have already begun the process to amend their fiscal rules to enable this spending increase.

Space technologies ("SpaceTech") – and satellites in particular – must play a crucial role in enhancing Europe's defence capabilities. As geopolitical tensions rise and new threats emerge, the integration of advanced space technologies into defence systems is essential for maintaining security and resilience.

Space technology is no longer a luxury or purely scientific endeavour for Europe – it is a cornerstone of security. From guiding troops and missiles, to linking commanders, to observing flashpoints, to detecting missile launches, SpaceTech permeate every facet of defence.

This has become increasingly clear during the Ukraine conflict; how modern warfare is being conducted is changing rapidly, and SpaceTech is at the heart of these developments.

The growing importance of SpaceTech within defence is reflected in the increasing share of defence budgets being allocated to SpaceTech. Historically, SpaceTech accounted for just a few percentage points of defence budgets, but more recently, space-related defence spending has accounted for as much as 5-10% of overall defence budgets.

Given how central SpaceTech has become to the rapidly evolving forms of both defensive and offensive warfare, it seems likely that SpaceTech will capture a greater proportion of defence budgets in forthcoming years. This should be especially true for nation states that have historically underinvested in their sovereign space capabilities.

This whitepaper sets out the reasons why the adoption of innovative SpaceTech capabilities will be intrinsic to the reset in European security now underway and will create a largescale investment opportunity for both European and international capital allocators.

SpaceTech & Europe's Defence Systems: 101

SpaceTech is inherently 'dual use', meaning there are both commercial and government applications for the same technology.

Very often, new space technologies are initially developed for military applications, with departments of defence being both the earliest and biggest customers.

SpaceTech is of such strategic importance today because it underpins almost every facet of how modern militaries operate. This includes:

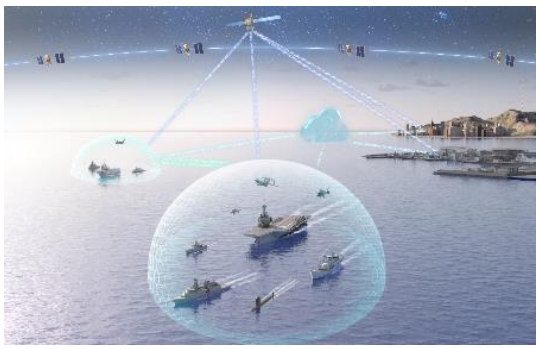
1. Strategic Surveillance & Actionable Intelligence

Government – and increasingly commercial - satellites equipped with high-resolution imaging and advanced sensors can monitor vast areas, detect potential threats, and gather critical data in near real-time – often referred to as intelligence, surveillance and reconnaissance ("ISR").

Such strategic surveillance capabilities enable decision-makers to respond swiftly and effectively to emerging challenges in not just defence, but also areas such as climate change, disaster relief, agriculture and insurance.

Artificial intelligence (A.I.) and machine learning algorithms are now being applied to these vast datasets collected from space to enhance data analysis and decision-making processes. Combining space data with AI can identify patterns, predict potential threats, and optimize defence strategies.

2. Secure Communication & Connectivity



Without reliable, secure communications, militaries can't function. Satellite communication systems enable seamless and reliable communication between military units, regardless of their location. This is particularly important in remote or hostile environments where traditional communication infrastructure may be compromised.

For decades, this has meant relying on government-owned communications satellites, but it also now means leveraging connectivity from commercial players whose capabilities can also be used for a myriad of terrestrial applications, such as broadcast television and helping billions of people get online for the first time.

3. *Global Navigation Satellite System (GNSS)*

GPS was developed by the US Department of Defence. Today, it's a bedrock technology of the modern world, including for militaries who rely upon it for both navigation and targeting.

Future advancements in GNSS will enhance the accuracy, security and reliability of positioning and navigation systems, critical for military operations – and also for autonomous cars, robots and flying taxis.

