

# Space & Security Industry in Saudi Arabia

# 26

CURRENT TRENDS  
AND PERSPECTIVES



*Second Edition*  
*July 2026*

**Contributors:**

**BAE SYSTEMS**



PRIVATEER





Dear Readers,

We are pleased to present the second edition of our magazine, "Space & Security Industry in Saudi Arabia: Current Trends and Perspectives." Following the success of our first publication, this new edition continues our effort to provide comprehensive insights into the rapidly evolving Saudi space sector.

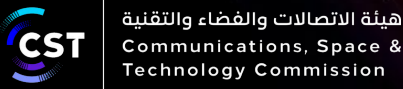
We extend our heartfelt thanks to all our contributors for their invaluable support, expertise, and collaboration in bringing this publication to life.

Please don't hesitate to let us know if you spot any errors or typos. We highly value your feedback and suggestions as we continue building a valuable resource for the growing space community.

Stay tuned for more exciting initiatives and future editions!

Best regards,  
Alex Cresnirov  
CEO and Co-Founder  
SpaceTech in Gulf

## Contributors:



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Saudi Arabia  
Centre for  
Space Futures

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# Key findings

Space & Security Industry in Saudi Arabia: Current Trends and Perspectives is based on research conducted throughout 2026. This study aims to provide the most up-to-date and comprehensive overview of the current state of the Saudi space and security industry ecosystem.

# 425

space and security organizations are currently active in the Saudi Arabia

Total Entities:

425

Saudi-based:

246

International:

179

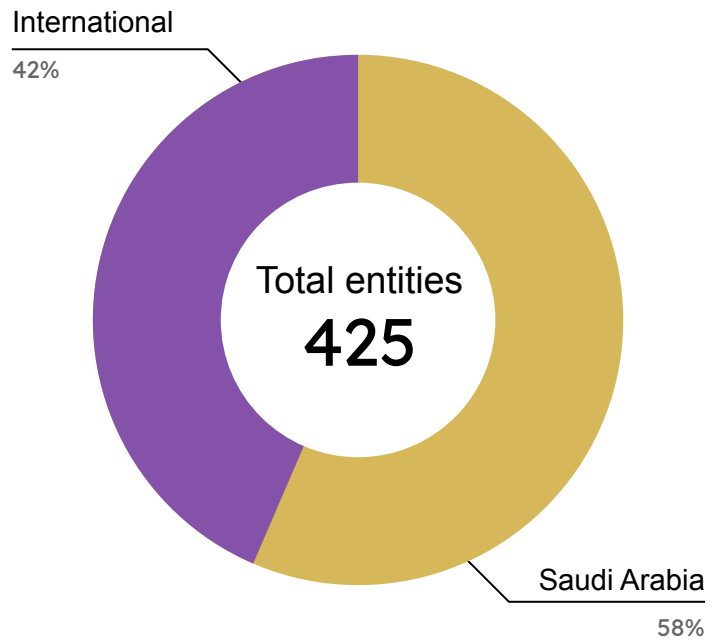
Most local sector:  
**SatCom**

13%

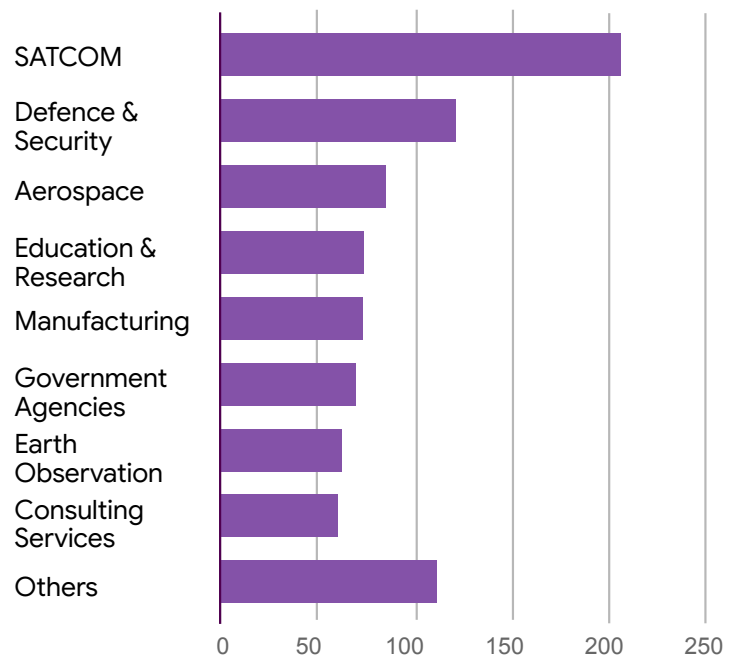
Most international sector:  
**SatCom**

12%

## Number of entities



## Number of organizations by industry



# Foreword

## About this Magazine

The purpose of this Magazine is to analyze Saudi Arabia's emerging space and defense industry ecosystem. We aimed to compile a comprehensive list of entities involved in the Saudi Arabian space and defense industry, directly or indirectly. This ranges from those directly engaged in space technology development to satellite communications departments. This report serves as a starting point, with the vision to continuously gather more data and insights, capturing the evolving landscape of the Saudi Arabian space ecosystem. Subsequent editions will build upon this foundation, offering a dynamic view of Saudi Arabia's contributions to the global space arena. Our aim is to contribute to a thorough understanding of the Saudi Arabian space industry, aiding informed decision-making and fostering growth in this promising frontier.

## SpaceTech in Gulf

SpaceTech in Gulf has solidified its position as the leading analytics and space market intel company in the Middle East and North Africa (MENA) specializing in strategic communications and market intelligence within the space domain.

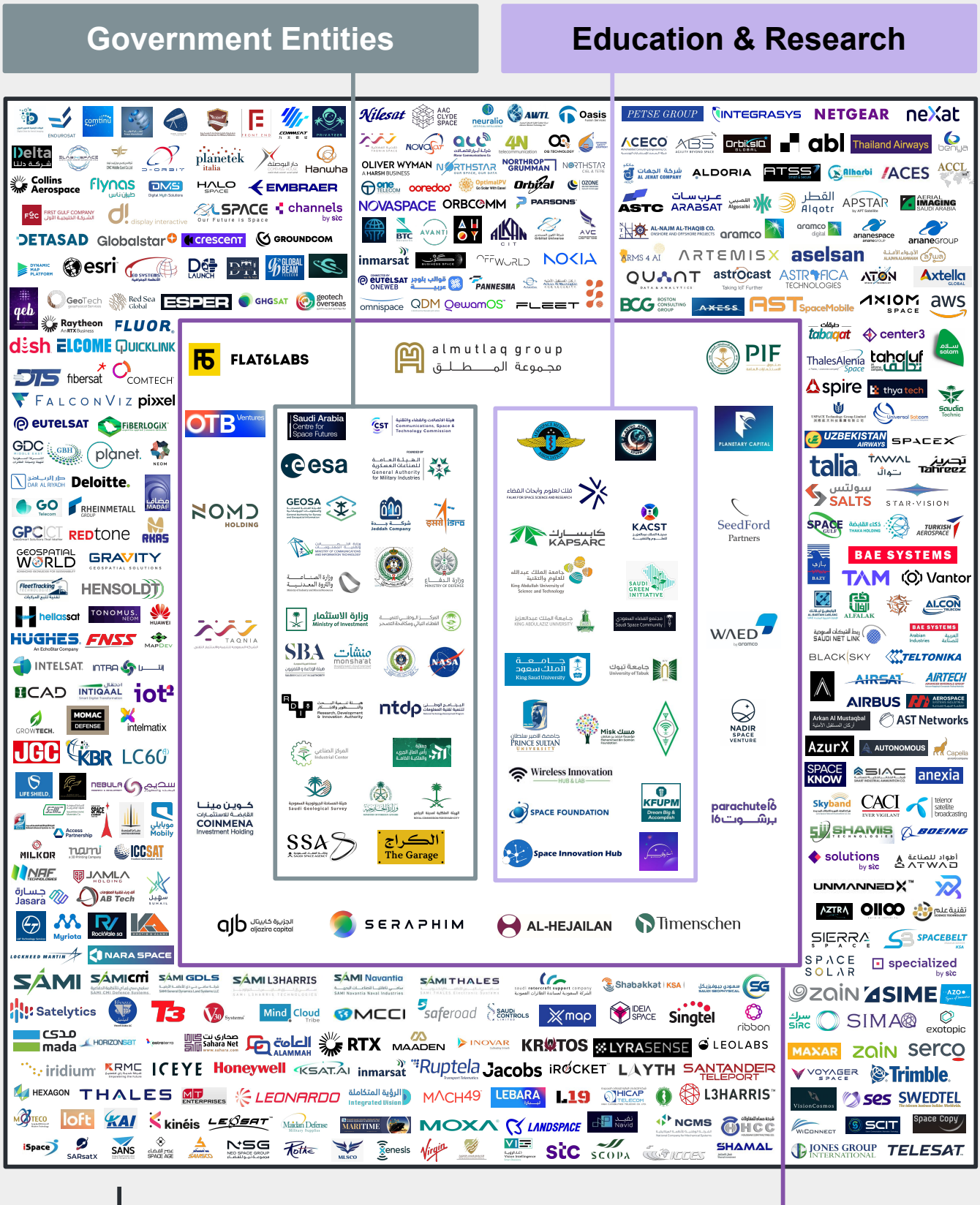
With a particular focus on the MENA region, the company offers expertise and insights into the unique challenges and opportunities that exist within this rapidly evolving sector. By leveraging its extensive knowledge and network, SpaceTech in Gulf helps its clients navigate the complexities of the SpaceTech landscape and develop successful business strategies that drive growth and innovation.

Contact us to learn more about how we can help you achieve your goals in the SpaceTech industry.

**Email: [info@spacetech-gulf.com](mailto:info@spacetech-gulf.com)**



# Saudi Arabia Space & Defense Ecosystem: 425 Key Organizations Driving Growth

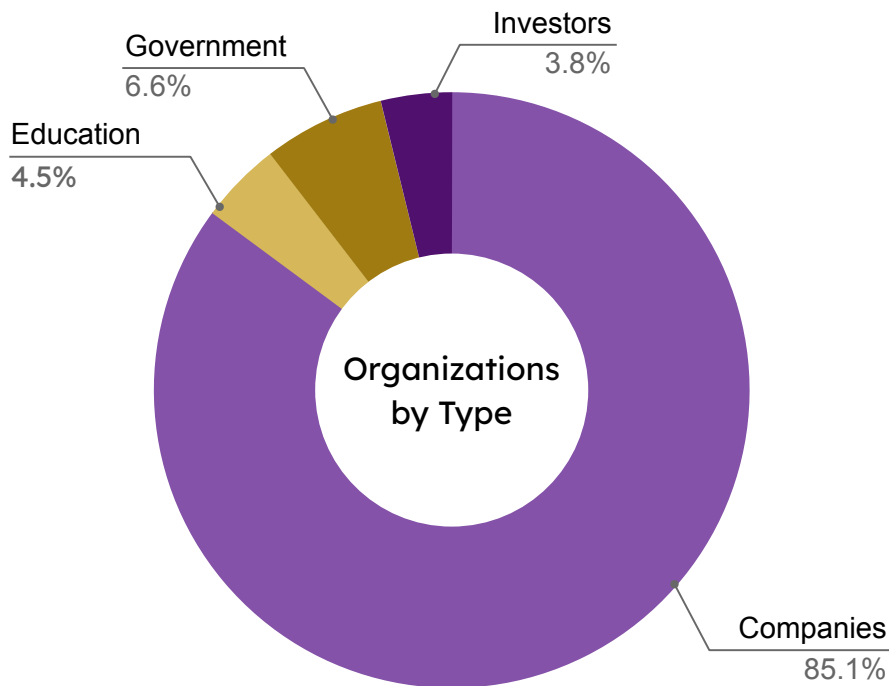


**Disclaimer:** This mind map is intended for demonstrative purposes only. If your organization's logo is missing or has been placed under an incorrect category, please do not hesitate to contact us and we will address it promptly.



# Saudi Arabia's Space & Security Ecosystem: 425+ Key Organizations Driving Growth

The ecosystem is overwhelmingly company-driven, with 362 private entities reflecting strong commercial momentum in Saudi Arabia's space sector. Government bodies (28) provide the institutional backbone through agencies such as the Saudi Space Agency and CST. Education institutions (19) and Investors (16) remain the smallest segments, indicating that both the research pipeline and domestic financing base are still developing to match the sector's growing ambitions.



The ecosystem has 425 space, security and related entities operating in Saudi Arabia across 10 categories, split between Saudi-based (246, 58%) and international (179, 42%) entities.

SATCOM remains the largest sector with 104 entities, reflecting its status as the most established segment of the space industry in Saudi Arabia and across the wider region. The relatively balanced split between Saudi (55) and international (49) players signals a maturing local industry that has built meaningful domestic capacity over decades.

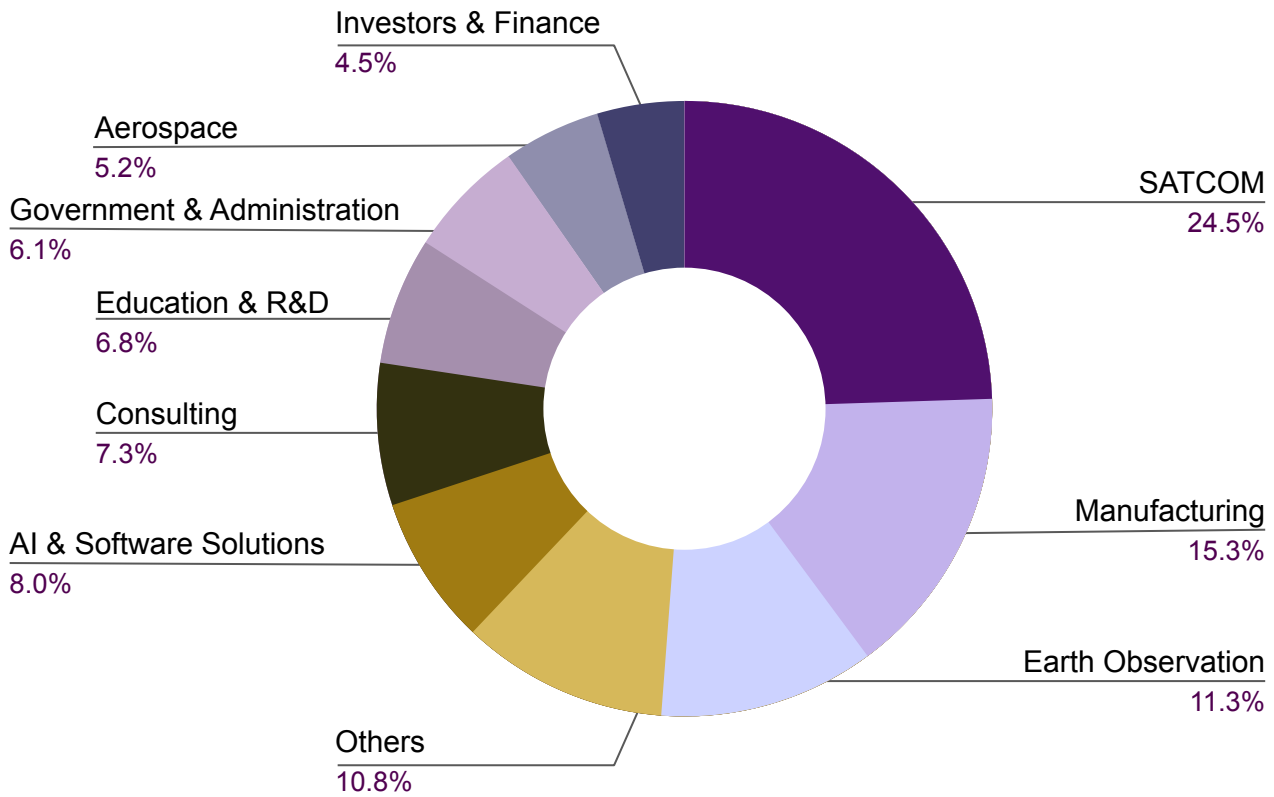
Manufacturing stands out as the sector most dependent on foreign expertise, with 38 of its 65 entities being international — the highest international count of any category. This underscores Saudi Arabia's continued reliance on global manufacturing capabilities, a gap that the kingdom's industrial localization agenda will need to address as its space ambitions scale.

Earth Observation & Geospatial Surveying (48 entities) and AI and Software Solutions (34 entities) are among the fastest-growing segments, driven in part by initiatives such as the SpaceUP competition organized by the CST and NSG, which has encouraged a wave of new company registrations in KSA, particularly in the Earth Observation space.

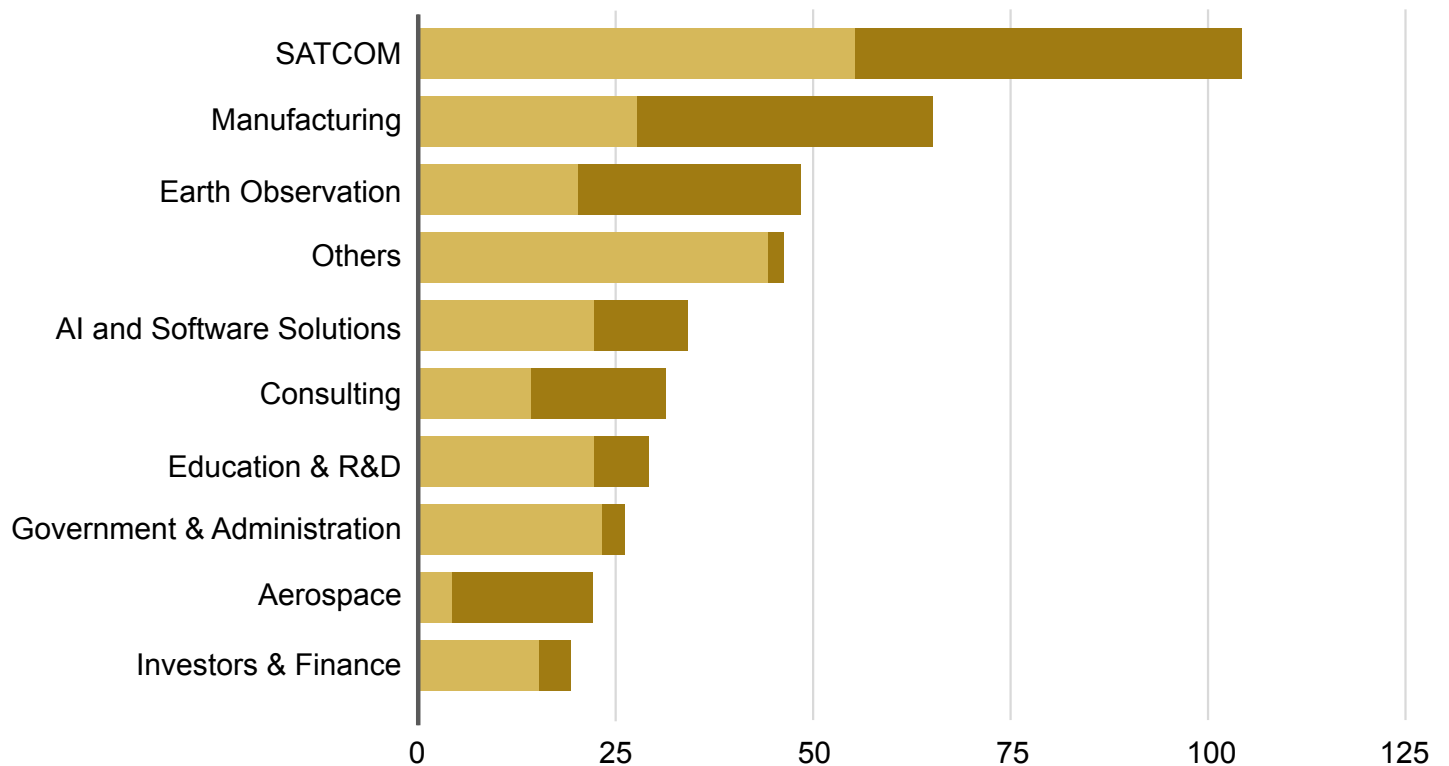
On the other end of the spectrum, Government & Administration (26 entities, 88% Saudi) and Others (46 entities, 96% Saudi) are overwhelmingly locally represented, as expected given their institutional nature. Investors & Finance remains the thinnest segment with only 19 entities, suggesting that domestic investment infrastructure is still developing relative to the broader ecosystem.

# The Distribution of 425 Organizations in Saudi Arabia

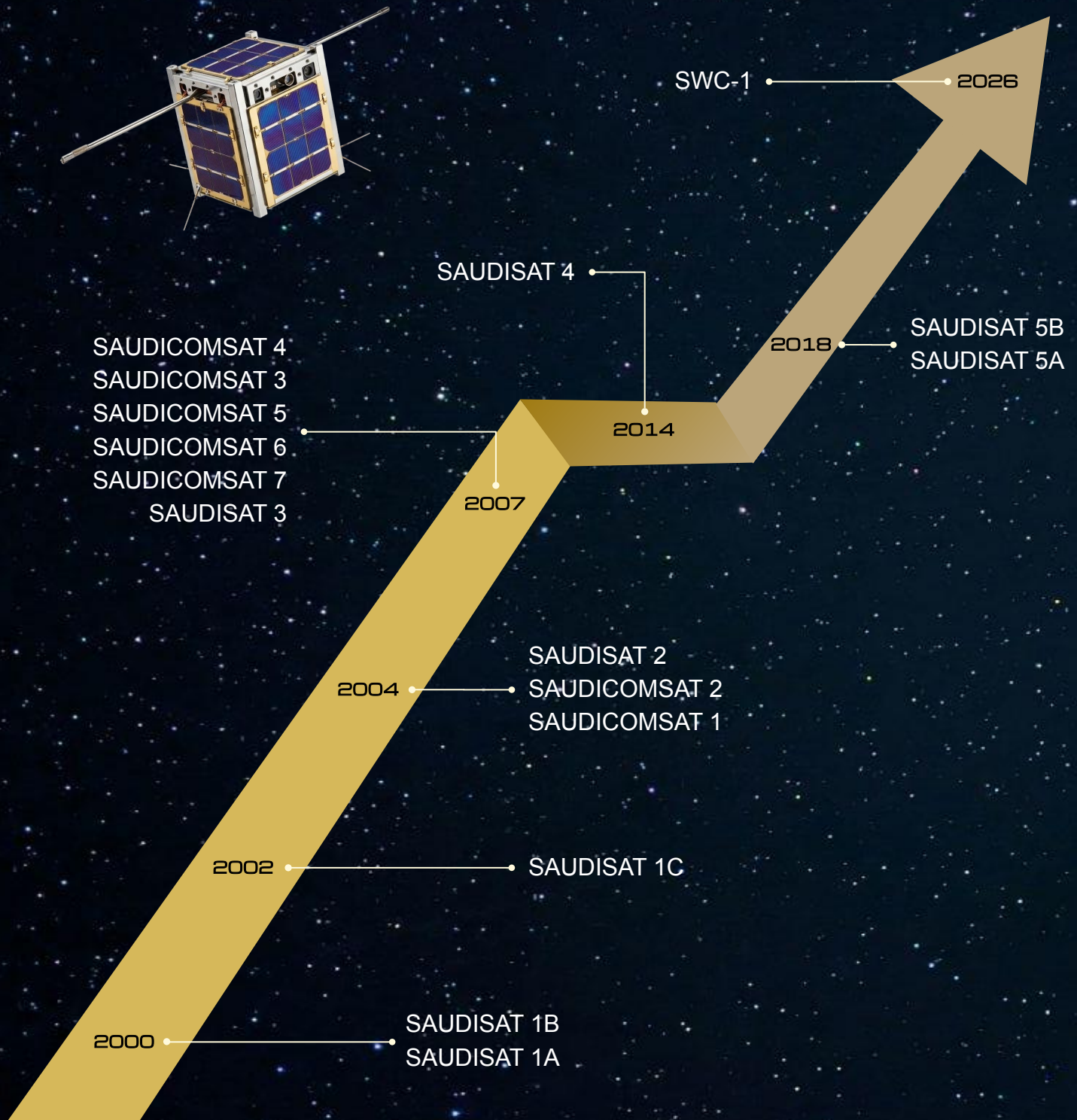
## Space & Security Industry / Total



## Space & Security Industry / Saudi Arabia vs International



# Saudi Arabia Satellites in Orbit — 2026



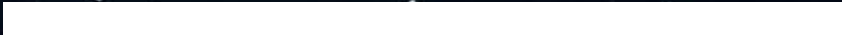
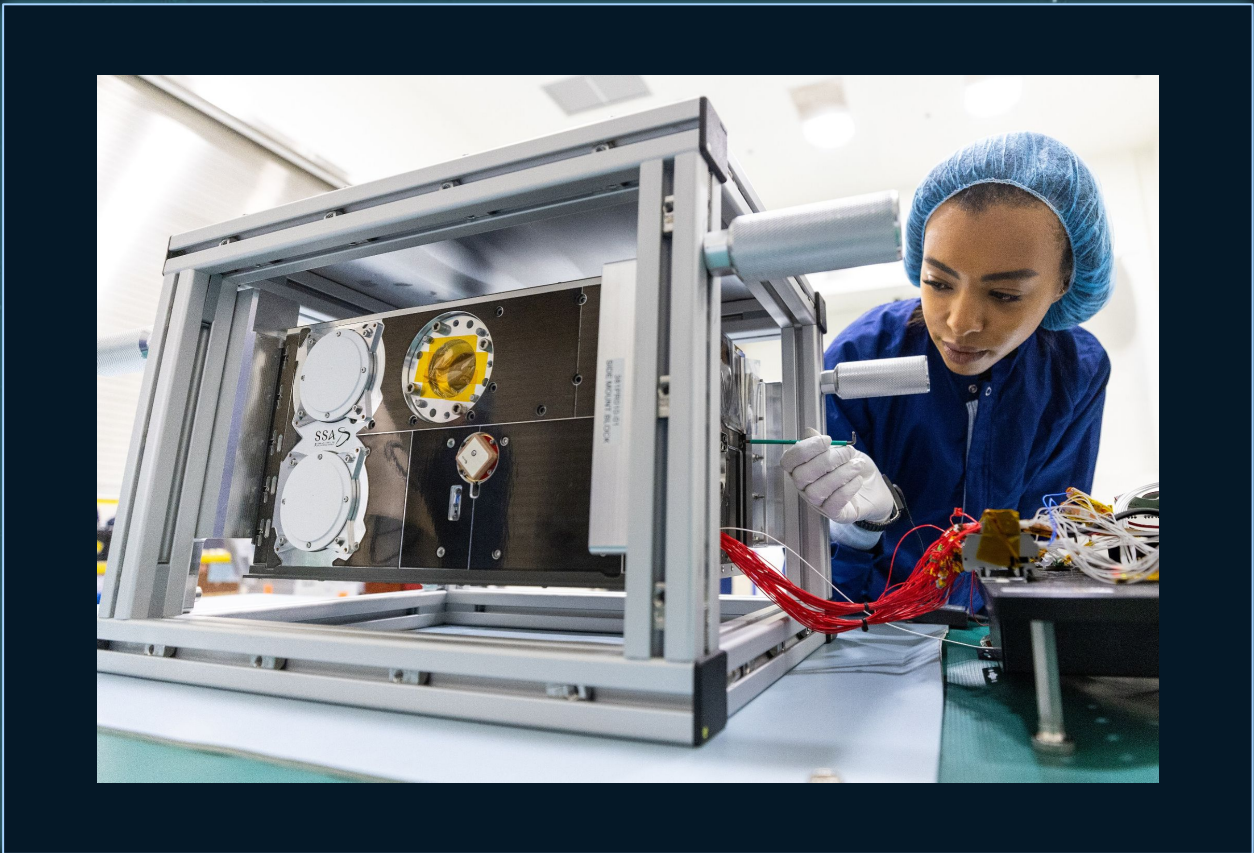
*Please note that some of the listed satellites may no longer be operational, yet remain in orbit.*



SHAMS is a 12U CubeSat developed by Saudi Arabia's Space Agency as a rideshare payload on the Artemis II mission. The probe's primary mission is to study the effects of space weather in the cislunar environment outside of Earth's magnetic field.



SHAMS orbit  
around Earth



# Interviews & Articles



## **Dr. Khalid AlShathri**

General Manager of Space Sector Development at Communications, Space and Technology Commission (CST)

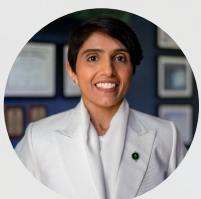
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## **Haithem Alfaraj**

NSG Group CEO

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## **Mishaal Ashemimry**

Managing Director, Centre for Space Futures

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## **Martin Smye-Rumsby**

Head of International Space Business Development at BAE Systems Digital Intelligence

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## **Luca Rossettini**

CEO and Founder at D-Orbit

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## **Venkat Pillay**

CEO & Founder of LatConnect 60 AI

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## **Alex Fielding**

CEO and Chairman at Privateer Space

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## **Prof. Mireille Elhajj**

Founder and CEO of Astra Terra

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**Frank Salzgeber**

Former Vice Governor CST

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**Dr. Junayd Miah**

Associate Director, Space & Connectivity  
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**Fahad Alhussain**

Partner at Nadir Space

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**Hesham M. Shageer, Ph.D.**

Co-Director CEAA KACST

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**Dr. Ayoub Alsubehi**

The Founder of Falak for Space Sciences  
and Research

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**Dr. Taghreed Al-Turki**

Postdoctoral researcher at the University of  
North Carolina

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**Abdullah AlGharrash**

Co-Founder of SpaceTech in Gulf

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**Dr. Khalid AlShathri**

General Manager of Space  
Sector Development at  
Communications, Space and  
Technology Commission (CST)



**SpaceUp Competition aimed to help bridge the gap between innovation and actual market demand through a concept designed around addressing some of the most common challenges faced by startups, particularly access to funding, securing customers, and validating their products in the market.**



**Looking back at 2025 and into early 2026, which achievements from CST's space agenda do you consider the most visible and impactful — both within the Kingdom and on the global stage?**

*Looking back at 2025 and into early 2026, one of the most visible achievements has been CST's continued efforts to strengthen the Space ecosystem and position Saudi Arabia as an attractive environment for innovation and entrepreneurship in the sector. This was reflected through initiatives and engagements that supported ecosystem growth, increased international visibility, and enabled stronger collaboration between startups, investors, and industry stakeholders. Participation in initiatives such as the Entrepreneurship World Cup (EWC) and SpaceUp competition helped create valuable opportunities for local and international startups and SMEs to engage with the ecosystem, showcase their technologies, and connect with potential demanders and partners.*

*On the regulatory side, CST continued advancing the sector's regulatory environment through public consultations and ongoing engagement with stakeholders, supporting a more transparent and collaborative approach toward the development of the Space sector.*

*In parallel, CST focused on enabling startups and entrepreneurs by integrating them into major events and ecosystem activities, helping support innovation, visibility, and access to wider commercial and investment opportunities.*



A milestone moment at the CST Sandbox Graduation 2025.

**SpaceUp was a first-of-its-kind competition in the region — what was the original thinking behind it, and did the outcome match what CST had envisioned when it was first designed?**

The original thinking behind [SpaceUp Competition](#) was to introduce a demand driver to support startups, where sector needs shape the selection and support of high-potential solutions rather than relying solely on traditional grant-based funding. Instead of offering financial grants alone, the competition focused on providing winning startups with access to real commercial opportunities and contracts within the Kingdom.

The concept was designed around addressing some of the most common challenges faced by startups, particularly access to funding, securing customers, and validating their products in the market. Through this approach, SpaceUp aimed to help bridge the gap between innovation and actual market demand.

Overall, the outcome aligned well with CST's vision of creating a more commercially driven and sustainable model for supporting entrepreneurship in the Space sector.

**Beyond agriculture, environment, and urban planning, are there any emerging EO use cases in Saudi Arabia that have surprised you in terms of demand?**

Beyond traditional sectors, CST has seen growing interest in expanding Earth Observation applications into more industry-focused areas, including logistics, infrastructure, and natural resources.

One of the areas that stood out the most in terms of demand was disaster management and national security. The increasing need for rapid response, monitoring, and real-time data has highlighted the critical role that Space applications and Earth Observation capabilities can play in supporting decision-making and emergency intervention.

**The investor awareness initiatives with Saudi Venture Capital and Private Equity Association (VCPEA) are ongoing — what is the current state of private investment flowing into the Saudi space ecosystem, and what sectors within space are attracting the most interest?**

Investor awareness initiatives remain ongoing and continue to support broader engagement with the investment community around opportunities in the Space sector.

Today, investment flowing into the Saudi space ecosystem over the past three years has included major investments, including USD 350 million from Axiom, USD 13 million from OQ Technology, the USD 150 million Saudi Space Fund, and USD 200 million from OneWeb, reflecting growing market interest and activity across the sector.

*In terms of areas attracting the most attention, interest has largely been focused on downstream applications and commercially driven Space solutions, particularly applications that support different industries and enable practical use cases through Space technologies and data.*

**Regulation and business friendliness can sometimes feel like they're pulling in opposite directions — how does CST find that sweet spot when it comes to attracting international space companies while still maintaining proper oversight?**

*CST works to maintain a balanced approach between enabling business growth and ensuring an effective regulatory environment for the Space sector. One of the key approaches is engaging the private sector directly in regulation development through public consultations, allowing stakeholders to contribute feedback and perspectives throughout the process.*

*In addition, CST's regulatory sandbox enables companies to test emerging technologies and services within a controlled environment, helping support innovation while ensuring the appropriate regulatory oversight. Through these efforts, CST aims to create an attractive environment for international Space companies while supporting sustainable sector growth.*

**How is CST measuring whether its regulatory environment is genuinely competitive against other emerging space hubs?**

*CST continuously monitors the competitiveness of its regulatory environment through benchmarking, stakeholder engagement, and sector-related indicators. This includes tracking market developments, investor and company feedback, regulatory trends in emerging Space hubs both locally and internationally, and the overall ability to attract and enable local and international Space companies.*

**Behind all the regulations, platforms, and competitions, space ultimately runs on people — where is Saudi Arabia today in terms of having enough homegrown space talent, and is the gap closing fast enough?**

*Human capital remains a key pillar for the growth of the Space sector, and the Saudi Space Agency (SSA) plays a leading role in developing national capabilities across different educational and professional levels. The Kingdom has made strong progress in building a growing talent pipeline, starting from early-stage awareness programs through to university and higher education initiatives.*

*This has been reflected through initiatives such as the Kingdom's participation in the International Olympiad for Astronomy and Astrophysics, in addition to programs like the "Madak" competition launched by SSA to encourage interest in Space sciences and technologies among students at an early stage. Together, these efforts are helping strengthen the national talent base and gradually close the skills gap required to support the sector's long-term growth.*



**Many space technologies — satellite imaging, communications, positioning — are inherently dual-use. How is Saudi Arabia approaching the governance of dual-use space technologies, and is CST working closely with other sectors on this?**

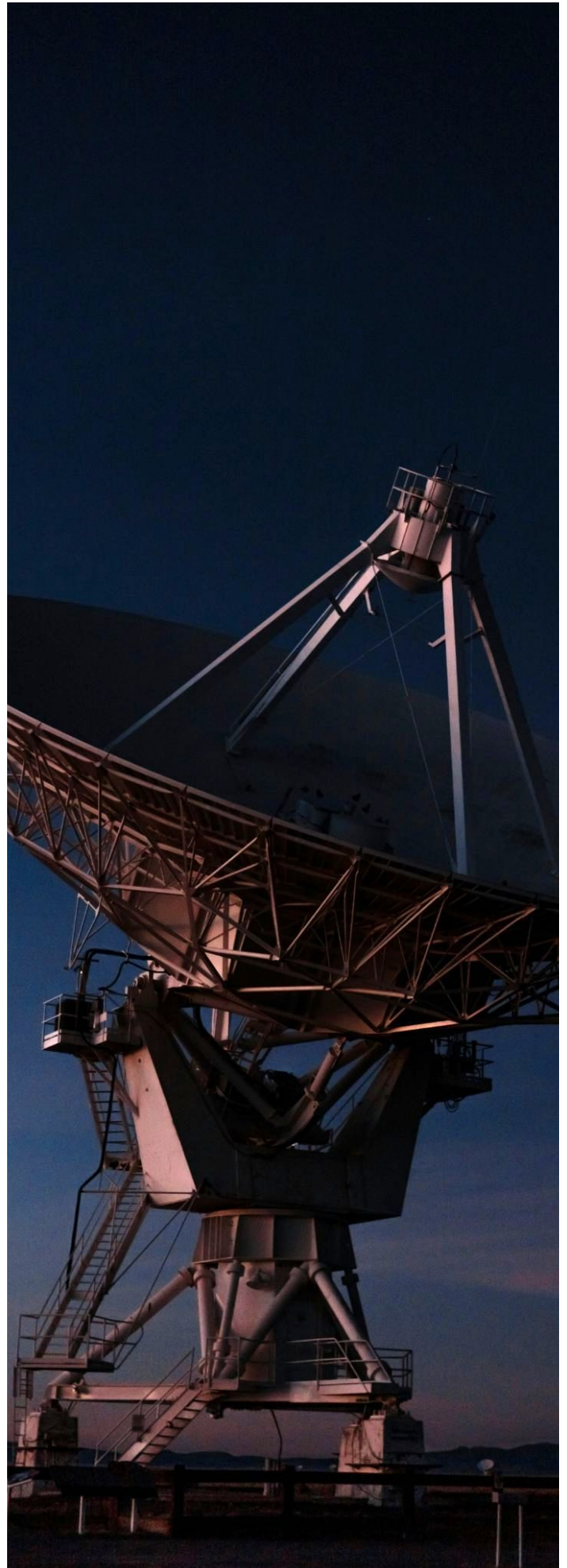
*Saudi Arabia addresses this through close coordination and collaboration between regulators and relevant sectors. CST works closely with different entities in government and sector regulators, including organizations such as General Authority of Civil Aviation (GACA), the Ministry of Industry and Mineral Resources (MIM), and the Ministry of Environment, Water and Agriculture (MEWA), to support the responsible development and deployment of Space-related services and applications.*

*This collaborative competition also extends to initiatives such as SpaceUp, where government entities participate in identifying sector needs and supporting practical use cases. The focus is not only on regulation, but also on enabling services, experiments, and ensuring that regulatory requirements are met in a way that supports innovation and sector growth.*

**Vision 2030 is approaching its final years — where does Saudi Arabia realistically stand today in terms of becoming a top-tier global space nation, and what is the single most critical milestone CST is focused on before 2030?**

*As Vision 2030 approaches its final years, Saudi Arabia is moving beyond being primarily focused on downstream Space applications toward enabling more upstream capabilities and technologies within the Kingdom.*

*One of the key priorities today is enabling companies to develop and test Space technologies locally by supporting experimentation, and technology validation activities. The broader objective is to position the Kingdom as a regional hub for developing Space-related services and enabling advanced Space technologies and experiments before 2030.*





## Haithem Alfaraj

NSG Group CEO

Haithem M. Alfaraj is a transformational technology leader with over two decades of experience across telecommunications and energy. Most recently, he served as Group Chief Technology Officer at stc, where he led the company's technology strategy, network infrastructure, digital platforms, cybersecurity capabilities, and operating model transformation.

During his tenure, Mr. Alfaraj architected landmark transformation programs spanning mobile network modernization, large-scale cloudification, digital platform development, and organizational operating model redesign — driving stc's evolution from a traditional telco into a digital technology group.

Prior to stc, he held senior technology roles at Mobily and began his career at Saudi Aramco, building expertise in large-scale technology operations and engineering.

Beyond his executive roles, Mr. Alfaraj has been a member of the GSMA Technology Group Board for six years, contributing to telecom industry standardization. He also serves as a Board Member of the Centre for the Fourth Industrial Revolution (C4IR), a partnership between KACST and the World Economic Forum.

Mr. Alfaraj holds a Bachelor's degree in Computer Engineering from King Fahd University of Petroleum and Minerals (KFUPM) and an Executive MBA from Hult International Business School, complemented by programs at INSEAD and Harvard Business School.