SpaceTech & The Changing Nature of Warfare

The Ukraine conflict has shown just how rapidly modern warfare is evolving to exploit the latest technological innovations, with the importance of SpaceTech only growing. To highlight just some of the ways this has been manifested in the Ukraine conflict:

1. Cyber	Increasing attacks on critical national infrastructure. One of the first things Russia did when it invaded Ukraine was to hack the satellite network from Viasat that the Ukrainian military and government relied upon. This indicates just how reliant governments/militaries are on space to be able to operate effectively.
2. Commercial Space	The Ukraine conflict has been a watershed moment for the SpaceTech ecosystem. The capabilities of emerging new players are, for the first time, being fully embraced by governments. This includes the role SpaceX / Starlink has played in ensuring that Ukraine's government and armed forces have been able to continue to operate in the face of the Russian onslaught. It also includes all the various commercial earth observation constellations that have been providing invaluable intelligence collected by their satellites to complement that of government satellites.
3. Drone Warfare	The face of future conflicts has now been irrevocably changed by the advent of drone warfare. In Ukraine, both manually controlled and semi-autonomous drones have been used by both sides. In the case of the Ukrainians, this is only made possible by having access to the satellite communications networks and positioning systems required to control/operate the drones.
4. Electronic warfare	This typically involves flooding an area with radio frequency signals to impact the ability of various electronic equipment to function. It also includes GPS jamming and spoofing. Russia has made widespread use of electronic warfare, both in an offensive capacity to degrade Ukrainian systems, but also in a defensive capacity to disguise their own activities. Space-based countermeasures from commercial providers have supported Ukrainian efforts, leading to the destruction of large amounts of Russian equipment.

As deep tech continues to evolve, Europe's investment in space technology will be crucial for maintaining security and resilience in an increasingly complex geopolitical landscape. Continued rapid developments in not just SpaceTech but also related areas such as A.I., quantum technology, microelectronics and new materials are likely to see the applications of SpaceTech in defence expand dramatically. Examples of some of these future uses of SpaceTech include:

- **Enhanced Cybersecurity:** Future space technology will leverage quantum cryptology and quantum computing to provide unbreakable encryption, ensuring the security of defence communications and data
- **Space-Based Defence Systems:** Anti-satellite weapons, missile defence systems, and space-based sensors are being developed to counteract adversaries' capabilities and safeguard critical infrastructure.
- **Advanced Reconnaissance:** Next-generation satellites will offer even higher resolution imaging, more sophisticated sensors, and new sensing modalities (such as quantum sensing) to provide unparalleled reconnaissance capabilities.
- **Autonomous Defence Systems:** AI-powered satellites will enable autonomous defence systems that can detect and respond to threats in space and on Earth without human intervention.

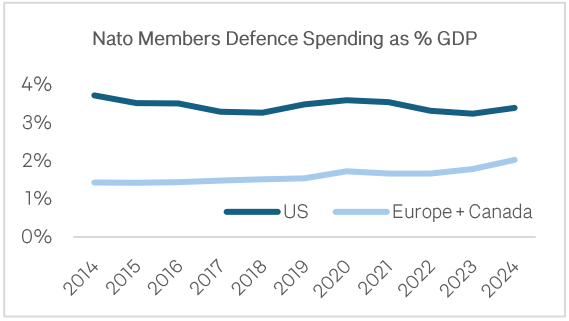
Europe's Defence Deficit

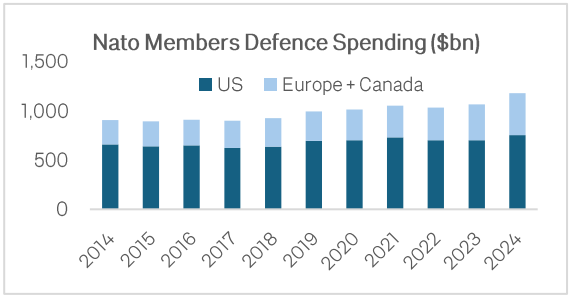
Since the inception of NATO in 1949, America has been its dominant member. Over the last decade, America has spent more than twice as much on defence as the rest of the members of NATO combined.

Whereas the U.S. has consistently spent more than 3% of GDP on defence, the other NATO members have collectively remained below 2% of GDP.

Although the gap in defence spending relative to the U.S. has reduced since Trump first became president in 2017, the U.S. still accounts for nearly two-thirds of the total defence spending by NATO members.

With clear indications that the U.S. may no longer be willing to shoulder the burden for Europe's security, the challenge for European countries / other NATO members to compensate for America's contributions is immense.