**NSG has rapidly expanded through strategic acquisitions and partnerships, including UP42, Display Interactive, Saudia, and Riyadh Air. How would you describe the company's growth philosophy, and what does this momentum say about Saudi Arabia's ambitions in space?**

*NSG's growth is driven by a disciplined, capability-led strategy, in addition to a focused approach to scaling its platforms and market presence.*

*As a global space services company, we are building an integrated portfolio across satellite communications, geospatial intelligence, and PNT to serve government and enterprise stakeholders across strategic sectors, including defense, aviation, and critical infrastructure.*

*Each acquisition and partnership — including UP42 and DI our aviation collaborations — is designed to strengthen sovereign capabilities, accelerate technology localization, and create long-term strategic value.*

*As part of PIF, NSG is positioned as a strategic company for the Kingdom of Saudi Arabia within its Vision Portfolio.*

*Our trajectory reflects a broader national ambition: positioning space as critical infrastructure that underpins connectivity, intelligence, resilience, and economic diversification under Vision 2030.*

**Eng. Haithem Alfaraj recently assumed the role of Group Chief Executive Officer, bringing deep experience from stc and Saudi Aramco. How does his appointment support NSG's next phase of growth?**

*Eng. Haithem Alfaraj's appointment marks a transition from foundation building to scaled execution and commercialization.*

*His focus is clear: accelerating sustainable growth across NSG's core sectors — government, defense, aviation, maritime, and enterprise — where space-enabled services are becoming mission-critical. A key priority is the commercialization of sovereign space infrastructure and national assets, transforming foundational capabilities into scalable, revenue-generating platforms that support national resilience and long-term economic value.*

*At the same time, NSG is deepening national, regional, and global partnerships to strengthen its multi-orbit, multi-domain positioning, while expanding access to technology, capacity, and international markets.*

*This includes advancing convergence between space, telecommunications, and digital platforms — particularly in high-growth areas such as direct-to-device (D2D) and IoT, where global market dynamics are rapidly evolving.*

**NSG positions itself as more than a satellite company, spanning communications, geospatial intelligence, and PNT. What is the long-term vision behind building such an integrated portfolio?**

*The future of the space economy is multi-domain by design. At NSG, we are integrating satellite communications, Earth observation, geospatial intelligence, and PNT into a unified architecture that enables end-to-end, decision-driven solutions.*

*This means moving beyond standalone capabilities:*

- 1 Satellite communications delivers resilient, multi-orbit connectivity;*
- 2 Earth observation provides real-time visibility and data acquisition;*
- 3 Geospatial intelligence transforms data into actionable insights;*
- 4 PNT enables precision, synchronization, and operational coordination.*

*Together, these capabilities create an integrated system — from data acquisition to decision-making to action.*

*This multi-domain integration allows NSG to support complex, mission-critical environments where connectivity, intelligence, and positioning must operate seamlessly — particularly across defense, aviation, maritime, and national infrastructure.*



*Visualization of NSG's satellite (SGS-1) in space*

**NSG Skywaves® is gaining international traction through partnerships with airlines such as Saudia and Riyadh Air. What does it mean for Saudi Arabia to have a homegrown in-flight connectivity platform competing globally?**

NSG Skywaves® represents a step-change in in-flight connectivity, positioning Saudi Arabia as a credible global player in one of the most competitive segments of the satellite communications market.

At its core, NSG Skywaves® is built on a multi-orbit architecture, combining GEO and MEO capabilities to deliver high throughput, low latency, and global coverage with built-in resilience, with a clear path to further integrate additional orbital layers over time.

This is enabled through a strong ecosystem of partners:

- **SES Open Orbits™** providing the multi-orbit backbone;
- **ThinKom** delivering advanced Ka-band antenna technology;
- **Eclipse Global Connectivity** contributing deep aviation integration expertise.

Together, this creates a highly reliable, scalable, and airline-grade connectivity solution.

Our partnerships with airlines such as Saudia, Riyadh Air, Thai Airways, Turkish Airlines, Aegean Airlines, and Uzbekistan Airways reflect growing market confidence in NSG's ability to deliver consistent, high-performance connectivity at scale.

Beyond passenger connectivity, NSG Skywaves® enables airlines to optimize operations, improve efficiency, and enhance digital services.

**UP42, originally developed by Airbus, is now part of NSG's ecosystem. How are you evolving the platform to support regional and national priorities?**

UP42 is a key enabler for NSG's geospatial strategy and has already been successfully launched in Saudi Arabia as NSG UP42 — the Kingdom's first Earth observation marketplace platform. Our focus is twofold:

**National (KSA):**

- Establish a sovereign geospatial ecosystem;
- Enable government and enterprise access to trusted, high-quality data;
- Support strategic sectors including defense, urban development, energy, agriculture, and environmental monitoring.

**International:**

- Expand global partnerships with leading Earth observation providers;
- Position NSG as a regional hub for geospatial intelligence and analytics;
- Provide scalable, cloud-based access to satellite data and AI-driven insights.

Support strategic sectors including defense, urban development, energy, agriculture, and environmental monitoring.

Through NSG UP42, users can access multiple EO services such as optical, SAR, hyperspectral, thermal, and AI-powered analytics through a single interface — enabling faster, more informed decision-making.

The platform is not just about data access — it is about democratizing geospatial intelligence while ensuring sovereignty, security, and scalability.

**In practical terms, how is NSG contributing to the development of Saudi Arabia's domestic space industry under Vision 2030?**

NSG is directly enabling Vision 2030 through real-world, high-impact use cases across multiple sectors:

- **Satellite communications solutions for the defense and government sectors:** Enabling ISR, secure communications, and operational coordination;
- **Aviation & Connectivity:** Delivering next-generation in-flight connectivity through NSG Skywaves®, powered by multi-orbit satellite communications, alongside high-performance broadband services for strategic customers;
- **Geospatial Intelligence:** Supporting urban planning, infrastructure monitoring, and environmental management through advanced Earth observation and analytics;
- **Disaster Management:** Enhancing preparedness, response, and recovery through real-time data, connectivity, and situational awareness;
- Beyond technology deployment, we are building national capabilities — developing local talent, enabling knowledge transfer, and creating sustainable value chains within the Kingdom.

## How are NSG's geospatial and Earth observation capabilities creating tangible impact across key sectors in Saudi Arabia?

Geospatial intelligence and Earth observation are now central to national decision-making and strategic planning. At NSG, these capabilities support:

- **Disaster Preparedness & Response:** Early warning systems, damage assessment, and recovery planning;
- **Government & Defense (ISR):** Real-time situational awareness, border security, and mission planning;
- **Urban Planning & Infrastructure:** Smart city development, land use optimization, and infrastructure monitoring;
- **Maritime Domain Awareness:** Vessel tracking, trade route security, and environmental monitoring;
- **Energy & Natural Resources:** Asset monitoring, environmental compliance, and operational efficiency.

These capabilities are deeply integrated into government and enterprise strategies, enabling proactive decision-making, enhanced resilience, and operational intelligence at scale.

## The satellite communications market is highly competitive. What differentiates NSG in this evolving global landscape?

NSG's differentiation lies in its ability to operate as a full-stack, multi-domain space services provider. NSG integrates multi-orbit satellite communications, geospatial intelligence and Earth observation, and PNT capabilities into a unified solution, unlike traditional satellite operators.



A group picture of NSG's Senior Management Team headed by Eng. Haithem Alfaraj with H.E. Eng. Abdullah bin Amer Alswaha, Minister of Communications and Information Technology and Chairman of NSG's Board of Directors, at NSG's HQ in Riyadh

This is reinforced by:

- Strong sovereign positioning aligned with national priorities;
- Long-term investment backing through PIF under the umbrella of Vision 2030;
- Strategic global partnerships;
- An ability to bridge space, telecommunications, and digital infrastructure.

This allows NSG to deliver integrated, scalable, and mission-critical solutions tailored to both national and international customers.

## Looking ahead over the next decade, what does success look like for NSG and for Saudi Arabia's role in the global space economy?

Over the next decade, NSG's ambition is to position Saudi Arabia as a leading global hub for space-enabled services and advanced technologies.

This will be driven by:

- 1 Strengthening leadership across key sectors, including government, defense, aviation, maritime, and enterprise;
- 2 Expanding global partnerships and international market presence;
- 3 Scaling sovereign capabilities into globally competitive platforms ;
- 4 Being a key player for enabling future space technologies.

At the core of this vision is NSG's multi-domain strategy, leveraging synergies between satellite communications, geospatial intelligence, and PNT to deliver integrated solutions at scale.

Success means not only participating in the global space economy, but shaping it — while enabling Saudi Arabia's long-term strategic, economic, and technological ambitions under Vision 2030.

# Saudi Arabia

Centre for  
Space Futures

Interview



**Mishaal  
Ashemimry**

Managing Director, Centre  
for Space Futures

Mishaal Ashemimry is the Managing Director of the Centre for Space Futures and the first female aerospace engineer in the Gulf Cooperation Council. A commercial pilot and space entrepreneur, she previously served as Special Advisor to the CEO of the Saudi Space Agency and VP for Diversity Initiatives at the International Astronautical Federation. Her technical foundation was built at Northrop Grumman and Raytheon, where she contributed to over 22 rocket programs, later leading her to found MISHAAL Aerospace to pioneer cost-effective launch vehicles for low Earth orbit.



## What motivated the creation of the Centre for Space Futures, and what gap in the global space ecosystem is it aiming to fill?

*The Centre for Space Futures was created to address a growing need in the global space ecosystem: a trusted and neutral platform with the convening power to bring together stakeholders across geopolitical, sectoral, and economic boundaries. Space is becoming an increasingly strategic layer of the global economy, underpinning communications, navigation, climate monitoring, logistics, agriculture, financial systems, and national resilience. As its importance grows, so does the need for dialogue that can bridge East and West, established and emerging space nations, public and private actors, and both space and non-space industries. The challenge is not a lack of activity, innovation, or ambition. The challenge is the need for a trusted platform that can connect these efforts, build confidence among stakeholders, and help the sector address shared opportunities and risks before they become barriers to growth. The Centre was established to play that role.*

*The Centre's location in Riyadh is a key part of its value proposition. Saudi Arabia occupies a unique position at the intersection of global markets and international partnerships, enabling constructive engagement across diverse regions and perspectives. Combined with the Kingdom's growing role in technology, innovation, and economic transformation, Riyadh provides an ideal environment for convening global stakeholders around the future of space. Through its connection to the World Economic Forum's Centre for the Fourth Industrial Revolution (C4IR) network, the Centre for Space Futures is uniquely positioned to bring together policymakers, industry leaders, investors, entrepreneurs, researchers, and international organizations from across the global space ecosystem. This convening power helps create dialogue and collaboration among stakeholders who may not otherwise have opportunities to engage in the same forum.*

*We do this through practical initiatives that connect policy, technology, sustainability, and investment. Future of Space Law white paper series examines how governance frameworks can evolve to support responsible and commercially viable space activities. Our Clear the Orbit, Secure the Future publication highlights the economic implications of space debris and reframes orbital sustainability as a market, investment, and resilience challenge.*

*Our Space Tech initiative identifies technologies with the potential to unlock new opportunities and helps connect them with the partnerships and ecosystems needed to scale. In that sense, the Centre is more than a convening platform. It serves as a bridge between perspectives, regions, and sectors, helping ensure that the global space economy develops in a way that is sustainable, inclusive, resilient, and commercially viable.*

## How does the Centre plan to shape the future of the global space economy over the next decade?

*The Centre plans to shape the future of the global space economy by focusing on three areas where it can create the greatest impact: foresight, convening, and translating dialogue into action. The space sector does not simply need more reports or more discussions. It needs trusted institutions that can identify emerging challenges and opportunities, elevate them into shared priorities, and connect those priorities with the partnerships, capital, and policy frameworks required to drive meaningful progress. Over the next decade, we aim to contribute to a space economy that is more investable, sustainable, resilient, and globally inclusive. This includes identifying technologies that can unlock new markets, supporting policy discussions that enable responsible commercialization, advancing conversations around orbital sustainability, and helping stakeholders understand emerging risks before they become barriers to growth.*

*A key part of our role is connecting communities that often operate within different ecosystems and perspectives. Governments, startups, investors, operators, academia, and adjacent industries frequently approach the space economy through different lenses. The Centre helps align these perspectives so that policy, technology, investment, and market needs can move forward together.*

*Riyadh's emergence as a global hub for innovation, investment, and international cooperation provides a strong foundation for this mission. By leveraging Saudi Arabia's unique diplomatic reach and the global C4IR network, the Centre is able to convene stakeholders from across established and emerging space economies, including actors that may not typically engage within the same forums. This enables the Centre to foster trust, encourage collaboration, and accelerate partnerships that can help shape the future trajectory of the global space economy. Ultimately, our ambition is to help create the conditions for long-term growth by connecting ideas with action, fostering international collaboration, and ensuring that the benefits of the space economy can be shared more broadly across regions, industries, and societies.*

## Many forecasts suggest the space economy could reach \$1 trillion to \$2 trillion by 2040. Which segments do you believe will drive the most growth?

The largest growth will come from the areas where space becomes deeply embedded in the terrestrial economy. Communications, positioning, navigation and timing, and Earth observation will continue to be foundational. These are the services that already power large parts of our daily lives, from logistics and financial transactions to weather forecasting and digital connectivity. However, the next wave of growth will come from downstream applications. The real opportunity is not only in building satellites or launching rockets. It is in using space data and space-enabled services to solve problems in energy, agriculture, insurance, climate resilience, mobility, urban planning, maritime activity, and national infrastructure.

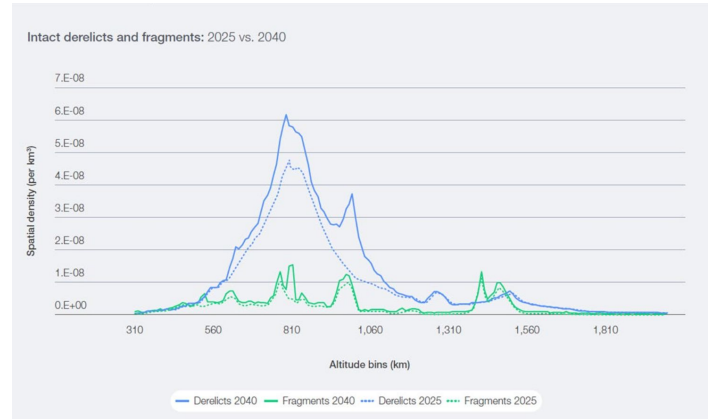
We also see major growth potential in in-space services, including space situational awareness, collision avoidance, life extension, servicing, debris mitigation, and eventually more advanced in-space manufacturing and logistics. As orbits become more congested, the market will increasingly reward companies that can protect assets, extend mission life, reduce operational risk, and make space activity more sustainable.

This is why the Centre took on the Space Tech initiative. We wanted to look beyond broad forecasts and identify the technologies that can actually unlock new market value. Through the Space Tech report, we are helping make these technologies easier to understand, assess, and connect to potential users, investors, and partners. The objective is not only to describe future technologies, but to create a bridge between foresight and ecosystem action.

## What are the biggest policy or regulatory barriers currently slowing the commercialization of space?

One of the biggest barriers is regulatory uncertainty. Companies and investors need clarity on licensing, liability, spectrum access, data policy, insurance expectations, export controls, safety standards, and long-term sustainability obligations. When rules are fragmented or unclear, innovation becomes slower and capital becomes more cautious.

Another challenge is that many legal and regulatory frameworks were designed for an earlier era of space activity. Today, we have small satellites, mega-constellations, commercial human spaceflight, lunar missions, in-orbit servicing, private space stations, and increasingly complex public-private models. These developments require policy thinking that is adaptive, practical, and internationally informed.



Source: Saudi Space Agency & LeoLabs. 2025 to 2040 debris levels, which includes intact derelicts and fragments, showcasing the peak fragment spike getting worse around 800 km

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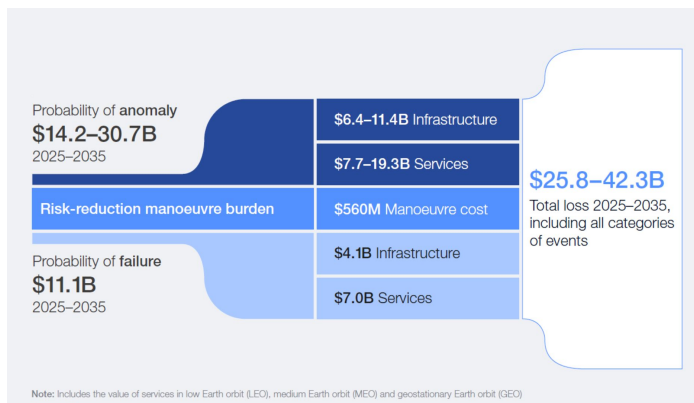
This is exactly why the Centre launched The Future of Space Law white paper series. The purpose of the series is to examine how space governance can evolve by learning from other domains, including air law, maritime law, the Antarctic Treaty system, telecommunications, and other international frameworks. We are not suggesting that these models can simply be copied into space. Rather, we are asking what lessons can help improve coordination, responsibility, commercial confidence, and long-term sustainability. A key part of this work, especially in the third paper of the series, is looking at how space governance can be operationalized. The challenge is not only to define principles, but to understand how they can be translated into practical mechanisms, institutional arrangements, standards, incentives, and decision-making processes that work for governments, industry, and the wider space ecosystem.

## How can emerging space nations and private startups engage with the Centre and contribute to its initiatives?

The Centre is designed to be inclusive. Emerging space nations and startups are central to the future of the space economy. Many of the most important use cases will come from new markets and from companies that are applying space capabilities to real economic and societal needs.

They can engage with the Centre through our research, workshops, ecosystem consultations, technology initiatives, and policy dialogues. For startups, the Space Tech initiative is particularly relevant because it is designed to identify promising technologies, explain their relevance through accessible factsheets, and connect them to broader ecosystem needs.

For countries, engagement can include collaboration on policy dialogue, sustainability frameworks, technology foresight, and capacity-building initiatives. The Centre is especially interested in working with actors who want to contribute to the responsible growth of the space economy, whether through technology, regulation, investment, or applied use cases.



Source: Novaspace, 2025. *The Economic Impact of Space Debris by 2035*

**Space sustainability and orbital congestion are becoming critical issues. What concrete initiatives is the Centre developing to address these challenges?**

Space sustainability is one of the Centre’s core priorities because the future space economy depends on the long-term usability of orbits. If orbital risk is not addressed, it can affect mission continuity, insurance costs, investor confidence, asset protection, and the reliability of services that people and economies depend on every day.

This is the reasoning behind *Clear the Orbit, Secure the Future*. We wanted to move the debris conversation beyond a purely technical or environmental framing and show that orbital congestion is also an economic issue. Debris risk affects commercial viability, operational costs, due diligence, financing, insurance, and long-term market resilience. Through this work, the Centre is helping frame space sustainability as a shared economic priority. We are focused on areas such as space situational awareness, collision avoidance, active debris removal, post-mission disposal, on-orbit servicing, risk modeling, standards, and incentives. The goal is to support a stronger market and policy environment for responsible space activity.

**What unique opportunities does the Middle East bring to the global space ecosystem?**

The Middle East brings three important strengths. The first is strategic ambition. The region is investing in future industries, digital infrastructure, advanced technologies, and economic diversification, which creates a strong foundation for space-sector growth.

The second is geography and connectivity. The region sits at the crossroads of Asia, Africa, and Europe, and can act as a bridge between established space powers and emerging space markets. This is valuable because the next phase of space growth will depend on broader participation, not only activity from traditional space nations.

The third is demand. The region has strong needs in climate monitoring, water management, desertification, energy, logistics, maritime security, smart cities, agriculture, and disaster response. These are all areas where space-enabled solutions can create immediate value.

**Looking ahead to 2035, what major shifts do you expect in the space industry, and how is the Centre preparing for them today?**

By 2035, space will be much more integrated into the global economy. It will not be viewed only as a standalone sector, but as an enabling layer for many industries. The most successful space companies will be those that can turn space capabilities into measurable value for governments, businesses, and citizens.

We will also see greater emphasis on resilience, sustainability, and governance. As more actors enter orbit, responsible operations will become essential to commercial success. Investors, insurers, regulators, and customers will increasingly ask whether space activities are reliable, sustainable, and aligned with long-term market stability.

The Centre is preparing for this future through its current portfolio of work. The *Future of Space Law* series addresses the governance questions that will shape responsible growth. *Clear the Orbit, Secure the Future* addresses the sustainability and economic risk questions that could define the next decade. The Space Tech initiative identifies the technologies that can unlock future value and helps connect them to the ecosystems that can advance them.

Together, these initiatives reflect the Centre’s purpose: to serve as an impartial global platform that bridges policy, technology, sustainability, investment, and international collaboration to support the future of the space economy.



## Martin Smye-Rumsby

Head of International Space  
Business Development at  
BAE Systems Digital  
Intelligence

Martin Smye-Rumsby is Head of International Space Business Development at BAE Systems Digital Intelligence, where he leads global engagement and growth across the company's space portfolio.

He is also Chair of the Remote Sensing and Photogrammetry Society and is an advocate for the use of satellite data and remote sensing to support security, sustainability, and economic development.





## How has the BAE Systems space offering evolved over recent years?

*BAE Systems has been active in the space domain for a long time. Our US space division has 70 years of expertise supporting US space missions, while our UK space business has been at the forefront of space innovation for over 30 years, including supporting European Space Agency (ESA) deep space exploration missions.*

*The BAE Systems Digital Intelligence business in the UK is currently focused on deploying Radio Frequency (RF) sensing technologies given the emergence of space as a critical operational domain alongside sea, land, air and cyber. A bold investment four years ago has resulted in the launch of our first Azalea satellite cluster into low Earth orbit, designed to deliver the timely, actionable intelligence required for military operations and disaster response.*

*The satellites are currently undergoing commissioning and we are excited to show our partners in the Kingdom what Azalea™ can do once this is completed.*

## What space capabilities do you think could add most value in the region?

*Efficiently and effectively countering drone munitions and ballistic missiles will undoubtedly be at the forefront of decision maker's minds in the region. Robust, high assurance space ISR capabilities can support governments in countering this threat as part of a layered approach to sense, decide and effect.*

*We have also recently seen some commercial space ISR operators restrict customer access to their data through time delays. Sovereign space capabilities are critical to those who need assured, unfettered access to insight from space at the speed of operational relevance. It is only by owning the means of data collection that one can provide a robust level of mission support when it matters most.*

*There has also been an increasing prevalence of radio frequency interference, often experienced as disrupting vital global navigation satellite system (GNSS) signals that the modern global economy fundamentally relies upon.*

*Relying upon a GNSS signal controlled by another actor opens up a variety of vulnerabilities, so assured position, navigation and timing (PNT) capability could add significant value to countries in the region.*

## Why has space become so important to national security?

Space has become indispensable to national security because nations like Saudi Arabia rely on orbital infrastructure across multiple dimensions of defence, resilience and economic strength.

What was once a niche enabler is now the backbone of global connectivity, intelligence and strategic awareness. Space underpins national sovereignty with secure satellite communications, resilient navigation and persistent Earth observation giving nations the ability to operate without relying on third-party controlled systems or external data pipelines.

Notably, threats have evolved beyond terrestrial boundaries. The likes of deniable cyber-attacks on satellites and contested orbits have elevated space to a critical operational environment. Protecting the space domain itself and maintaining security in orbit are now essential to maintaining stability on Earth.

Finally, space provides persistent, wide-area visibility that platforms in other domains can't match. Whether monitoring climate-driven challenges, securing maritime routes or ensuring the integrity of critical energy infrastructure, space-derived intelligence is now indispensable for situational awareness. The co-sensing capability of Azalea™, for example, is designed to provide clarity in an ever more contested operating environment.

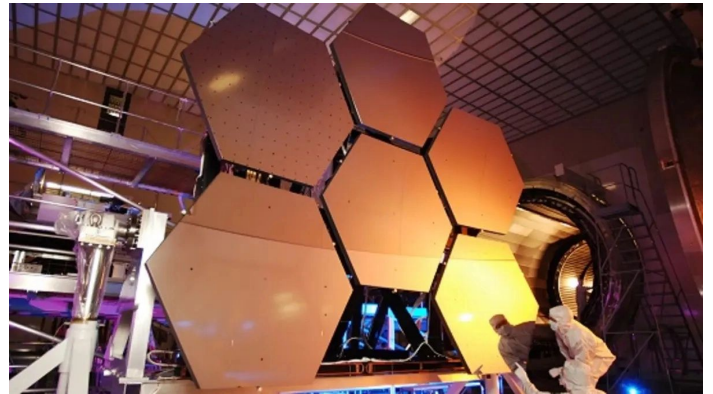
## How is BAE Systems positioned to help the government of Saudi Arabia advance its space capabilities?

Saudi Arabia has already demonstrated a growing space capability through its SaudiSat satellite series developed in Kingdom – boasting excellent industrial facilities in country and growing private sector space companies like Neo Space Group, SARsatX and others.

BAE Systems is uniquely positioned to support Saudi Arabia as it accelerates its ambitions in space, providing the depth of expertise, technology and long-term partnership required to build a resilient, sovereign and globally competitive space ecosystem. Our decades of designing, integrating and sustaining some of the world's most complex systems enable us to deliver space solutions that meet the highest standards of reliability, security and mission assurance. As Saudi Arabia expands its orbital infrastructure, this track record will be invaluable.

Something that distinguishes BAE Systems from the growing field of start-up companies is that we offer end-to-end capability across the space value chain – from satellite payload innovation and space-based intelligence systems like Azalea™, to ground infrastructure, secure networks and mission support. This will enable Saudi Arabia to develop integrated, multi-orbit capabilities that support a range of objectives.

Finally, we operate as a strategic partner, not simply a technology supplier. Our collaborative, mission-focused approach aligns directly with the Kingdom's long-term vision for becoming a regional leader in advanced space technologies.



## How does BAE Systems approach collaborating with key national stakeholders and partners to accelerate the development of the Saudi space ecosystem?

For me, the way BAE Systems collaborates in Saudi Arabia really begins with one simple idea: partnership comes first. Before we discuss any technology or capability in any great depth, we focus on building genuine relationships with the people and organisations shaping the Kingdom's space ambitions. That is how you create momentum that lasts.

BAE Systems has spent decades working shoulder-to-shoulder with national stakeholders across the Kingdom, and that experience matters. It has taught us the importance of sovereign capability development. How to build strong local teams, establish real engineering depth in-country and deliver the kind of skills transfer that leaves a lasting legacy.

For the last 60 years, our relationships in Saudi Arabia have been built on trust, continuity and shared ambition – and that is exactly how we are approaching our key space partners. As the Kingdom expands its capabilities across satellites, ground systems and space-enabled services, BAE Systems will be that long-term mission partner every step of the way.

**Looking ahead to 2030 and beyond, what role do you envision BAE Systems playing in the transformation of Saudi Arabia's space industry?**

*I see BAE Systems playing a genuinely meaningful role in helping Saudi Arabia shape a world-class, sovereign and sustainable space industry. The Kingdom's ambition is remarkable. For us, the opportunity is to be a trusted, long-term partner in making that vision a reality.*

*From my perspective, it starts with helping to build enduring national space capability. As a company, we want to be engaged in harnessing Saudi talent across satellite systems, space-based sensing, communications and mission support. Our experience in skills development and in-Kingdom engineering gives us a strong foundation to help nurture STEM talent and create the sort of technical depth that underpins a resilient space ecosystem.*

*Beyond that, I believe BAE Systems will play a crucial role as an 'ecosystem enabler' – co-creating the next generation of space solutions with local partners. Organisations like the General Authority for Defense Development and the General Authority for Military Industry are vital here. The Kingdom's space sector will thrive when industry, academia, innovators and government are connected through shared research, development pathways and technology transfer.*

**Saudi Arabia aims to localise over 50% of its defence spending under Vision 2030. With space a vital operational defence domain, how is BAE Systems placed to meet this Vision 2030 goal?**

*Our role at BAE Systems is to be a long-term strategic space domain partner – one that brings global experience, local commitment and a genuine belief in the Kingdom's potential.*

*When I consider Saudi Arabia's defence spending ambitions, I see a natural alignment with the way we already operate in the Kingdom. Localisation is something we have been committed to in-Kingdom for decades. That experience places us in a strong position to support the evolution of the Saudi space sector alongside the Communications, Space and Technology Commission.*

*Over many years, we have helped develop a skilled aerospace workforce, engineering training centres and advanced industrial facilities across a wide range of constituent disciplines. That same model of transferring knowledge and enabling sustainable local capability translates directly into space.*

*We also understand that localisation is about more than manufacturing. It is about creating an ecosystem: nurturing local suppliers, supporting SMEs, partnering with universities and building research capacity. By strengthening the wider innovation community, and The Garage at KACST is a good example here, we help ensure that capability remains truly sovereign and resilient.*

**Innovation in space  
for advantage on earth**

Our Azalea Satellite Cluster collects radar and RF data, analyses this in orbit using onboard machine learning, then delivers resulting intelligence rapidly to wherever it is needed

**Synthetic Aperture Radar**  
Capturing advanced radar images night and day, through any weather

**Cluster Computing**  
Processing all data received on the multi-sensor satellite cluster to derive intelligence and transmit this to where it's required

**Radio Frequency, Send, Receive and Detection**  
to track signals on Earth as well as provide secure communications

Azalea™ Cluster 1 Overview

**BAE SYSTEMS**

SAR Satellite Imagery



## Luca Rossettini

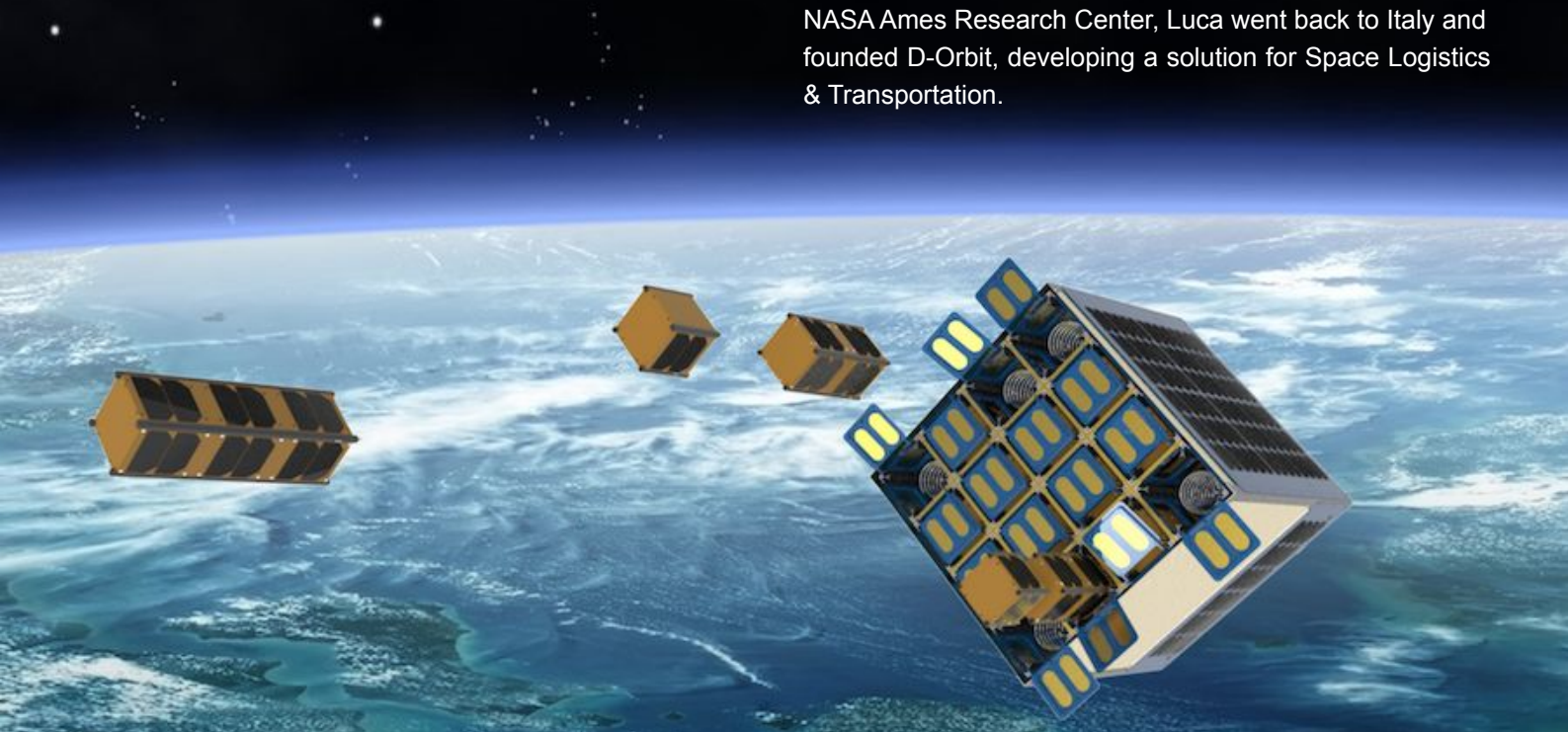
CEO and Founder  
at D-Orbit

Luca is a visionary entrepreneur, seeking a profitable and sustainable expansion of humankind in space. In 2009 Luca won a Fulbright scholarship and in 2010 obtained a Certificate in Technology Entrepreneurship in Silicon Valley, California. After an internship position at NASA Ames Research Center, Luca Rossettini went back to Italy and founded D-Orbit, developing a solution for Space Logistics & Transportation.

Luca is an entrepreneur, seeking a profitable and sustainable expansion of the humankind in space. In 1998 Luca quit his Airborne Officer career and got a Master's in Aerospace Engineering in Italy (2003). After a year working in a US research lab on nanotechnologies applied to space propellant, he came back to Europe, where, in 2005, he successfully concluded a Master's in Strategic Leadership Towards Sustainability.

During his Ph.D. studies in Advanced Space Propulsion Luca founded IRTA (startup providing advanced vision and slow-motion tracking techniques) and co-founded The Natural Step Italia (The Natural Step is an international NGO that helps corporations and communities to pursue their objectives within a strategic sustainability framework), where the idea of applying strategic sustainability concepts to the space sector originated. In 2008 he applied for the European Astronauts Corp among 10,000 candidates. He went through the whole selection and positioned among the first two hundred.

In 2009 Luca won a Fulbright scholarship and in 2010 obtained a Certificate in Technology Entrepreneurship in Silicon Valley, California. After an internship position at NASA Ames Research Center, Luca went back to Italy and founded D-Orbit, developing a solution for Space Logistics & Transportation.



## What is D-Orbit's long-term vision for the future of space logistics and the in-orbit economy?

*Our vision is to build the infrastructure that will enable the next phase of the space economy.*

*Today, there are over 14,000 satellites in orbit, projected to exceed 43,000 by 2032, but no coherent logistics layer to deploy, operate, service, and evolve them over time. What we are building is that missing layer, a persistent, scalable infrastructure in orbit.*

*This is not just about efficiency. It is about enabling a new economic system in space, including applications related to security, resilience, and protection of critical infrastructure.*

*We are developing this infrastructure through a set of proven and evolving platforms: transportation with ION (22 successful missions and over 240 payloads brought to orbit, Europe's third-largest fleet by size and first by investment efficiency), in-orbit servicing with GEA (under a EUR 120 million contract with ESA where Eutelsat is the first customer), satellite manufacturing with NOX (a high-performing SAR satellite designed and manufactured by D-Orbit for the IRIDE constellation), and in-orbit computing through our Space Cloud Services (built node by node entirely by us). Each of these capabilities is already validated in orbit and designed to integrate into a unified ecosystem.*

*But the broader vision goes beyond technology. We are moving toward a multi-polar space economy, where different regions of the world will play strategic roles. In this context, we believe regions like the Gulf have the potential to emerge as major global players alongside the US, Europe, China, and India.*

*Our role is to help building the infrastructure that connects these emerging ecosystems into a global network, ultimately extending beyond Earth, toward cislunar space and, in the longer term, interplanetary logistics.*

## Which markets (commercial vs. government / institutional) are the highest priority for D-Orbit in the next 3–5 years?

*We see three priority areas, increasingly interconnected, and all critical to the evolution of the space sector.*

*First, institutional and defense applications. Space is now a strategic domain, and the demand for space-based intelligence, security, and protection capabilities is growing rapidly. Governments are not just investing in access to space, but in the ability to generate, process, and act on data in real time. This is an area where D-Orbit is already operational. Our platforms enable in-orbit data processing, autonomous operations, and rapid deployment of sensing capabilities. This allows us to support use cases such as situational awareness, environmental monitoring, and security applications, transforming space data into actionable intelligence that directly contributes to the protection of infrastructure, assets, and people.*

*Second, commercial operators, particularly constellation providers and technology developers, who require increasingly flexible, fast, and cost-efficient access to orbit. Third, emerging space nations seeking sovereign capabilities.*

*This is where we see one of the most important global shifts. Regions like the Gulf are not simply entering the space sector, they are building integrated ecosystems with long-term strategic ambition across both civilian and defense domains.*

*Our role in these markets is not that of a traditional supplier. We act as partners, sharing heritage, platforms, and industrial capabilities to accelerate the development of local space infrastructure, including capabilities that are critical for national security and resilience.*

*This trend is accelerating globally. In countries like the Kingdom of Saudi Arabia, where security, stability, and protection of critical assets are strategic priorities, we see a strong and growing demand for space-based intelligence capabilities that are sovereign, scalable, and operational.*



## How is D-Orbit advancing capabilities in in-orbit computing, autonomy, and hosted payloads?

*These capabilities are deeply interconnected and form the foundation of the next generation of space infrastructure.*

*For example, our ION platforms allow customers to deploy hardware and software directly in orbit without building their own satellites. This dramatically lowers barriers to entry and accelerates innovation. Our missions have hosted dozens and dozens of payloads spanning quantum computing, blockchain, AI processing, computers, radios, antennas, and propulsion systems.*

*With our Space Cloud Services, we are moving computation from the ground to space. Data is processed where it is generated, and only actionable insights are transmitted to Earth. This drastically reduces latency, bandwidth constraints, and operational complexity.*

*Autonomy is the next layer. As operations become more complex, for example in geostationary orbit, spacecraft must be able to navigate, make decisions, and execute missions independently.*

*The long-term vision is what we call intelligent orbital networks: multiple satellites working together, collecting, processing, and distributing data dynamically. This is where space transitions from infrastructure to intelligence.*

## What technical challenges remain in developing in-orbit servicing and satellite life extension?

*The challenges are both technical and systemic. Most satellites in orbit today were not designed to be serviced. That requires us to develop solutions that can operate with existing structures.*

*Autonomy is another key challenge. In geostationary orbit, communication delays prevent real-time human control. The spacecraft must be capable of identifying, approaching, and docking with its target independently.*

*Then there is reliability. When operating near high-value assets, there is zero margin for error. This is where flight heritage becomes critical. You cannot simulate this level of complexity entirely on the ground — it must be proven in orbit.*

*Finally, the regulatory environment is still evolving. Standards for proximity operations and servicing are being defined, and we are actively contributing to shaping them based on real operational experience.*

## How do you approach integrating AI and edge computing into your space systems?

*The exponential growth of satellite data is creating a structural bottleneck. Traditionally, data is sent to the ground for processing, but bandwidth is limited and latency can be significant. This model does not scale.*

*Our approach is to process data directly in orbit.*

*We run AI and machine learning algorithms onboard our platforms, transforming raw data into actionable intelligence before transmission. This enables use cases where speed is critical, from environmental monitoring to security and situational awareness. This is particularly relevant for applications related to security and situational awareness, where timely and reliable information can directly support decision-making and risk mitigation.*

*With the integration of Planetek, we have extended this capability into a full pipeline, from data acquisition to analytics.*

*We started already distributing processing across multiple satellites, creating the first network where intelligence is not centralized but orchestrated in orbit. This is a fundamental shift in how space systems operate.*

## How will the recently secured Series D funding be deployed across M&A, in-space computing, and expansion activities?

*The industry is solving access to space. The challenge now is how to operate in space efficiently and at scale. This funding is focused on accelerating that transition.*

*We are investing in expanding our industrial capacity, strengthening strategic roadmap through targeted acquisitions, and advancing the next generation of in-orbit capabilities, including servicing and distributed infrastructure.*

*A key priority is also geographic expansion.*

*As new regions invest in space, particularly in the Middle East, we are scaling our presence to support local ecosystems: not just through services, but through long-term industrial partnerships. This reflects our broader strategy: building infrastructure that operates globally, while enabling local capability development.*

## How does the strategic cooperation framework with ELT Group support D-Orbit's goals in the Middle East and globally?

Space is now a strategic domain, central to national defense, security, resilience, protection of critical infrastructure and technological sovereignty. These capabilities are no longer future concepts, they are already operational and increasingly required by governments worldwide.