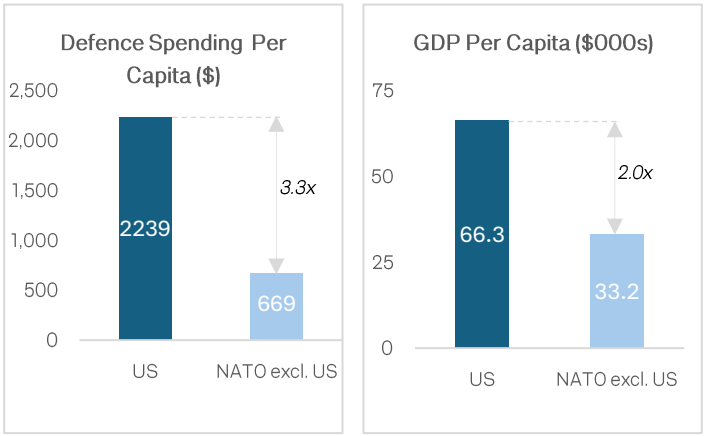


Source: Nato

Although recent announcements about the EU implementing a €800bn plan to increase European defence spending and the German parliament approving a new €500bn infrastructure defence fund are encouraging, both initiatives still fall short of matching American defence expenditure.

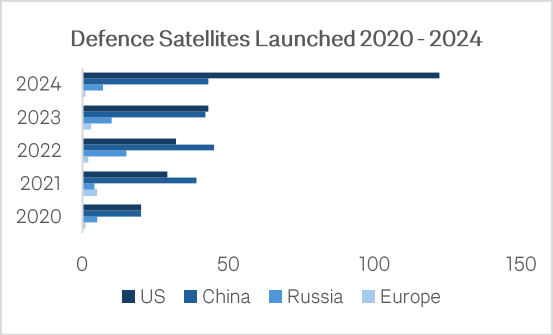
America's current per capita defence spending is more than three times that of the other remaining members of NATO.

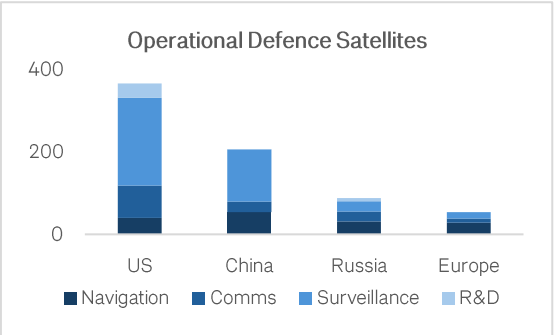
Whilst a significant proportion of this difference is due to America having double the GDP per capita of these countries, even factoring this in, defence spending would need to be lifted by c.70% to match the US. Achieving this seems extremely unlikely, given the poor state of public finances in these countries.



Source: Nato

Europe's Chronic Underinvestment in Defence-Related Satellites





Source: AEI

The challenges relating to space capabilities are even more acute. Except for the Galileo satellite navigation constellation - the European equivalent to GPS - Europe is very heavily underinvested in government-owned defence-related space assets relative to not just the US, but also China and Russia. Europe has just 55 operational defence-related satellites – of which half are the Galileo constellation - versus America's 366, China's 206 and Russia's 88 satellites. This deficit is most severe in ISR / intelligence gathering satellites, where Europe has a paltry 16 satellites set against America's 213. Although Europe is also under-invested in communications satellites, its near-total reliance on the US for space-based intelligence gathering represents a potential existential risk to Europe's security, were the US to ever withdraw cooperation with its own surveillance satellites.

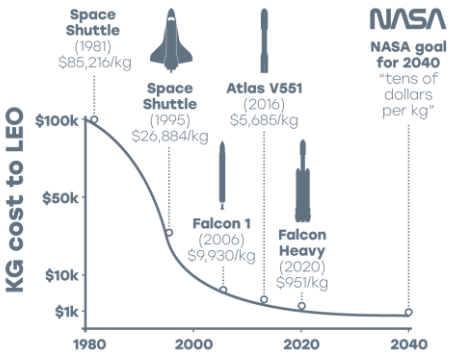
Even though the threat posed by Russia and the risk of the US demanding Europe shoulder greater responsibility for its own security have both been known for some time, there has to date been no response from Europe in terms of the number of defence satellites it has launched. In the last five years, it has launched just 12 satellites. Over the same period, China has significantly increased the number of satellites it has launched (189) in an effort to establish near-peer capabilities with America, which, in turn, has responded in kind with a dramatic increase in satellites launched (246).

With the geopolitical climate souring, in 2024 America launched 122 defence satellites, China launched 43, Iran launched six, and Europe launched a meagre one satellite. Given the widespread acceptance that Europe now needs to establish a much greater degree of sovereign defence capability/autonomy from the previous over-reliance on the US for its security, addressing the severe deficit in defence satellites must be made a top priority.