The partnership with ELT Group brings together complementary capabilities to address this reality: combining advanced sensing, cyber intelligence, and orbital infrastructure into integrated space-based services. What makes this collaboration particularly important is its alignment with the strategic ambitions of the region.

In the Middle East, and especially in Saudi Arabia, we are seeing a clear intent to build sovereign capabilities in both space and defense. This requires more than technology. It requires ecosystem development. Our approach reflects that.

Through our local presence, we are not just delivering systems, but contributing to industrial development, technology transfer, and the creation of local competencies. This is how sustainable space ecosystems are built: through partnership, not procurement.

## What opportunities do you see emerging from alignment with Saudi Vision 2030 priorities?

Saudi Arabia is laying the foundations of a new global space and defense ecosystem.

What makes this moment unique is the combination of long-term vision, strategic investment, and a strong focus on sovereignty and industrial development. This creates a rare opportunity.

The Kingdom is not looking to simply access space, it is building the capability to operate, manage, and evolve their own space infrastructure. Our role is to support the acceleration of that process.

Through our Distributed Space model, we enable partners to leverage our heritage, platforms, and operational experience to develop local capabilities much faster than traditional approaches would allow. At the same time, our infrastructure supports the growing demand for real-time data, autonomous operations, and secure communications across sectors such as energy, finance, and environmental monitoring. We do not see the Kingdom simply as a customer or anchor tenancy, but as a future pillar of the global space economy.

## Can you describe your strategy for working with governments and national space agencies?

Institutional partnerships are fundamental because they enable the development of capabilities at a scale that no single actor can achieve alone. Our approach is always tailored to the maturity of the ecosystem.

In established markets, we work within structured programs and frameworks, contributing to large-scale initiatives alongside agencies and industrial partners.

In emerging space nations, the need is different. Governments are not just procuring systems, they are building industries. In these contexts, we position ourselves as infrastructure partners. We share technology, production capabilities, and operational know-how to accelerate the development of sovereign space capacity. This is not about delivering a satellite, it is about enabling a national capability.

Across all markets, the common principle remains the same: we build platforms that serve both institutional and commercial needs, creating a unified and scalable infrastructure.



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## What is your perspective on the evolving regulatory environment for space traffic management and debris mitigation?

A coherent regulatory framework is essential for the future of space operations. Space is inherently global. Satellites operate across borders, and fragmented or conflicting national regulations can quickly become a limiting factor.

We welcome the progress being made in areas such as space traffic management and debris mitigation, as these are critical for safety, security, and long-term sustainability. However, alignment is key. Regulations must be developed on shared principles and designed to work together across jurisdictions. Without that coherence, we risk introducing inefficiencies into the very system we are trying to scale. As operators with real experience in orbit, we actively contribute to these discussions, helping ensure that regulatory frameworks are grounded in operational reality.



## Venkat Pillay

CEO & Founder  
of LatConnect 60 AI

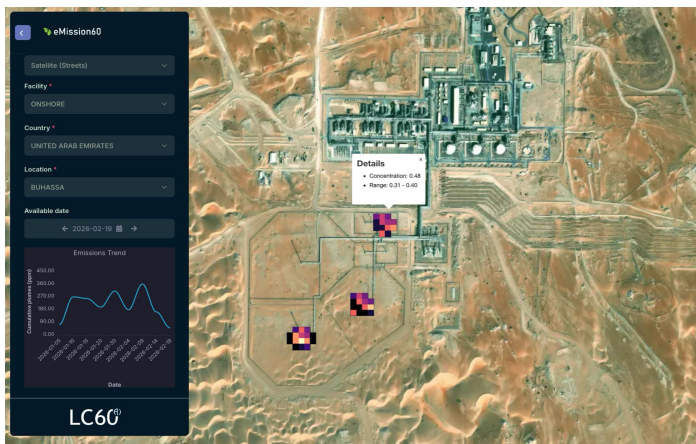
Venkat Pillay is the CEO & Founder of LC60 AI Ltd (LC60 AI), a satellite-enabled Earth Observation company established in 2019 in Perth, Australia. He leads the strategic vision and growth of LC60 AI, spearheading the development of cutting-edge satellite constellations, data analytics solutions, and insights through the proprietary EONet60 platform for industries including defence, agriculture, environmental monitoring and climate assessment.

With over 16 years of experience in satellite missions across Southeast Asia, Venkat has also contributed as a Program Manager and Systems Engineer for Canadian and U.S. government satellite programs such as Radarsat Constellation Mission, CASSIOPE and DARPA SeeMe. He holds multiple patents in UAV-LEO satellite integrated operations and data fusion, granted in the USA, Australia, Malaysia and Singapore, reinforcing his expertise in advanced space technologies.



**What technical and commercial milestones do you commit to achieve within 6, 12, and 18 months after closing this round, and how do these reduce technical and market risk for the next round?**

Over the next 18 months, we are executing a staged roadmap that progressively reduces both technical and market risk. Within the first 6 months, we scale a production-ready multi-sensor intelligence platform validated through real customer use cases, demonstrating repeatability and near-term revenue potential. In parallel, we are soliciting early pre-orders for upcoming SWIRSAT datasets, that will have very high Short Wave InfraRed (SWIR) resolution that is word-leading, with an initial focus on defence and other high-value sectors, helping to validate demand and inform mission tasking and product design. By around 12 months, SWIRSAT reaches pre-operational readiness, reducing dependency on third-party data sources and improving control over performance, availability, and margins. Within 18 months, SWIRSAT becomes operational, enabling proprietary datasets, stronger customer lock-in, and longer-term contracts. Alongside this, we continue development of a next-generation SWIRSAT sensor, with the aim of improving spatial resolution even further and spectral coverage over time, supporting future capability upgrades and sustained differentiation.



LC60 AI's eMission 60 to track and report methane emissions (aligning with OGMP 2.0 framework)

**How is your multi-sensor fusion stack (optical, SAR, SWIR, GNSS-R) architected at a technical level, and which components are proprietary versus dependent on third-party data and models?**

LatConnect 60's multi-sensor fusion stack is designed as a flexible architecture that integrates optical, SAR, SWIR, and GNSS-R data into a single, consistent intelligence layer.

Core fusion logic and analytics are developed in-house, while third-party data is used selectively at the input level to ensure coverage and resilience. This approach allows the platform to evolve as new or sovereign datasets become available without changing the underlying system.

**What are the key technological breakthroughs you plan to deliver over the next two years (e.g., real-time analytics, predictive modeling, autonomous tasking, edge processing), and which of these are directly enabled by this round?**

Over the next two years, LatConnect 60 will deliver a set of advancements. These include sovereign satellite access and control via the SWIRSAT constellation, faster analytics pipelines, more robust predictive models built on multi-sensor time series, and increasingly automated satellite tasking to prioritise high-value areas.

This investment round directly supports the integration of SWIRSAT with our analytics platform, allowing us to move from reliance on third-party datasets toward a more controlled, responsive, and differentiated space-to-insight capability, with edge-enabled concepts introduced as the constellation matures. In parallel, we will continue development of a next-generation SWIRSAT sensor, aimed at progressively improving spatial resolution and expanding spectral coverage over time, supporting future performance upgrades and long-term platform evolution.

**What regulatory, data sovereignty, and export-control risks could materially affect your operations in the UAE, Saudi Arabia, and neighboring markets, and how are these risks reflected in your technical architecture and operating model?**

Operating across the UAE, Saudi Arabia and neighbouring markets requires careful attention to data sovereignty, regulatory, and export-control considerations. These risks primarily relate to how sensitive data is stored, processed, accessed, and shared across jurisdictions. We address this through a design-by-default approach: our technical architecture supports jurisdiction-aware data handling, clear separation between raw data and derived analytics, and controlled access to insights based on local requirements. Where appropriate, this approach is complemented by joint development of in-country receiving and processing capabilities, including on-premise deployments managed through country-specific JV or partnership arrangements. Together, this model allows us to remain compliant while scaling across neighbouring markets without re-engineering the platform.

**How do you plan to evolve your platform from descriptive analytics to predictive and prescriptive decision-making tools for sectors such as energy, climate, and infrastructure?**

*LatConnect 60's platforms are designed to mature in stages as data coverage and model confidence increase. We start with high-quality descriptive analytics that provide reliable monitoring across energy, climate, and infrastructure assets. As multi-sensor time series develop over time, we move into predictive analytics that identify trends, anomalies, and potential risks. In parallel, our data engineering team is developing a generative-AI-based querying engine to make these insights more accessible and to further support prescriptive decision-making. The upcoming SWIRSAT constellation is expected to strengthen this prescriptive stage by introducing very high-resolution SWIR data and closer integration between sensing and analytics, supporting scenario evaluation and decision prioritisation.*

**What role do you see for generative AI and foundation models in your future roadmap - for example, natural-language interfaces, automated reporting, or AI-driven scenario simulation?**

*We see generative AI and foundation models as a supportive layer that helps make complex Earth observation insights easier to access and use. This includes natural-language interaction with geospatial information, automated reporting for different audiences, and AI-assisted scenario exploration. In this context, our data engineering team is developing a generative-AI-based querying layer to enable more intuitive interaction with geospatial intelligence and to support scenario evaluation and decision-making. These capabilities are built on top of validated analytics with appropriate controls and transparency, allowing them to be adopted in a way that aligns comfortably with both sovereign and enterprise governance practices.*

**How do you ensure model accuracy, explainability, and trust for government and enterprise customers, and what investments in validation, benchmarking, and certification are planned in this round?**

*Ensuring accuracy, transparency, and trust is fundamental to LatConnect 60's engagement with sovereign and institutional customers. Our analytics combine data-driven AI models with established geospatial and remote-sensing datasets.*

*They are supported by continuous validation against trusted reference data and the use of confidence indicators to enable informed decision-making at policy and operational levels. To support institutional adoption and regulatory confidence, our solutions are benchmarked and aligned, where applicable, with recognised international and sector-specific frameworks, including ISO standards, Verra methodologies, Bureau Veritas assurance practices, the UN REDD+ framework and OGMP 2.0 for methane and emissions reporting. As part of this investment round, we are further strengthening validation pipelines, formal benchmarking processes, and alignment with recognised assurance and certification pathways. This investment focus is intended to de-risk large-scale deployment, support sovereign oversight requirements, and ensure that LatConnect 60's capabilities meet the expectations of long-term, state-backed investors seeking durable, auditable and policy-aligned geospatial intelligence platforms.*

**What is the exact size of the current investment round, what minimum and maximum ticket sizes are you targeting, and what post-money valuation range are you offering to investors?**

*The company is raising a Series A round of minimum US\$5 million or more to accelerate commercial scale across MENA and advance the deployment of its SWIRSAT constellation. The minimum ticket size targeted is US\$1 million, while larger allocations are flexible. Capital raised beyond the US\$5 million threshold would be used to accelerate expansion into defence and natural resources markets. The round is structured at a pre-money valuation of US\$18 million, implying a post-money valuation of approximately US\$23 million at the US\$5 million raise, increasing proportionally if additional capital is secured.*

**How will the proceeds of this round be allocated in percentage terms between AI platform development, data acquisition, SWIRSAT constellation design and deployment, regional team expansion in MENA, and sales and marketing?**

*Proceeds from the US\$5 million round will primarily be directed toward the development and deployment of the SWIRSAT constellation, which will account for 60% of the capital. A further 40% will be allocated to team expansion and commercial scaling, with a strong focus on building regional capabilities in MENA.*

**What is your current revenue run rate, qualified pipeline, and conversion rate, and what ARR do you project over the next 24 months specifically from MENA customers?**

*The company currently operates at an annualized revenue run rate of approximately US\$4 million, derived from a mix of multi-year commercial contracts and government grants. The qualified pipeline for 2026 stands at around US\$6 million, spanning active tenders and opportunities at LOI and MOU stages.*

**Does this round fully finance the first operational phase of the SWIRSAT constellation, or will a separate infrastructure round be required, and what are the capital needs and deployment timelines to reach commercial orbit?**

*This funding round fully finances the first operational phase of the SWIRSAT constellation, specifically SWIRSAT-1 and SWIRSAT-2. The satellites are scheduled for launch in Q4 2026, with commercial operations commencing in Q1 2027. Total capital expenditure required for these two satellites is approximately US\$8 million, largely subsidised by non-dilutive capital, i.e. grants from the Australian Space Agency and Western Australian state government.*

**What commercial traction do you already have in MENA (signed contracts, pilots, LOIs, government programs), and what percentage of next year's forecast revenue is already contractually secured?**

*In the UAE, the company is currently at LOI and MOU stage with ADNOC, via Space42, for SWIRSAT capacity offtake supporting energy operations monitoring. A broader partnership with Space42 is also in place for advanced geospatial intelligence across multiple missions. In Saudi Arabia, the company is engaged in active bidding with government entities through the Saudi SpaceUp Challenge, aligned with the Saudi Green Initiative. In Qatar, a partnership has been established with Es'HailSat, while additional early-stage discussions are underway in the agriculture and natural resources sectors.*

*At present, contractually secured revenue is primarily concentrated in APAC markets. However, commercial visibility in MENA is expected to accelerate materially following the SWIRSAT launch in Q4 2026, converting current LOIs, partnerships, and pilots into long-term contracts.*

**What is the intended exit pathway for investors in this round and what level of revenue scale, technological differentiation, and market leadership is required to reach that outcome within 4–6 years?**

*The company is pursuing two primary exit pathways. The first is a potential IPO by the end of 2027, targeting a NASDAQ listing via SPAC following a successful SWIRSAT launch and early commercial scaling, with the option of a future dual listing in MENA. The second pathway is a strategic acquisition by defence primes, satellite operators, energy majors, or infrastructure-focused corporations seeking vertically integrated geospatial intelligence capabilities.*

*Within a four- to six-year horizon, the company is targeting US\$100 million or more in ARR, supported by 70–80% gross margins. This outcome is underpinned by a strong and defensible moat created through full vertical integration, from proprietary SWIRSAT infrastructure to AI-driven analytics and SaaS delivery. The long-term objective is to establish clear market leadership in high-resolution SWIR intelligence across high-growth APAC and MENA markets.*



*LC60 AI formed a partnership with Space42 at Dubai Airshow 2025*

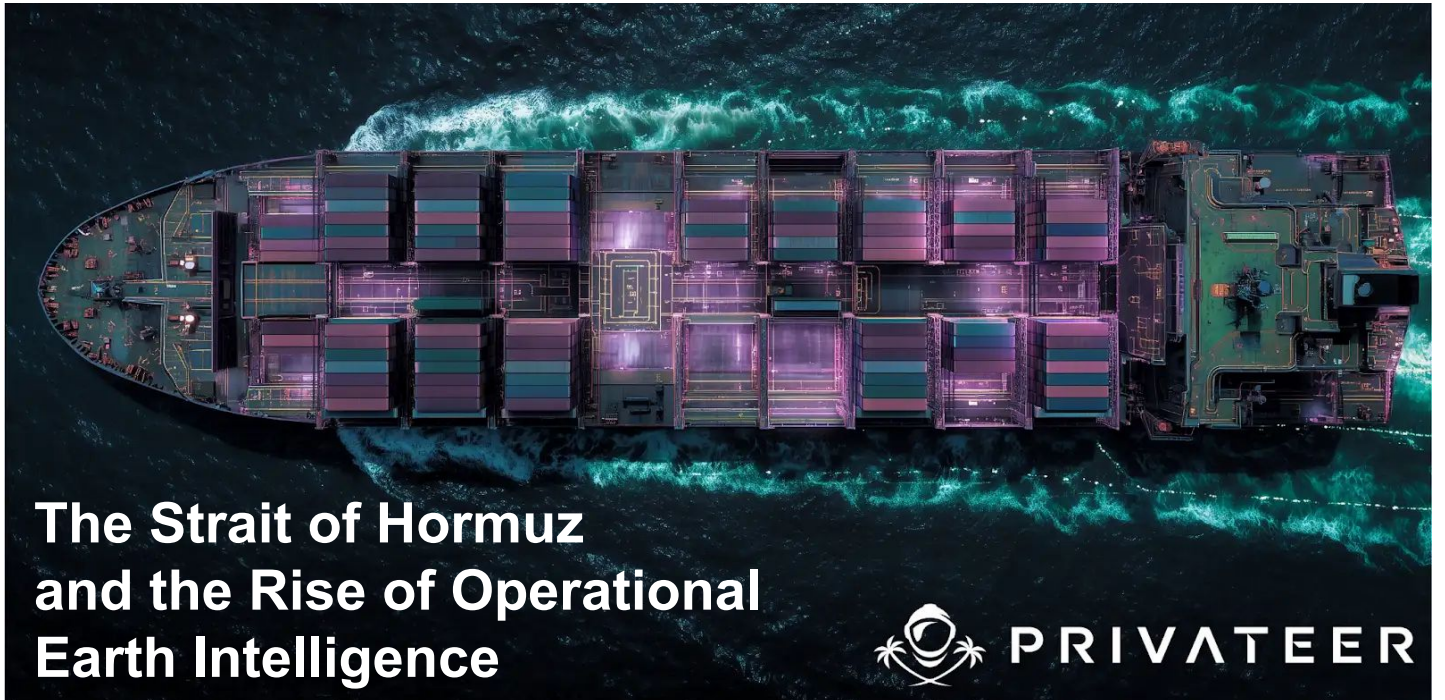


## Alex Fielding

CEO and Chairman  
at Privateer Space

Alex Fielding is a leader and entrepreneur in the space and robotics industries, with over 25 years of experience in engineering, management, and innovation. He is the CEO and Chairman of Privateer, the leading privately traded geospatial intelligence platform company. He is also the Founder and Director of Ripcord, a company that uses vision guided industrial robots for digitization and cloud-based access.

Alex has a proven track record of creating and scaling successful companies, products, and technologies that have a positive impact on the world. He co-founded GPS company Wheels of Zeus with Apple's co-founder Steve Wozniak, which was sold in 2006. He was CTO at Power Assure and VP at Vigilant before starting Ripcord while a contractor at NASA. He is an advisor to Astra. He holds multiple patents in the fields of vision guided robotics, machine learning, and cloud computing. He is a founding member of Singularity University and an active contributor to the IETF. He is passionate about advancing the frontiers of science, technology, and education for the benefit of humanity.



# The Strait of Hormuz and the Rise of Operational Earth Intelligence



For years, satellite intelligence was treated as a specialized capability largely associated with national security, military ISR, or highly technical geospatial workflows. That distinction is fading quickly. In many sectors, space-enabled intelligence is becoming operational infrastructure: a system organizations increasingly depend on to validate activity, assess risk, and maintain continuity in environments where traditional signals can no longer be fully trusted.

Few places demonstrate that shift more clearly than the Strait of Hormuz.

Roughly a quarter of the world's seaborne oil trade and around one-fifth of global LNG trade passes through this narrow maritime corridor. At its tightest point, the Strait narrows to roughly 29 nautical miles, leaving few viable alternatives capable of supporting comparable global energy flows. When disruption occurs in Hormuz, the consequences move quickly through shipping markets, insurance pricing, logistics networks, commodity trading, and broader economic systems.

What makes the current environment especially important is that the disruption is no longer limited to physical or kinetic threats alone.