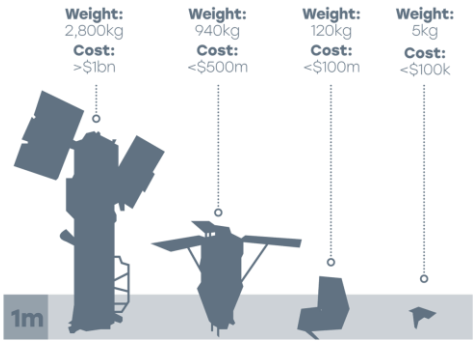
The Role of Innovative SpaceTech Companies In Addressing Europe's Security Deficit

The response to the US pullback from Europe needs to be collective, and it needs to be holistic. Critically, the response needs to avoid a focus on national economic interests at the expense of rapid improvement in defence capabilities for collective security. Whilst European defence primes will undoubtedly have an important role to play, most especially in munitions and weapons systems, both high costs and long time horizons for delivery of these primes are unlikely to match against the pressing need to quickly reinforce Europe's sovereign space capabilities.

It is therefore imperative that is the cutting-edge capabilities of more nimble, innovative SpaceTech companies with market-ready technology form the basis of Europe's response to its dearth of defence satellites and associated capabilities.



Source: Futuretimeline.net



Source: Satellite Applications Catapult

Over the last decade, radical changes within the space sector have led to a 100-fold decrease in the cost of accessing space. Often referred to as 'New Space', a new economic paradigm has emerged, comprising of low-cost launch via reusable rockets from the likes of SpaceX and miniaturised satellites constructed from repurposed microelectronics off-the-shelf (COTS) componentry.

Whereas previously the high cost of both building satellites and launching them to orbit resulted in small constellations of only a handful of satellites, today, for a comparable cost, it is now possible to have very large constellations of hundreds and even thousands of small, low-cost satellites. These satellites are now unlocking entirely new capabilities through the collection of enormous, unique global datasets and universal, abundant connectivity, creating a new digital infrastructure in the sky.

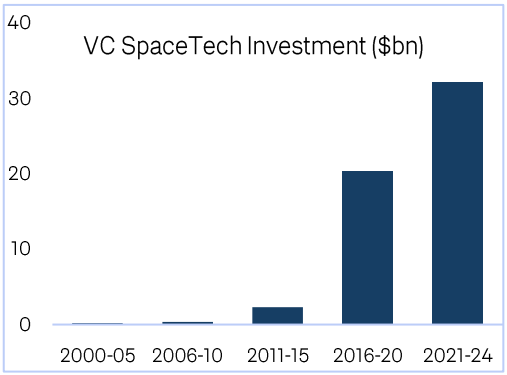
With further exponential declines in the cost of accessing space anticipated over the next decade, this is leading to a new industrial revolution in space that is potentially analogous to the impact of the PC, cloud and smartphone revolutions, with SpaceTech – alongside A.I. – being one of the megatrends likely to define societal change over the coming decade.

The dramatic reduction in the cost of accessing space has already spawned a thriving ecosystem of thousands of SpaceTech start-ups worldwide. With many of these companies having now developed and deployed their technology, the SpaceTech market is now at an inflection point. In the context of defence and global security, this means there is now a growing cohort of SpaceTech companies with market-ready technology that are already being adopted by more forward-leaning departments of defence around the world.

The European SpaceTech Ecosystem and Financing Deficit

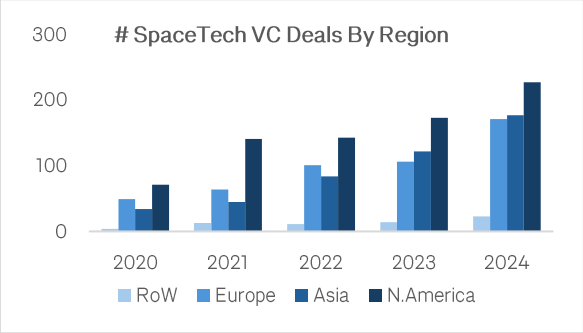
The changes in the space industry, coupled with a surge in demand from departments of defence and governments for new SpaceTech capabilities, have led to an influx of investors into the sector, with more money being invested in the last four years than in the previous twenty years combined.

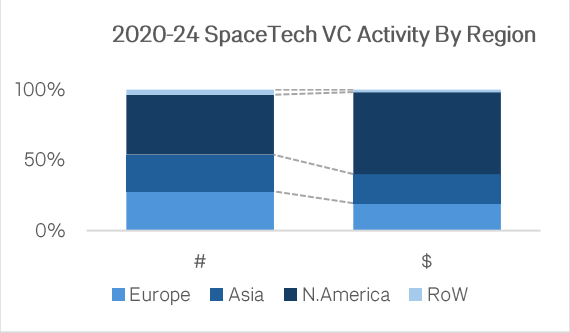
A record 601 SpaceTech companies raised venture capital investment in 2024, representing a 50% year-on-year increase relative to 2023, which itself had been a record year of SpaceTech investment activity.



Source: Seraphim Space Index

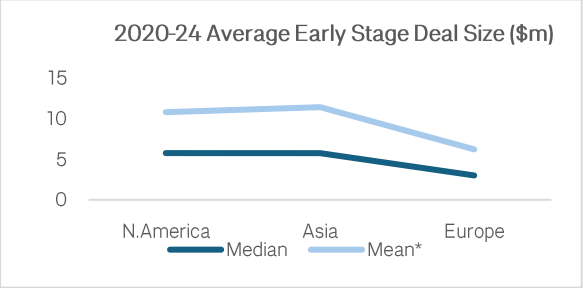
Although the European region has seen a significant pick-up in SpaceTech investment activity in recent years, it still lags behind, both North America (principally the US) and Asia (principally China). Over the last five years, Europe has accounted for 28% of the number of SpaceTech deals closed, but just 19% of the money invested. Whilst these figures have improved somewhat more recently (29% of deals in 2024 and 22% of money invested), this points to the continued underinvestment in European SpaceTech companies relative to their peers in the US and China.

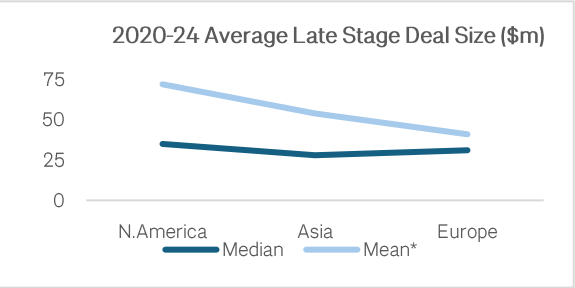




Source: Seraphim Space Index

Average deal sizes in Europe are dramatically lower relative to North America and also lag behind Asia. This is particularly pronounced with early-stage deals, where average European deals are approximately half the size of North American and Asian equivalents. Although median later-stage transactions are fairly consistent across different geographies, the average (mean) of North American deals is c.75% higher than European equivalents.





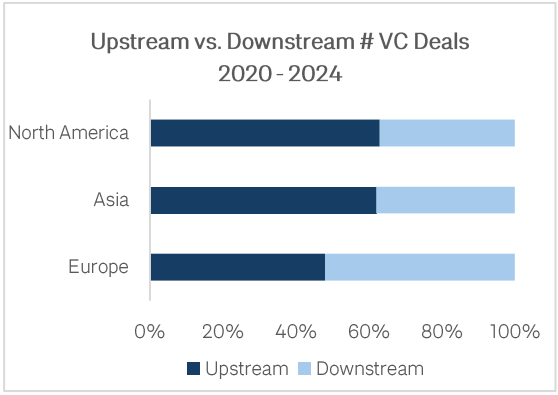
Source: Seraphim Space Index

Notes: Excludes outliers of 'megaconstellations' such as SpaceX's Starlink and OneWeb which have raised $billions*

This points to several cascading issues that result from the difficulties European SpaceTech companies typically face when trying to raise large amounts of capital.

Unlike the U.S., which has a venture capital ecosystem that has been developed over many decades, Europe's venture capital market is much less mature. This means that there are far fewer funds in Europe with sufficient scale to finance capital-intensive SpaceTech companies, and even fewer willing to invest in defence.

One consequence of this is that, in comparison to America, less money is invested into more capital-intensive 'upstream' businesses (such as rocket launchers and satellite constellations). Whereas close to two-thirds of SpaceTech venture capital deals over the last five years in North America and Asia have been into upstream companies, in Europe, less than half of investments have been in these strategically vital domains, with investment activity focused on more capital-efficient downstream areas such as data analytics.



Source: Seraphim Space Index

Rocket launchers and satellite constellations are the core infrastructure of New Space. Because of this, they require the greatest amount of capital, but equally, they represent some of the most valuable parts of the market. Much like Europe's governments have under-invested in defence satellites (relying instead on America's space-based intelligence gathering capabilities), the same is true for Europe's New Space ecosystem, at least in part as a function of insufficient availability of capital.