Recent advisories from UKMTO and JMIC have highlighted a growing pattern of GNSS spoofing, AIS anomalies, electronic interference, increased naval activity, and broader degradation of maritime situational awareness throughout the Arabian Gulf, Gulf of Oman, and Strait of Hormuz. Increasingly operators are confronting an environment where self-reported vessel positioning and identity data cannot always be independently trusted without external validation.

The operating challenge in Hormuz is increasingly about degraded trust in the information environment itself.

Once vessel positioning, identity signals, or declared activity become unreliable, every downstream operational decision becomes more difficult and more expensive. Commercial operators may struggle to validate routes or cargo movement. Insurers face greater uncertainty in underwriting risk exposure. Ports and terminals must evaluate disruptions with incomplete visibility. Commodity traders, shipping companies, and governments are all forced to make higher-stakes decisions in environments where confidence in the underlying data has weakened.

This is where Earth intelligence is rapidly becoming operationally indispensable.

Optical imagery provides visibility into what is physically present. Synthetic Aperture Radar (SAR) enables monitoring through cloud cover, darkness and adverse weather conditions.

Space-based AIS expands vessel visibility beyond the limitations of terrestrial receivers. RF geolocation and signal intelligence layers can further assist in validating activity independently of transponder-based reporting. Increasingly, the real value emerges from the ability to fuse these sources together and identify inconsistencies between declared and observed behaviour, detect spoofing or dark-vessel activity and surface behavioural patterns that would otherwise remain hidden.

That shift matters because the challenge is no longer simply collecting imagery or receiving signals. The challenge is validating reality and resolving ambiguity quickly enough to support operational decisions in environments where the individual data feeds may be degraded, manipulated or incomplete.

In many ways, this represents the evolution of dual-use capability into something broader and more commercially embedded. The same fused intelligence architecture can simultaneously support maritime security operations, insurance underwriting, energy logistics, port management, supply chain resilience, environmental monitoring, and strategic trade analysis. Different stakeholders may reach different conclusions from the same data, but they increasingly rely on a shared operational intelligence layer to do so.

Hormuz illustrates this reality with unusual clarity.

When maritime chokepoints destabilize, the effects move rapidly through global trade systems. UNCTAD has repeatedly highlighted how disruptions in strategic waterways contribute to freight volatility, congestion, rerouting pressure, and wider supply chain instability. The World Economic Forum has also noted the growing strain placed on insurance markets as geopolitical risk increases across critical maritime corridors.

At the same time, commercial intelligence providers are now operating within the same decision environment historically associated with sovereign ISR systems. That does not mean commercial platforms are replacing government capabilities. It means strategic industries increasingly require persistent, evidence-based situational awareness to continue operating effectively in contested or uncertain environments.

The distinction between defense infrastructure and commercial infrastructure is becoming less rigid.

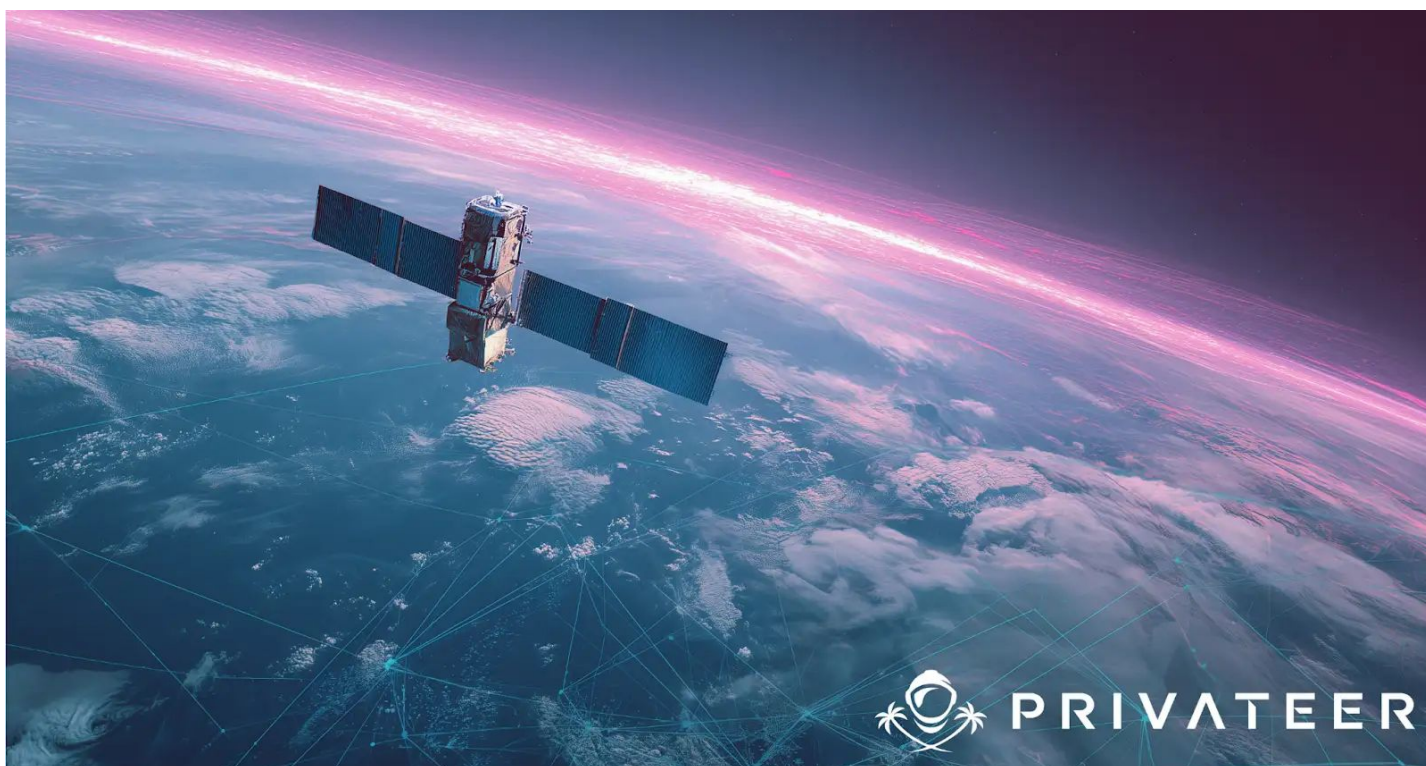
This transition is still understated in many mainstream conversations surrounding Earth observation. Much of the long-term economic value of EO systems is expected to emerge downstream, within operational industries rather than the satellite sector itself. Yet many organizations still treat Earth intelligence as a specialized analytical capability instead of an integrated operational function.

That mindset is changing.

Platforms such as Privateer's Elements reflect a broader industry shift toward making fused Earth intelligence more accessible and operationally usable beyond traditional geospatial specialists. Rather than focusing solely on imagery collection, these systems increasingly aggregate satellite, terrestrial, and customer-provided data into unified operational environments capable of supporting vessel tracking, interference detection, supply chain analysis, infrastructure monitoring, environmental alerts, and risk assessment workflows.

The relevance of that model becomes especially apparent in places like Hormuz.

When spoofing, dark-vessel activity, electronic interference, or conflicting signals emerge, operators are rarely dealing with perfect information. Decisions must still be made despite incomplete visibility. In those scenarios, the ability to validate vessel activity and positioning across AIS, SAR, EO imagery, RF detections, and other independent sources becomes far more valuable than relying on any single feed or sensor alone.



That is why the future of Earth intelligence is increasingly centered on orchestration, cross-sensor validation, and decision confidence rather than raw data accumulation. The strategic advantage increasingly belongs to platforms capable not only of collecting information, but of verifying what is actually occurring within contested or degraded operational environments.

The Gulf Cooperation Council region is becoming one of the clearest examples of this transition from space ambition into operational capability.

The UAE continues expanding its Earth observation ecosystem through initiatives such as MBZ-SAT, Etihad-SAT, and the GIQ platform, which integrates imagery from hundreds of satellites across multiple providers. Saudi Arabia's PIF-backed Neo Space Group recently completed the acquisition of UP42 while advancing the Kingdom's ambitions around commercial EO accessibility and geospatial infrastructure. Oman's OL-1 satellite reflects growing regional investment in AI-enabled Earth observation systems, while Qatar continues expanding its capabilities in communications and interference monitoring infrastructure.

Taken together, these developments represent something larger than a collection of isolated national projects.

The GCC is emerging as one of the first regions where sovereign investment, commercial Earth intelligence, maritime security requirements, energy infrastructure protection, and logistics modernization are converging into a broader operational ecosystem.

For a region so deeply tied to global trade flows, energy exports, and maritime continuity, the commercial incentives surrounding Earth intelligence are immediate and practical rather than purely aspirational.

This is no longer primarily about prestige programs or symbolic participation in the global space economy.

It is about building resilient operational infrastructure for an increasingly uncertain strategic environment.

The Strait of Hormuz may ultimately be remembered as more than a geopolitical flashpoint. It may also serve as one of the clearest demonstrations of how Earth intelligence is evolving into a foundational operating layer for global commerce, infrastructure, and strategic decision-making.

Organizations that operationalize this capability now will likely shape the next generation of resilience, logistics coordination, maritime awareness, and infrastructure security. Those that fail to adapt may find themselves increasingly dependent on fragmented visibility and secondhand interpretation during moments when clarity matters most.

In the coming decade, strategic advantage may belong less to the organizations with access to the most data and more to those capable of validating reality faster than everyone else.





## **Prof. Mireille Elhajj**

**Founder and CEO  
of Astra Terra**

Prof. Mireille Elhajj is the Founder and CEO of Astra Terra. Her expertise lies in forming strategic partnerships, steering the company's scientific and technical research, managing Astra Terra's portfolio with its various programs, and driving progress across space, space governance, smart cities, and capacity building, while overseeing the company's strategy with the Board of Advisors.

As a PNT expert, she is a Fellow of the Royal Institute of Navigation. She is also a member of the Technical Committee, responsible for scientific research publications. She has a long history with Imperial College London, where she is now a Visiting Professor at the Civil and Environmental Engineering Department, and a member of the Industrial Advisory Board (IAB). She is also currently the Co-Director of two summer programs: The Integrated Space Science Engineering Program, and the Emerging Technology in Security and Resilience.

Her technical expertise is in Positioning, Timing, and Navigation (PNT) Systems Engineering, Resilience of Infrastructure, remote sensing and security. She has published various scientific papers in PNT interference mitigation, and novel integrity monitoring methods for multiple telematics, and smart cities applications (<https://astra-terra.com/news/publications>).

Prof. Elhajj holds a PhD from Imperial College London, where she researched the use of new GPS signals to improve accuracy for surface transport. She also holds an MSc in Transport Engineering from Imperial College London, an MSc in Financial Analysis and Fund Management (FAFM) from Exeter University.

She is also a member of the PNT committee and the EO committee with TechUK, the bridge between the government and the tech sector in the UK. She is a mentor for various startups and a judge at the Royal Academy of Engineers for startups. Besides her professional roles, she is a public speaker and mentor where she delivers various webinars and seminars in her areas of expertise. Astraterra is a member of ADS, TechUK, the IAF and UKSpace.

## What is AstraTerra, and what distinguishes it from other consultancies?

*AstraTerra functions as a specialized boutique consultancy, acting as a critical "bridge" that translates high-level scientific research into tangible real-world implementation. Our differentiation lies in our agility and a refusal to work in isolation; we leverage global multidisciplinary expertise to engineer integrated, analytical strategies, leaving no stone unturned. At our core, we acknowledge that a technical solution lacks validity unless it accounts for inherent systemic resilience. Our fundamental mission is to decode complex scientific findings into actionable, long-term frameworks that empower both national governments and emerging startups to navigate a resilient future.*

## Can you explain AstraTerra's expertise in PNT and its importance to modern infrastructure?

*Positioning, Navigation, and Timing (PNT) is the "invisible backbone" of modern life, acting as the scaffolding for logistics, maritime shipping, financial systems, and essential services. AstraTerra specializes in PNT because modern society is moving deeper into automation, where technologies like autonomous transport, drone deliveries, and self-driving cars rely entirely on precise, uninterrupted PNT. Without reliable PNT, modern infrastructure would grind to a halt. The future of humanity relies on PNT.*

## What capabilities does AstraTerra offer in terms of Earth Observation (EO) and digital innovation?

*Earth Observation has become a critical tool for many applications including humanitarian missions and disaster management. Since AstraTerra is in the heart of resilience, it leverages PNT and EO data to build smart targeted platforms and digital twins: virtual models of physical environments that allow for real-time monitoring and optimization of infrastructure and other applications such as urban and agricultural health. These technologies help cities and critical networks become more responsive and resilient. By combining these tools with high-speed 5G and 6G connectivity, AstraTerra works to address global challenges and support more sustainable societies.*

## In your view, how do these technologies specifically enhance resilience in the face of global threats?

*Resilience is about the ability to adapt and recover. By employing PNT anti-jamming and anti-spoofing technologies, we protect the core signals that modern society relies upon from both accidental and intentional interference. Simultaneously, Earth Observation allows us to analyze environmental risks and infrastructure performance at scale. When we fuse this high-fidelity data with AI-driven models, we can proactively manage everything from urban mobility and disaster response to energy grid stability, ensuring that our systems remain responsive even under extreme pressure.*

## AstraTerra works across transport, GNSS, and space education — what drew you into partnering with the Saudi Space Agency specifically, and how does the Youth Program fit into your broader mission?

*My work at AstraTerra is rooted in the acknowledgment of the criticality of the space sector for a resilient infrastructure and a resilient society: from satellite navigation to urban mobility, it is the backbone of a modern economy. What drew me to the Saudi Space Agency was their clear, national commitment to building a sovereign space ecosystem from the ground up, rather than just acting as a consumer of space services. Their "whole-of-nation" approach to Vision 2030 resonated with my philosophy that technological advancement must be matched by human capability. The Youth Program is the engine for this vision; it ensures that the Kingdom's space ambitions are backed by a generation of local experts capable of designing, sustaining, and innovating within their own sovereign infrastructure.*

## The Integrated Space Science Program is a program delivered at Imperial College, with the support of AstraTerra, is designed to build foundational knowledge in young people. What gaps in space education did you identify in Saudi Arabia that this program was built to address?

*This educational divide is a global phenomenon, primarily driven by the relative novelty of the sector and the lingering misconception that orbital expertise is reserved solely for astronauts or specialized engineers. As the industry accelerates, propelled by machine learning, human capacity is struggling to keep pace. We identified a critical "application gap"; while interest in theoretical physics is high, there is a lack of training that translates these concepts into professional skill sets.*

*For example, students may often master the mechanics of orbit but lack the experience to integrate complex subsystems, such as power, communication, and PNT or EO data analysis, within the harsh constraints of a real-world operational environment.*

*Our program was designed to help people with no previous knowledge to gain preliminary but comprehensive knowledge of the space sector and its various aspects from policy to astrophysics to economics. Moving beyond textbook theory, the program emphasises the system-level integration and hands-on engineering realities necessary for building autonomous, secure infrastructure. This disparity is particularly evident in emerging national space programs where the foundational ecosystem is still maturing.*

**How much of that technical, real-world expertise makes its way into the curriculum for students in the program?**

*That expertise is the curriculum's foundation. When I teach students about GNSS signal integrity or interference mitigation, I don't just present the theory; I share the specific technical trade-offs we navigated while developing wayfinding solutions for the visually impaired with WeWALK, or while optimising bus positioning for urban transit. Bringing these "trench experiences", the failures, the iterative testing, and the real-world constraints into the classroom transforms abstract physics into a professional skill set. It forces students to think not just as scientists, but as engineers solving for precision and safety. Today, Resilience is indivisible from any project especially of a mission critical nature.*

**This November, you will be co-delivering a specialised course in Innovation Engineering with AI, alongside the Center for Active Resilience at ICL. How do courses like this help people in the Space industry and Engineers in general?**

*This course is designed to bridge the gap between technical potential and strategic execution by leveraging innovation. But as not all innovation is commercially viable or can prove engineering feasibility, we guide C-suite leaders to view technology as both a driver of innovation and a surface for risk. By understanding the intricacies of engineering constraints, market and client needs, and the added benefits of AI and ML in innovation, leaders can systematically validate concepts, de-risk their investment portfolios, and make decisions that favor the long-term sustainability of the company over short-term gain.*

**You've led navigation and positioning projects with partners like Imperial College London and WeWALK, tell us about the project and why it is important to you as a Company.**

*The WeWalk initiative represents a world-class societal endeavor, addressing wayfinding for the visually impaired—one of the most significant humanitarian challenges today. By providing a secure, user-friendly, and technology-driven solution, we empower individuals with the profound gift of autonomous mobility. This project, which we subsequently expanded, remains deeply personal to AstraTerra because it embodies our fundamental mission: engineering technology that serves humanity. Our contribution focused on developing the integrity monitoring layer for the data, ensuring the solution is inherently safe while providing the essential resilience framework for the entire system.*





For young Saudis reading this magazine who are curious about space but don't know where to start, what's one piece of advice you'd give them?

*I would encourage you to move past the perception of "space" as an isolated or niche pursuit. It is a sophisticated, global ecosystem that demands a multidisciplinary approach—integrating data analytics, legal frameworks, material sciences, finance, and logistics. You do not need to wait for a specialized "space degree" to begin your journey. Instead, cultivate mastery in your core discipline, be it software development, strategic design, or public policy, and identify the precise intersection where your expertise can address orbital challenges. The international space community, spanning from the Gulf to Europe and beyond, thrives on openness and diversity. True growth comes from active immersion in space activities and a commitment to daily learning. The future of this sector belongs to the passionate and the bold who act as the necessary link between terrestrial requirements and orbital innovation.*

**Be that catalyst. Be Bold.**

How does AstraTerra ensure its projects remain "human-centered"?

*AstraTerra's guiding question is always, "What human need are we trying to solve?". The company prioritizes accessibility, inclusivity, and ethical use in its engineering. For example, they collaborated with the Royal National Institute for the Blind and WeWALK to create navigation and wayfinding systems for the visually impaired, later expanding this work to include mobility solutions for the aging population.*

Saudi Arabia's space ambitions have grown significantly in recent years. From your vantage point working directly with the Commission, what excites you most about the trajectory of the Kingdom's space sector?

*What excites me most is the deliberate, pragmatic alignment of space capabilities with national development priorities. The Kingdom is not pursuing space for the sake of prestige; they are identifying how space-based data, such as Earth observation for water security or satellite communication for infrastructure resilience, can solve tangible, pressing challenges. This focus on "space for impact" is refreshing. It turns the sector into a catalyst for broader economic diversification, linking orbital technology directly to sustainable development on the ground. Add to this the new ecosystems of start ups that will make the supportive layer of the Space economy in Saudi. I am very optimistic about the Commission's program and trajectory.*





### Frank Salzgeber

Former Vice Governor CST

*Frank served as Acting Vice Governor for Space sector at CST in Saudi Arabia, contributing to the Space programs and the build-up of the policy & regulation in the Kingdom of Saudi Arabia. With over 23 years in the industry, he is a serial entrepreneur known for launching ventures, driving innovation and solving complex problems. Before joining CST, Frank was the Head of the Innovation and Ventures Office at the European Space Agency (ESA), where he built the largest space entrepreneurship network in the world, the ESA BICs. He and his team initiated over 380 industry transfers, supported over 1,500 start-ups, and facilitated over 1,000 downstream business cases. Frank also headed the Technology Transfer Program Office (TTPO) and the Commercial Development for Human Spaceflight and Exploration unit at ESA. Frank's mission is to promote and foster the development of the Space economy and to inspire and empower the next generation of Space innovators.*

*Prior to joining ESA, Frank served as the founder and CFO / COO of an IT start-up based in Munich, Germany, which merged with CANCOM IT SA, in addition to his seven years of experience at Apple Computer, and served 2 years in the German Air Force.*

**The prospect of humanity returning to the Moon through programs like NASA's Artemis program is undeniably historic. But while global attention is fixed on lunar milestones, a quieter—and arguably more transformative—shift is unfolding closer to Earth.**

**The real story is commercial space. And more specifically, the opportunity it presents for the Gulf Cooperation Council (GCC).**

#### **Commercial Space: A Golden Opportunity for the GCC**

The commercial space sector is rapidly emerging as the true story of today's space race, offering unprecedented opportunities for the Gulf Cooperation Council (GCC) nations especially the Kingdom of Saudi Arabia.