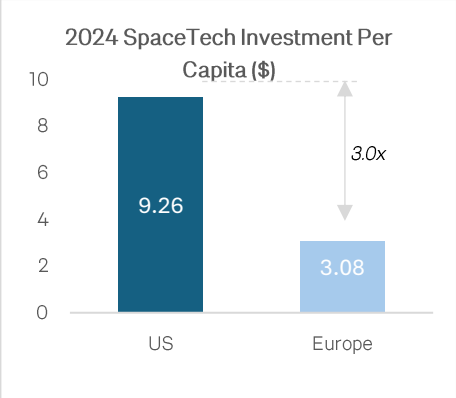
There are further ramifications for Europe's relative lack of risk capital to support its leading SpaceTech companies. The 'power law' of venture capital dictates that a disproportionately large amount of value in any given market category is captured by just a small proportion of market participants. This often leads to there being one dominant company that captures at least twice as much of the market as its nearest competitor.

In capital-intensive markets such as SpaceTech, the availability of capital is a key determinant for which company is likely to become the dominant player. Whereas the American venture capital ecosystem is adept at channelling large amounts of capital into the highest-performing companies to boost their prospects of securing market leadership, European companies do not always benefit from these same dynamics.

Whilst in North America, 25% of investment rounds and 80% of capital is focused on later-stage companies, in Europe, only 17% of rounds and 68% of capital flow into later-stage companies. This puts European companies at a distinct disadvantage relative to American competitors and is one of the key drivers behind the relative paucity of globally leading New Space companies in Europe.

This all amounts to Europe currently trailing behind America within the New Space market. Even with the sizeable recent uptick in investment activity, the per capita investment in Europe's SpaceTech companies is still less than a third of America's.

With defence-related space capabilities being one of the most acute areas of historic underinvestment by European nations, and with commercial New Space companies being the most obvious cost-effective and timely solution to rectifying this shortfall, resolving the SpaceTech funding environment must also be an imperative.



Source: Seraphim Analysis

Key Takeaways & Recommendations

Key takeaways from this whitepaper include:

- SpaceTech plays an integral role in defence through intelligence gathering, secure communications and navigation
- Almost all forms of SpaceTech are dual use, with applications in both the defence / government realm alongside a wide array of commercial use cases
- The importance of SpaceTech for global security is growing through the rapidly evolving forms of modern warfare. This is leading to space capturing an ever-greater share of defence budgets
- Even with recent announcements boosting European defence spending, matching U.S. levels of spending will likely not be achievable
- European underinvestment in defence-related satellites is particularly acute and poses an existential risk to Europe's security that needs to be addressed urgently
- Embracing the commercial 'New Space' ecosystem provides a cost-effective and fast response to this imperative
- Whilst there has recently been a surge in European SpaceTech investment activity, the European ecosystem still lags behind its counterparts in both the U.S. and China
- Access to finance for European SpaceTech companies – and in particular those that are capital-intensive – remains a significant impediment
- Boosting the availability of capital for Europe's leading SpaceTech companies is therefore an imperative if Europe is to address its defence / SpaceTech deficit required to re-establish sovereign control of its own security
- The scale of the countermeasures required for Europe to achieve security autonomy are massive. Although this presents many challenges, it could also present a very large investment opportunity for those investors willing to finance the innovative SpaceTech companies that will be central to these initiatives

Key Recommendations to address these points include:

- Significant budget allocation at both national state and European levels to support rapid procurement of ISR satellites / constellation and deployment of sovereign secure communications constellation
- Radical overhaul of procurement processes in favour of making fast decisions, levelling the playing field for innovative SMEs and avoiding parochialism of competing national champions
- Significant weighting given in procurement processes to speed of delivery of required capabilities.
- Short-term prioritisation on procuring the most cutting-edge, cost-effective, market-ready space capabilities, irrespective of their country of origin (including outside of Europe / from other allied countries if required). This is necessary to backfill the capability deficit as quickly as possible to reduce reliance on / compensate for US capabilities
- Establishment of pan European (including UK) equivalent to the U.S. Space Development Agency as a procurement mechanism dedicated to maturing the European SpaceTech ecosystem, with prioritisation on strategically important areas for defence such as ISR, secure communications, rocket launchers and satellite manufacturing. Objective of developing operational capabilities to boost European security within the next 24 months

- Full implementation of the Draghi report's recommendations
- Governments and supranational bodies need to act decisively to quickly mobilise private finance at scale for SpaceTech companies focused on developing dual-use technologies essential for European security
- Key measures to achieve this must include:
    - Appropriate incentives to address existing impediments of capital allocators for investing into relevant companies / funds that can help address Europe's security / SpaceTech deficit. Specifically, current restrictions many institutional investors have on investing in anything defence-related must be removed / redefined
    - European governments / supranational bodies to channel substantial additional investment capacity via fund managers with well-established, relevant specialist domain expertise and demonstrable track record of deploying capital quickly and impactfully. Investment mandates need to deprioritise geographic restrictions (such as only investing into European companies) in favour of a greater focus on addressing capability gaps in European security. To include the ability to finance on-shoring of international / non-European companies that may possess market-leading technology aligned with the objective of delivering European security autonomy.

Case Study: Iceye – a Blueprint for European success

Helsinki-based Iceye operates the world's largest constellation of intelligence-gathering radar satellites. The business has raised more than $450m of VC investment, making it one of Europe's best-financed SpaceTech / defence-related start-ups. Iceye was recently ranked by Fast Company as the 20th most innovative company in the world and the 2nd most innovative company in Space sector.

Most satellites use optical cameras – similar to those found in a smartphone – to capture information about the Earth. However, these optical cameras and sensors don't work for two-thirds of the world, as at any one time they are covered by clouds or darkness.

In order to collect actionable, timely intelligence, it is essential that you can do this regularly and reliably. Unlike optical cameras that can't see in the dark or through clouds, Iceye's satellites use radars to create synthetic images (known as synthetic aperture radar or 'SAR') to image the Earth day and night, rain or shine.

Prior to Iceye, only a handful of wealthy governments could afford these SAR satellites since it typically cost $hundreds of millions for each satellite. By taking a novel approach and looking to repurpose microelectronics components designed for terrestrial applications, Iceye was able to reduce both the size and cost of these satellites by a factor of 100x.

This has enabled Iceye to launch a constellation of 48 of its satellites – making it the biggest commercial SAR constellation in the world. These satellites are capable of capturing information anywhere on Earth every hour at a resolution of as little as 25cm. When fused with A.I. this data can be extremely powerful, generating actionable intelligence about changes anywhere on the planet that Iceye's technology has detected in close to real time.

Iceye supports the intelligence gathering of governments / militaries by selling images taken by their satellites, in addition to selling nation states their own satellites where there's a pressing need for sovereign control.

Iceye's government customers span North and South America, Europe, the Middle East and the Far East. Iceye is able to serve customers worldwide because, unlike American-based competitors, they are not restricted by US ITAR export controls.

Iceye has been able to establish itself as the global leader in SAR satellites through a combination of factors that could serve as a blueprint for the success of Europe's domestic Spacetech / defence emerging players:

- Adopted a highly vertically integrated approach to control its own supply chain and innovate iteratively as quickly as possible (i.e. akin to SpaceX)
- Benefitted from significant cost advantage relative to US competitors for space engineering talent. Iceye was able to hire multiple engineers for the equivalent cost of a single engineer based in the Bay Area in the US
- Benefitted from vital early support from the Finnish Government grant programmes to develop the concept of its miniaturised SAR satellites
- Early customer traction led to unlocking a sizeable round of seed funding, including participation from US-based investors
- Flexibility and willingness to enable government customers to procure Iceye's capabilities according to their own requirements. This has included selling satellites to governments to provide them with much-needed sovereign capability / control of their space-based intelligence gathering
- Ability to serve customers worldwide when US competitors are restricted by US ITAR export controls
- Dual use go-to-market strategy. Although defence remains its primary market and governments its primary customers, Iceye also uses its satellites to serve commercial customers in a broad range of different sectors, including agriculture and insurance