**There is a second mover advantage, or more cream on the cake.**

The United States continues to dominate the global space market, attracting numerous companies to establish their operations there. Meanwhile, European nations are ramping up their investments in space, driven by national priorities and political factors. Germany, for instance, is backing its own secure satellite communications constellation, setting an example in government-led innovation. But also China and India are moving fast and smart.

Joint initiatives between the European Space Agency and the European Union demonstrate intent, but fragmentation across Europe poses challenges for newcomers. Major defence firms leverage their influence to steer large procurement consortia, making it difficult for new entrants to break through. New space ventures often rely on their own tier one and two suppliers within these consortia, limiting broader collaboration.

By contrast, big space companies are notably absent in the Kingdom and other GCC countries. This lack of established “old” players is a significant advantage. With no existing outdated facilities or production capabilities, any investment will be directed towards cutting-edge technology, free from the constraints of legacy infrastructure. The region stands poised for a second-mover advantage, ready to leapfrog into modern space industry practices. Ever Rial will be invested in the day after tomorrow and not in the code of yesterday.

Recent crises have underscored the importance of greater coordination, not less. Enhanced GCC collaboration on developing high-level space capabilities would bolster each member's economy and create a unified, competitive regional industry.

As the Kingdom positions itself as the "new Switzerland", it enjoys major advantages and fresh opportunities in exports. This is the sweet spot for space and dual-use applications, opening doors for both commercial and strategic growth.

The US Space Force budget has tripled, outpacing regular defence spending, and Germany has unveiled a €35 billion space defence programme for the next five years. These headline-grabbing developments reflect a global trend towards prioritising space, both for security and economic progress.

"Space is no longer the final frontier; it's the frontline of national security and sustainable development."

The success case of new space is driven by private space companies. Space technology and infrastructure have become a key part of all security and defence applications.

### Send me your location!

In the next five years, we will see certain trends influencing the cost structure of Space.

Some of the changes will follow other technology industries like the automotive or the computer industry. Besides the launcher business, there will be a move from vertical integration to a lean supply chain.

Take a Quad LNB for your satellite dish, for example. Everybody can buy space technology for 10 bucks. Standardization also comes with the availability.

The same move we will see in the space components market.

All this is triggered by the number of LEO constellations, but also by young innovative space companies like D-Orbit.

Tier one and two suppliers will build components on stock and sell them on demand. This will all lead to a massive price reduction in the components market and a high short-term availability. Availability is already today one of the biggest issues of the supply chain.

The location of the component provided to us will be of the essence! Only if you can address nearly the entire world from your country do you have the chance to become a market leader.

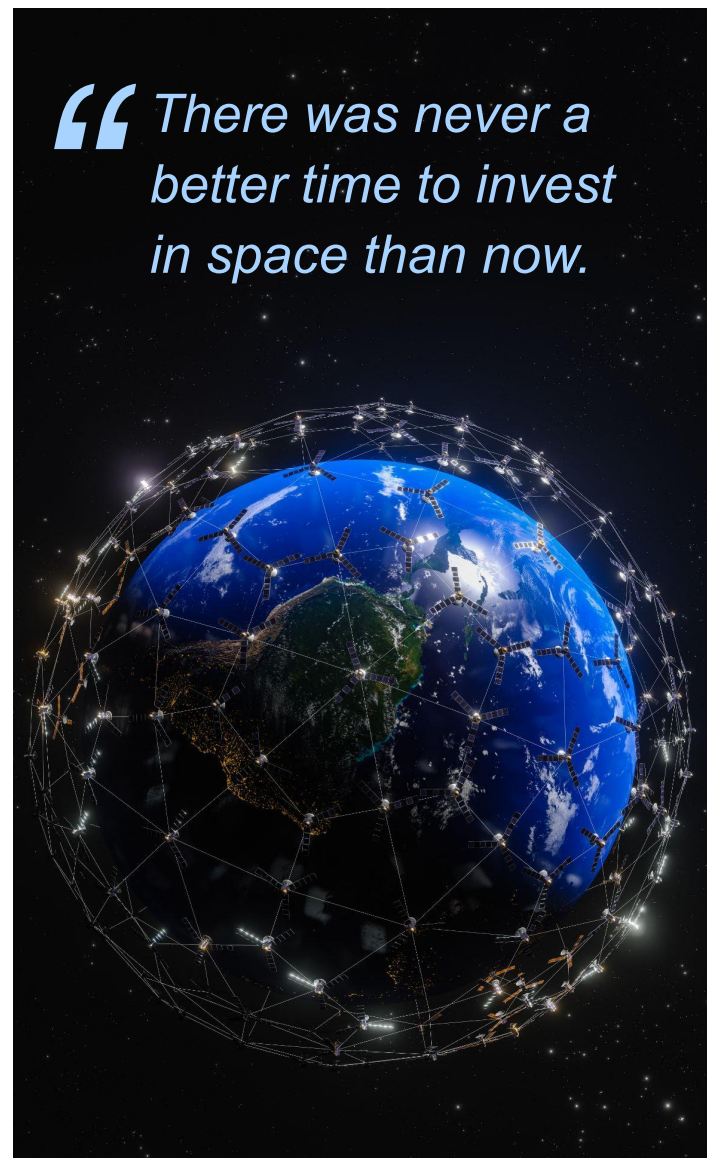
### More communications, not less.

I stopped to count the announcements of new Leo constellations, especially for connectivity. Next to the number of satellites in low Earth orbit, the number of bandwidths goes up.

Additionally, we have thousands of earth observation and remote sensing satellites delivering more data rather than less. RF will reach its limit and finally, laser communication will solve our issues.

Space will connect the synergies of the AI and data centre boom on the ground and the investments that were recently announced for orbital data centres.

Overall, this is an infrastructure investment case, and the business of the kingdom is familiar with big infrastructure investments. There is a unique window of opportunity for industry players as well as investors.





## Dr. Junayd Miah

Associate Director, Space &  
Connectivity at Access Partnership

*Dr Junayd Miah has led major programmes and advised government partners on space operations, resilient communications, Space Situational Awareness and Earth Observation, working closely with academic, commercial and international collaborators.*

*Before joining the private sector, Junayd served as Science Adviser for UK Space Command, where he led the MINERVA programme – an over GBP 120M effort to define future UK space architecture – and oversaw the delivery of the UK Government’s first owned and operated Mission Operations Centre in over 17 years. He also contributed to multiple international missions including the US-UK CIRCE space weather satellite and the UK-owned Prometheus-2 EO and SSA mission.*

*Junayd holds a Bachelor’s degree from Southampton University, a Master’s from Harvard University, and a PhD from Durham University. He is a Chartered Physicist and Fellow of the Institute of Physics.*

## Sovereignty on Orbit: The GCC Space Sector in 2025

The Gulf Cooperation Council no longer watches space from the sidelines. In 2025, the region's space sector reached a decisive inflection point — one defined not by symbolic firsts, but by a shared and increasingly urgent imperative: sovereign control. From satellite manufacturing alliances in Abu Dhabi to a sovereign geospatial intelligence platform in Riyadh, an encrypted LEO constellation taking shape in Saudi Arabia, and Oman receiving civil aviation approval for the Middle East's first commercial orbital spaceport, the architecture of an independent Gulf space power is being laid in real time. What runs through all of it is the recognition that in a more contested and multipolar world, dependence on foreign systems for critical data, communications, and intelligence is no longer a viable strategic posture.

### From Symbolic Launches to Operational Constellations

The year opened with a burst of launch activity that made the shift concrete. The UAE put four significant spacecraft into orbit across 2025: Thuraya-4, an advanced L-band mobile communications satellite operated by Space42; MBZ-SAT, the UAE's most capable optical Earth observation platform, built by Emirati engineers with 90% of its structure manufactured locally; ETIHAD-SAT, the UAE's first synthetic aperture radar (SAR) satellite, which can image through cloud cover and darkness; and in December, the pan-Arab hyperspectral imaging satellite Arab Satellite 813, a cooperative mission among the Arab Space Cooperation Group. Bahrain joined the club in March when the National Space Science Agency (NSSA) successfully launched Al Munther, the Kingdom's first domestically designed and built satellite, aboard a SpaceX Falcon 9 as part of the Transporter-13 mission.

These are not simply technical milestones. ETIHAD-SAT's all-weather radar capability fundamentally changes the UAE's ability to monitor its maritime domain, track illicit activity, and generate persistent, reliable imagery for decision-making without routing requests through international imagery providers.

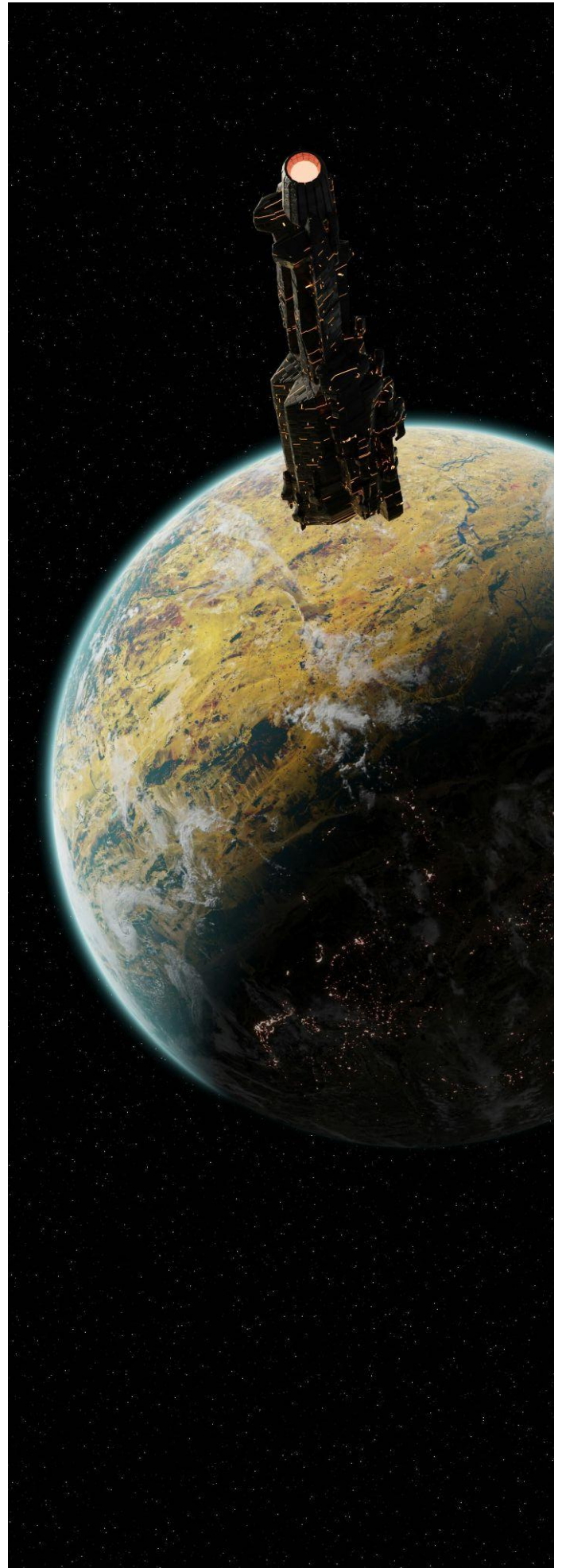
MBZ-SAT's imaging is reported to be twice as precise as its predecessor, with significantly higher daily throughput — metrics that matter not just for environmental monitoring, but for the kind of near-real-time situational awareness that sits at the intersection of civil planning and national security. Space42 also completed the integration and testing of three Foresight SAR satellites — Foresight-3, 4, and 5 — within the UAE itself for the first time in 2025, signalling a maturing domestic manufacturing capability.

### The Sovereign Data Agenda

If there is a single defining policy theme running through GCC space activity in 2025, it is the aggressive assertion that data must be nationally controlled — not merely owned through asset procurement, but hosted, processed, and analysed inside national borders by national talent.

Saudi Arabia's Neo Space Group (NSG), a Public Investment Fund (PIF) company, made the clearest statement of this intent in October 2025 with the launch of NeoMaps — the Kingdom's first fully national geospatial intelligence platform, developed, hosted, and operated entirely by Saudi professionals. NSG's CEO Abdulaziz Al-Farraj was explicit about the strategic rationale: "NSG is building sovereign geospatial and satellite capabilities that directly advance Vision 2030, pairing national platforms with global best-in-class data to turn observation into decision-ready insight". The platform delivers near-real-time smart reports within four to six hours of satellite tasking, cutting a dependency chain that had previously run through foreign commercial providers. NeoMaps was complemented by the launch of NeoEye, the Kingdom's forthcoming national Earth Observation intelligence platform, completing what NSG frames as an integrated sovereign geospatial ecosystem.

At the financial scale above, in August 2025, Saudi-based SpaceBelt KSA signed a \$640 million, five-year contract with US launch company iRocket to deploy a sovereign low-Earth orbit (LEO) satellite constellation of up to 30 launches — purpose-built for encrypted, Saudi-controlled secure communications across the Kingdom and the GCC. In the UAE, Space42 announced the development of the country's first Sovereign Mobility Cloud in September 2025, built on Core42's Sovereign Public Cloud powered by Microsoft Azure. The platform secures autonomous mobility data, HD mapping, telematics, and digital twins entirely within UAE jurisdiction — extending the sovereignty logic from space infrastructure itself into the downstream data flows that space systems generate.



## Defence Space Moves Front and Centre

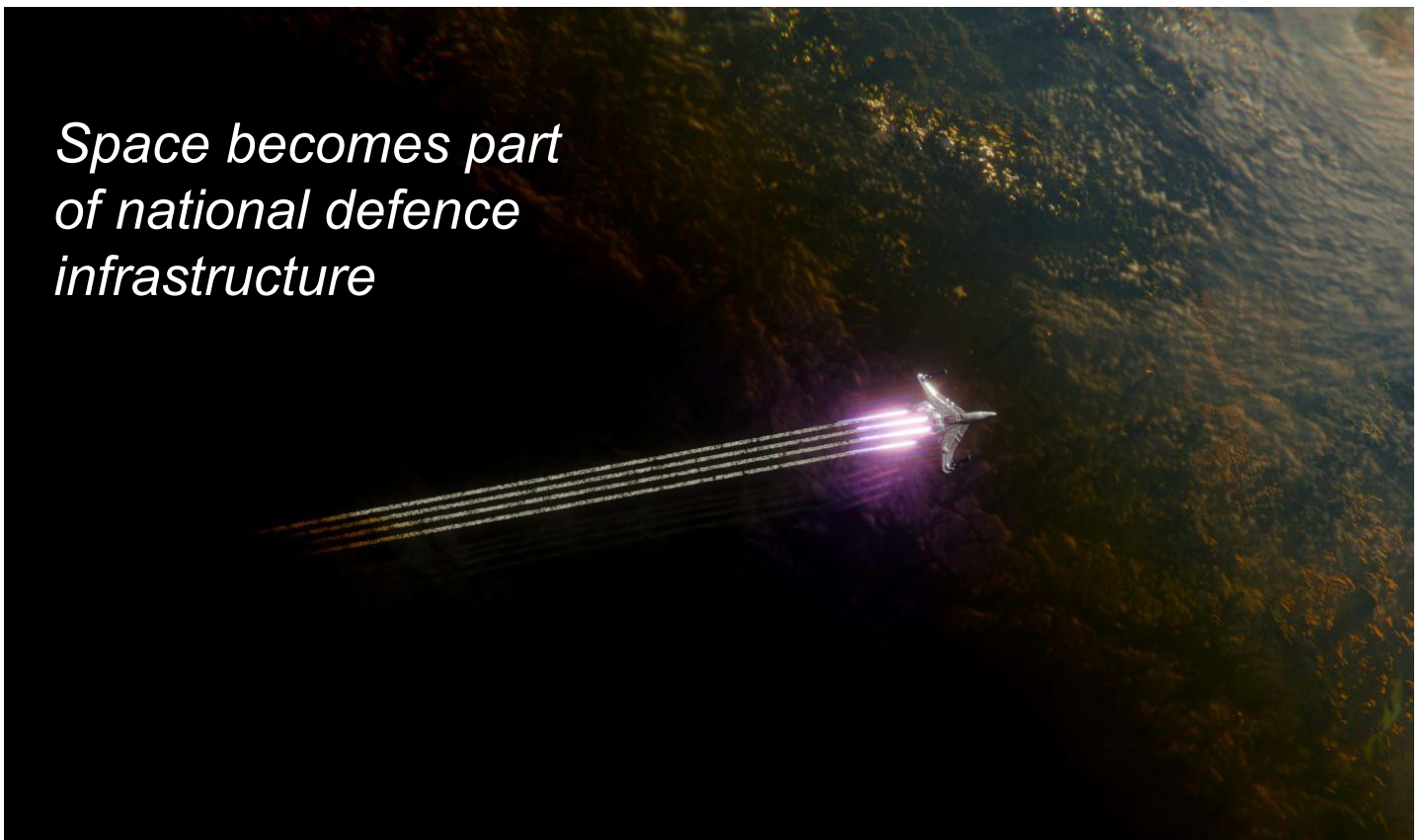
The convergence of civil and military space agendas became unmistakable at the Dubai Airshow in November 2025, where two significant defence-space partnerships were formalised in a single day. Space42 and EDGE Group's ultra-secure communications entity KATIM announced a strategic SATCOM manufacturing alliance designed to build a comprehensive, sovereign hardware capability — combining Space42's satellite communications infrastructure with KATIM's advanced cryptographic waveforms, government-grade secure communications, and antenna systems. The explicit goal: SATCOM technologies traditionally sourced internationally would now be designed and manufactured within the UAE. On the same day, Space42 signed a Cooperation Agreement with defence manufacturer Calidus to co-develop AI-enabled SATCOM solutions for national security platforms, including a framework for joint IP ownership and technology transfer that builds localised knowledge within UAE-based teams.

The UAE's defence-space integration has been building since earlier in the year. At IDEX 2025 in February, Space42 and EDGE's FADA entity formalised an MOU to establish a joint venture for an integrated Earth Observation ecosystem with explicit dual-use mandates across government and commercial domains.

FADA is also the contractor developing the UAE Space Agency's Sirb radar satellite constellation — a programme that places the design of sovereign ISR assets directly within the defence-industrial base. Saudi Arabian Military Industries (SAMI), meanwhile, showcased command, control, communications, and intelligence (C4I) systems at both IDEX 2025 and DSEI 2025 in London — systems that are architecturally dependent on space-based communications and EO data, and which SAMI is progressively seeking to indigenise. Per the General Authority for Military Industries (GAMI), Saudi Arabia's military localisation target of 50% by 2030 had reached 24.89% by end-2024, with SAMI accelerating across land, cyber, and communications domains simultaneously.

Academically, Taylor & Francis published a 2025 analysis framing GCC states as practitioners of "New Defence" — a model defined by the spin-in of civilian technologies, software-defined engineering, and private financing, with space and AI as the two sectors where Gulf investments are most advanced. The analysis noted that whilst GCC programmes strongly align with civilian technology appropriation and software-defined innovation, they remain heavily dependent on state-led financing and lack the operational feedback loops that would accelerate maturation — a challenge that the region's defence establishments are increasingly aware of.