Appendix A: Examples of European Defence Related New Space Companies

Company Name	HQ	Category	Funding	Description
Iceye	Finland	Satellites – Earth Observation	$472m	Operates the world's largest constellations of radar satellites used by governments / militaries for intelligence gathering.
Unseen Labs	France	Satellites - Earth Observation	$132m	Operates a constellation of spectrum surveillance satellites focused on maritime situational awareness.
SatVu	UK	Satellites - Earth Observation	$52m	Developing the world's first satellite constellation for high resolution thermal data for defence and climate applications.
Aalto	UK	Drones & UAV	$100m	Develops a solar-powered stratospheric autonomous platforms for earth observation and connectivity.
OneWeb	UK	Satellites - Telecoms	$4.7bn	European equivalent to SpaceX's Starlink 'megaconstellation' for delivering high-speed, low latency internet access from space
Swissto12	Switzerland	Satellites - Telecoms	$48m	Manufacturer of advanced RF products, satellite payloads and systems, including a geostationary telecommunications satellite.
Sateliot	Spain	Satellites - IoT Networks	$72m	Satellite telecom operator offering global continuous IoT connectivity under 5G protocol.
OQ Technology	Luxembourg	Satellites - IoT Networks	$54m	Satellite 5G IoT operator providing uninterrupted cellular coverage for terrestrial assets.
Kineis	France	Satellites - IoT Networks	$111m	Developer of satellite technology designed to offer global connectivity for the IoT domain.
All.Space	UK	Ground Terminals	$141m	Low power, flat panel antennas capable of simultaneously connecting to different satellites in different orbits with different operators. Key capability for resilient communications for militaries and beyond.
Leaf Space	Italy	Ground Terminals	$39m	Seamless access to satellites via a global network of interconnected ground stations.
Quadsat	UK	Communications	$13m	Drone-enabled satellite testing & calibration.
Isar Aerospace	Germany	Rockets	$440m	Rocket launchers providing access to space for small and medium satellites, enabling global satellite constellations.
RFA Augsberg	Germany	Rockets	$37m	Rocket launchers offering fast & flexible launch solutions for satellite constellations.
Orbex	UK	Rockets	$163m	Rocket launcher specifically designed for small satellites, with a focus on reusability
PLD Space	Spain	Rockets	$145m	Space technology company that develops reusable rockets.
Blackshark	Austria	Mapping & 3D	$35m	A 3D digital twin of Earth powered by satellite data & artificial intelligence.
LiveEO	Germany	Insights & Monitoring	$65m	Using AI to translate satellite data into actionable business insights.
D-Orbit	Italy	Space Logistics	$263m	In-space transportation company, providing solutions for moving, precise deployment and removing satellites.
ExoTrail	France	Space Logistics	$75m	End-to-end space mobility operator, developing an electric propulsion system and offering in-orbit services for small satellites.
Clear Space	Switzerland	Space Logistics	$37m	Provider of debris removal services intended for the future of space exploration and operations.
Atmos Space Cargo	Germany	Space Logistics	$17m	Develops and manufactures space capsules to return cargo from space, from microgravity experiments to entire rocket stages.
Exploration Company	Germany	Space Logistics	$235m	Develops, manufactures and operates modular and reusable spaceships serving the needs of space stations.

Open Cosmos	UK	Space Hardware	$63m	Designs, builds, and operates low-earth orbit satellites, providing data and images.
Reflex Aerospace	Germany	Space Hardware	$10m	Builds and delivers tailor made satellite platforms.
U-Space	France	Space Hardware	$9m	Smallsat manufacturer focused on defence / government markets
AerospaceLab	Belgium	Space Hardware	$57m	Manufacturing satellites for earth observation, telecommunications and technology demonstrations.
Re-Orbit	Finland	Space Hardware	$8m	Building software-enabled satellites for secure communications.

Appendix B: Examples of Ways European Investors Can Get Exposure to New Space

Strategy	New Space Exposure	Examples	Pros / Cons	
Exchange Traded Funds (ETFs)		• Procure Space ETF • Ark Space ETF • Kensho Final Frontiers ETF	· Liquidity · Diversified exposure	⟍ Mainly mature companies ⟍ Few listed New Space players
Listed generalist VC funds		• Schiehallion Fund • Molten Ventures • Destiny.xyz	· Liquidity · Broader tech exposure	⟍ Limited space exposure ⟍ Limited space diversification ⟍ Limited domain expertise
Listed specialist VC funds		• Seraphim Space Investment Trust (LSE:SSIT)	· Liquidity · Diversified exposure · Domain experts · Global coverage	⟍ Share price volatility ⟍ Sector concentration
Listed New Space companies		• Rocket Lab • Planet Labs • AST Space Mobile	· Liquidity · Growth potential	⟍ Concentration of risk ⟍ Limited information ⟍ Few listed New Space players ⟍ Share price volatility
Private deeptech VC funds		• OTB Ventures • Join Capital • vSquared	· Broader tech exposure	⟍ Illiquid ⟍ Limited space diversification ⟍ Reduced domain expertise ⟍ Geographic limitations
Regional specialist VC funds		• Alpine Space • Orbital Ventures • Primo Space	· Diversified exposure · Domain experts	⟍ Illiquid ⟍ Geographic limitations ⟍ Sector concentration
Global specialist VC funds		• Seraphim Space Venture Fund	· Diversified exposure · Domain experts · Global coverage · Defence / climate focus	⟍ Illiquid ⟍ Sector concentration