*Space becomes part  
of national defence  
infrastructure*



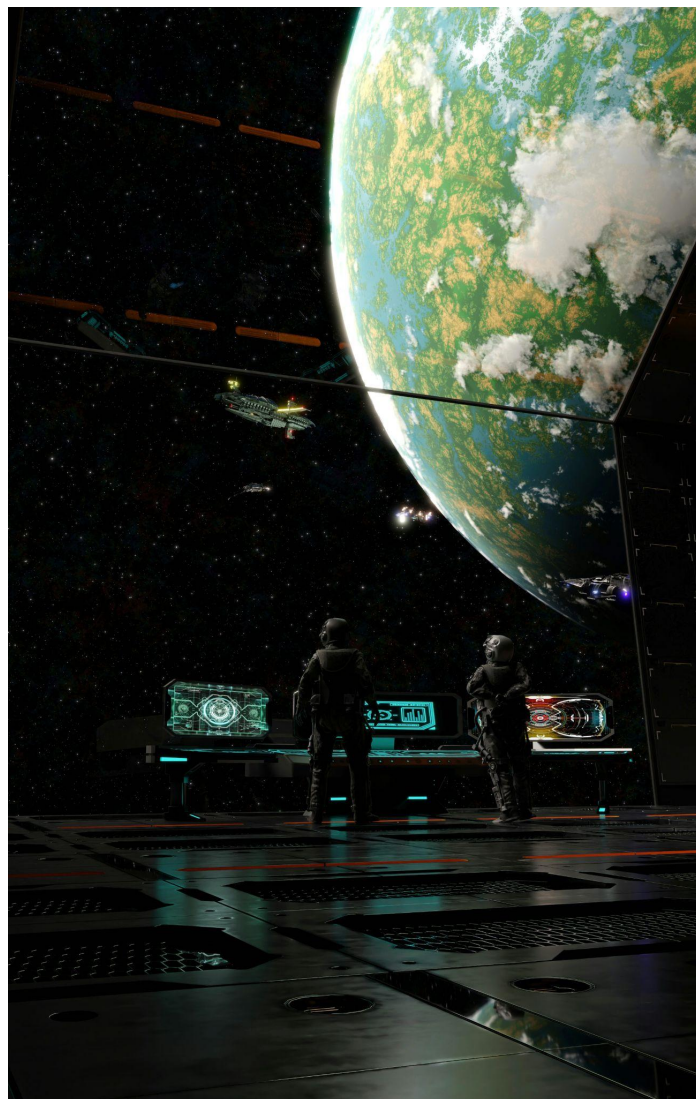
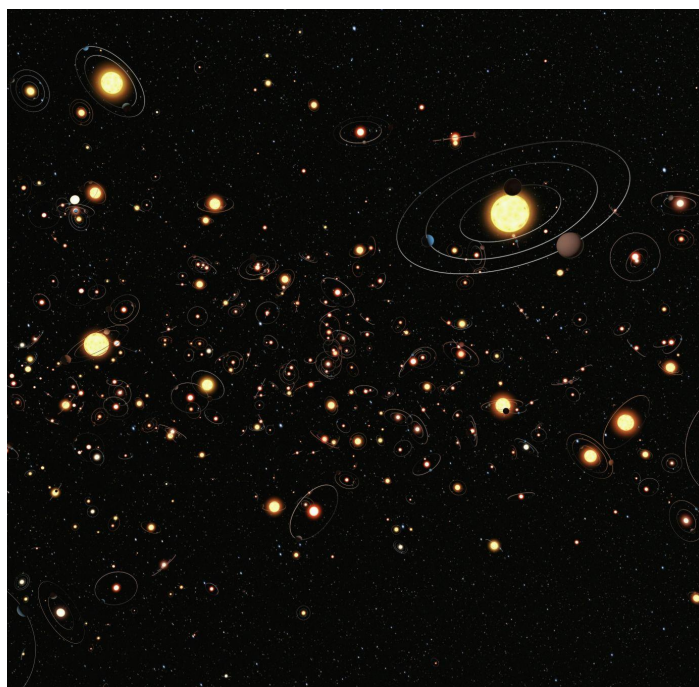
## Building the Industrial Base

Sovereign capability requires more than satellites and platforms — it requires the factories, engineers, and institutions to sustain them. Across the GCC in 2025, this industrial foundation is being deliberately constructed.

In Oman, the Etlaq Spaceport in Duqm received initial approval from the Civil Aviation Authority (CAA) in October 2025, authorising it to proceed with bookings for orbital launches and to provide infrastructure for light- and heavy-lift rockets across four launch pads. Located at 18 degrees north latitude, Etlaq offers genuine orbital efficiency advantages for equatorial and sun-synchronous trajectories, positioning Oman as a potential regional gateway for commercial launch.

Oman's Ministry of Transport, Communications and Information Technology also signed a cooperation agreement with Airbus Defence and Space in November 2025 for OmanSat-1 — the Sultanate's first dedicated communications satellite, based on Airbus's fully reconfigurable OneSat platform, expected to be operational by May 2029 and covering Oman, its exclusive economic waters, the Middle East, East Africa, and Asia.

Bahrain's Al Munther nanosatellite, beyond its Earth observation mission, carries a cybersecurity payload with advanced encryption capabilities to safeguard data from interception — a deliberate design choice that mirrors the broader GCC emphasis on securing data at the source. Bahrain also inaugurated its first national ground station in 2025, securing sovereign TT&C (Telemetry, Tracking and Control) capability for AlMunther and future LEO missions — a small but symbolically significant declaration of infrastructure independence.



## The Road Ahead

The pattern across 2025 is unmistakable: GCC states are systematically closing the gaps through which strategic dependencies can be exploited. Saudi Arabia is building sovereign geospatial intelligence infrastructure at national scale. The UAE is anchoring ISR, communications manufacturing, and deep-space exploration within a nationally-controlled industrial base. Oman is converting its geography into sovereign launch infrastructure. Bahrain is demonstrating that ambition of purpose matters more than scale of resources.

The GCC's approach is not autarky — international partnerships with Airbus, Microsoft, Thales Alenia Space, and others remain central to the delivery model. What has changed is the terms. Technology transfer, joint IP ownership, in-country manufacturing, and sovereign data hosting are now non-negotiable conditions, not optional add-ons. The orbit is no longer someone else's domain — and for the GCC, 2025 was the year that claim shifted from aspiration to architecture.



**Fahad  
Alhussain**

Partner at Nadir Space

U.S./Saudi experienced CEO, Board Member, and investor in small and large companies in space, defense, biotech, and a space pioneer. He has a track record of successfully turning small and/or struggling companies into key market leaders within 1-2 years. He has deep experience in the space sector in particular, as satellite Laser tracking engineer at NASA, communications engineer of Saudisat-1, the first Saudi satellite, and responsible for KSA's satellite network deployment in the country. He led many U.S. and Saudi companies successfully through complex transformation processes from startup to profitability, growth and merger with key industry stakeholders.

He is currently a managing partner at nadir space , a deep tech VC focused on space tech and biotechnology. Previously, he was the general partner at Seedford , Its portfolio includes Axiom Space, Voyager Space, SpaceX, Elroy Air, Skydweller, and numerous other space, Earth observation, and advanced air mobility companies. seedford launched the first Saudi private investment fund dedicated to investments in the commercial space industry and space technologies at LEAP 2024.



**Given your strategy of investing in leading international companies like SpaceX and Axiom Space, what is the specific value proposition that the Saudi Space Fund and your network offer to these global players? Is it primarily capital, strategic market access, or something else?**

*Capital is merely the entry ticket in today's deep-tech landscape; what truly sets us apart is strategic, localized venture building. The true value we bring to global leaders is unparalleled market access and ecosystem integration. Saudi Arabia is not just a customer; it is actively transitioning into a primary hub for the \$1 trillion global space economy. We act as the vital bridge, helping these giants transition from being mere vendors in the region to becoming integrated, long-term strategic partners. This means facilitating high-value joint ventures, deeply navigating local regulatory frameworks, and aligning their technology roadmaps with the sovereign needs of the broader MENA market. We provide the geopolitical and commercial de-risking necessary to deploy dual-use technologies, advanced autonomy, and satellite infrastructure at scale.*

**Your portfolio includes established giants and emerging startups. How do you strategically allocate capital between these two categories, and what is your vision for cultivating and funding the first generation of Saudi and Gulf-based space champions?**

*We employ a highly deliberate 'barbell' approach to capital allocation. On one end, investing in established global giants provides our portfolio with baseline stability, proven execution, and deep industry relationships. We then leverage those exact networks—and the technological cross-pollination they offer—to benefit the other end of the barbell: our early-stage startups.*

*To cultivate the first generation of Gulf-based space champions, passive investing is insufficient; we focus on active venture building. We aggressively source leading-edge IP and startups from Europe, Asia, and the US, and pair them with localized engineering talent and capital. By doing so, we are creating homegrown companies that are custom-built to solve specific regional challenges in defense, multi-domain connectivity, and Earth observation, ensuring the intellectual property and manufacturing capabilities take root here in the Kingdom.*

**You've invested in companies like Privateer that sit at the intersection of AI and space. How do you evaluate the defensibility of an AI-powered space startup versus the underlying space infrastructure or data itself? Where do you see the most durable moats being built?**

*AI is a powerful accelerator, but an algorithm alone rarely forms a lasting moat—it too easily becomes a commoditized 'wrapper.' The most durable competitive advantages are built at the intersection of proprietary data capture and the physical infrastructure that enables it. When evaluating a company at this intersection, we look for exclusive access to high-fidelity, multi-domain data streams or ownership of the hardware layer itself.*

*If a startup controls the data pipeline from orbit to the ground—whether through proprietary sensors, edge-computing in space, or unique orbital telemetry—their AI becomes an insurmountable asset. We evaluate the defensibility based on how hard it would be for a competitor to replicate the source of the data, not just the code analyzing it.*

**Having been instrumental in building Saudi Arabia's digital infrastructure, what are the most critical parallels you see between the telecom/ISP boom and the current space wave? What lessons on regulation, infrastructure roll-out, and ecosystem building are you applying directly?**

*The historical parallels are striking and deeply inform our strategy. Just as the early ISP boom required laying millions of miles of subterranean fiber before the digital app economy could flourish, the space economy requires robust orbital and ground infrastructure to be established first. We are currently in the 'laying fiber' phase of space—deploying Low Earth Orbit (LEO) constellations, High-Altitude Platform Stations (HAPS), and resilient ground stations.*

*The greatest lesson from building the early digital and IT infrastructure is that regulatory standardization and spectrum allocation are the ultimate bottlenecks. We are applying those exact lessons now by working closely with regulators to proactively shape interoperability standards and secure spectrum rights. You have to de-risk the physical and regulatory infrastructure before you can reliably monetize the application layer.*

**With your deep engineering background, what are the top technical red flags you look for during due diligence that a non-technical investor might miss? What level of technical maturity (e.g., TRL) is a minimum for you to invest, and does this differ for Saudi vs. international startups?**

*My engineering background makes me highly allergic to 'physics-defying' claims or brilliant hardware designs that lack a pragmatic path to manufacturing. A major red flag during due diligence is a team that hasn't accounted for SWaP-C (Size, Weight, Power, and Cost) constraints, or lacks a clear strategy for supply chain resilience.*

*For international hardware investments, we generally look for a minimum Technology Readiness Level (TRL) of 5 or 6—there must be a proven, testable prototype operating in a relevant environment. However, for Saudi startups, we are willing to engage earlier, around TRL 3 or 4. This is because we have the local resources, board-level experience, and strategic intent to actively surround them with world-class technical advisors and help them cross the 'valley of death' between the lab and commercialization.*

**For a startup you invest in, do you facilitate and navigate relationships with Saudi authorities (SSA, CST) to create commercial opportunities and de-risk their path to market in the region?**

*Absolutely; this is a core differentiator of our fund's operational model. Navigating the Saudi Space Agency (SSA) and the Communications, Space and Technology Commission (CST) isn't just about regulatory compliance — it's about strategic alignment. We actively work with our portfolio companies to map their technologies onto national priorities and Vision 2030 objectives. By functioning as a translator between tech founders and government stakeholders, we help our startups secure early pilot programs, access to testing ranges, and crucial dual-use defense contracts. This de-risks their path to market and transforms regulatory bodies into early adopters.*

**In a market with significant valuation compression, what is your advice to early-stage space startups on setting a realistic valuation? What metrics or milestones carry the most weight with you in this new environment?**

*The era of pricing early-stage rounds based on highly speculative, ten-year Total Addressable Market (TAM) models is over. The market has corrected, and my advice to founders today is to price for execution and survival, not perfection. In this compressed environment, we heavily weight tangible, de-risking milestones. I look for successful hardware testing, secured launch manifests, and most importantly, signed letters of intent or early defense contracts that demonstrate real commercial traction. A startup that can demonstrate a clear path to dual-use revenue streams—serving both commercial and defense sectors—carries far more weight and commands a premium over a polished pitch deck with theoretical margins.*

**You have significant investments in AAM (e.g., Elroy Air, Skydweller). Do you view this as a separate sector or a logical extension of the space value chain? What is the specific investment case for AAM in the Middle East context?**

*I do not view Advanced Air Mobility as a separate sector; rather, it is a crucial, integrated layer of the broader multi-domain connectivity and logistics network. We view airspace as a continuum from the ground to deep orbit. In the Middle East, the investment case for AAM is immediate and incredibly compelling. Our unique geography—vast distances, remote borders, and rapidly developing mega-projects—demands innovative logistics. Heavy-lift drones, autonomous delivery systems, and HAPS bridge these geographic divides. They enhance border security, provide resilient Intelligence, Surveillance, and Reconnaissance (ISR), and serve as high-altitude communication relays that perfectly complement our orbital assets. It is a vital piece of the aerospace value chain.*



**You famously believe in "time as our friend." How do you structure your fund's terms and manage LP expectations to accommodate the long hold periods and capital intensity of space investments, which defy traditional VC models?**

*Space is hard, and hardware takes time. Deep-tech and aerospace development cycles simply do not fit neatly into traditional software VC timelines of rapid iterative scaling. We structure our fund with the understanding that 'time is our friend' when building durable, high-barrier-to-entry infrastructure.*

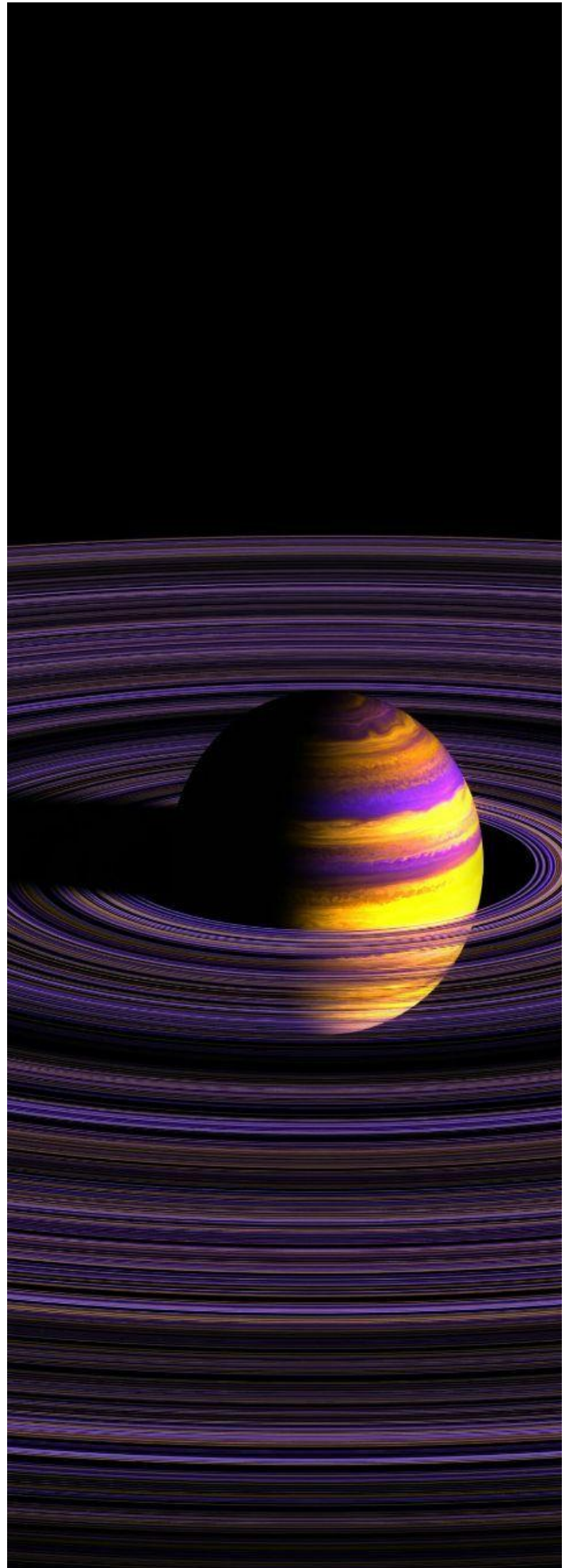
*We manage LP expectations by shifting the focus from immediate liquidity events to intermediate value-creation milestones. We tranche our capital based on technical and commercial de-risking. Securing a major Ministry of Defense contract, successfully passing a critical design review, or achieving a strategic joint venture are all massive value-inflection points. We educate our partners that these milestones fundamentally increase the enterprise value of the company long before an IPO or acquisition.*

**Your vision is to create a leading global space ecosystem in Saudi Arabia. Looking ahead to 2030, what are the 2-3 most critical, tangible milestones, beyond financial returns, that will signal you have succeeded? (e.g., a homegrown IPO, a major tech transfer, a globally recognized mission).**

*Beyond generating top-tier financial returns, success by 2030 looks like three highly tangible, transformative milestones. First, executing a successful IPO or facilitating a major global acquisition of a homegrown Saudi space-tech company that we seeded and built from the ground up.*

*Second, the establishment of a fully operational, localized manufacturing facility within the Kingdom. Whether that is fabricating advanced optical sensors, drone airframes, or satellite bus components, true success means the technology transfer has resulted in local job creation and GDP contribution.*

*Finally, I want to see our portfolio companies acting as the primary commercial contractors executing a major sovereign space mission for Vision 2030—proving that the ecosystem we funded is now powering the nation's future.*





## Hesham M. Shageer, Ph.D.

Co-Director CEAA  
KACST

*Hesham Shageer is an emerging-technology leader and operational executive specializing in large-scale scientific and technological initiatives. He currently serves as the General Manager of the Deep Sea Exploration (DSX) Institute and Co-Director of the Center of Excellence for Aeronautics and Astronautics (CEAA) at the King Abdulaziz City for Science and Technology (KACST). With a strong academic foundation and extensive leadership experience, Hesham excels at driving applied research, digital transformation, and innovation. His work focuses on advancing national technological capabilities, orchestrating complex high-impact projects, and fostering strategic collaborations between research institutions and industry to accelerate sustainable technology development.*

## Interview

**How has the CEAA's research agenda evolved to directly support the Saudi Aviation Strategy and the Kingdom's goal of becoming a global aviation and logistics hub by 2030?**

*The CEAA has transitioned from theoretical studies to a mission-driven agenda focused on the Saudi Aviation Strategy. Key shifts include prioritizing Autonomous Systems and Advanced Air Mobility to integrate drones into commercial airspace, developing sustainable designs, and utilizing AI-driven logistics to optimize hub operations. These efforts directly support the 2030 targets of 330 million passengers and 4.5 million tons of cargo through localized, high-tech aviation solutions.*

**In what ways is the Center contributing to Saudi Arabia's "strategic autonomy" in space technology, particularly regarding the indigenous design and manufacturing of satellite systems?**

*The CEAA fosters strategic autonomy by transitioning Saudi Arabia from a technology buyer to a developer. It oversees the indigenous design of satellites like Saudisat-4 UV LED mission, utilizing national cleanrooms and Advanced Manufacturing Centers for local fabrication. By developing sovereign payloads and geospatial portals, the Center ensures data independence. Coupled with advanced materials research (e.g., 3D-printed titanium), these efforts secure a domestic supply chain, reducing reliance on foreign entities for critical space infrastructure.*

**Out of all the current initiatives (from advanced computational technology to intelligent space systems) which single project do you believe will have the most transformative impact on the Saudi aerospace supply chain by the end of this decade?**

*The localization of Additive Manufacturing (3D printing) and advanced aerospace materials will be most transformative. By producing high-strength carbon-based composites and components domestically, Saudi Arabia shifts from a "make-to-stock" import model to a resilient "make-on-demand" system. This reduces lead times for critical parts, slashes MRO costs, and provides the essential physical backbone for the Kingdom's Advanced Air Mobility and satellite programs, fundamentally securing a self-sustaining national aerospace supply chain.*

**The KACST-Stanford collaboration is a cornerstone of your research. How does this bridge between Riyadh and Silicon Valley facilitate the transfer of "Deep Tech" knowledge and the commercialization of aerospace patents?**

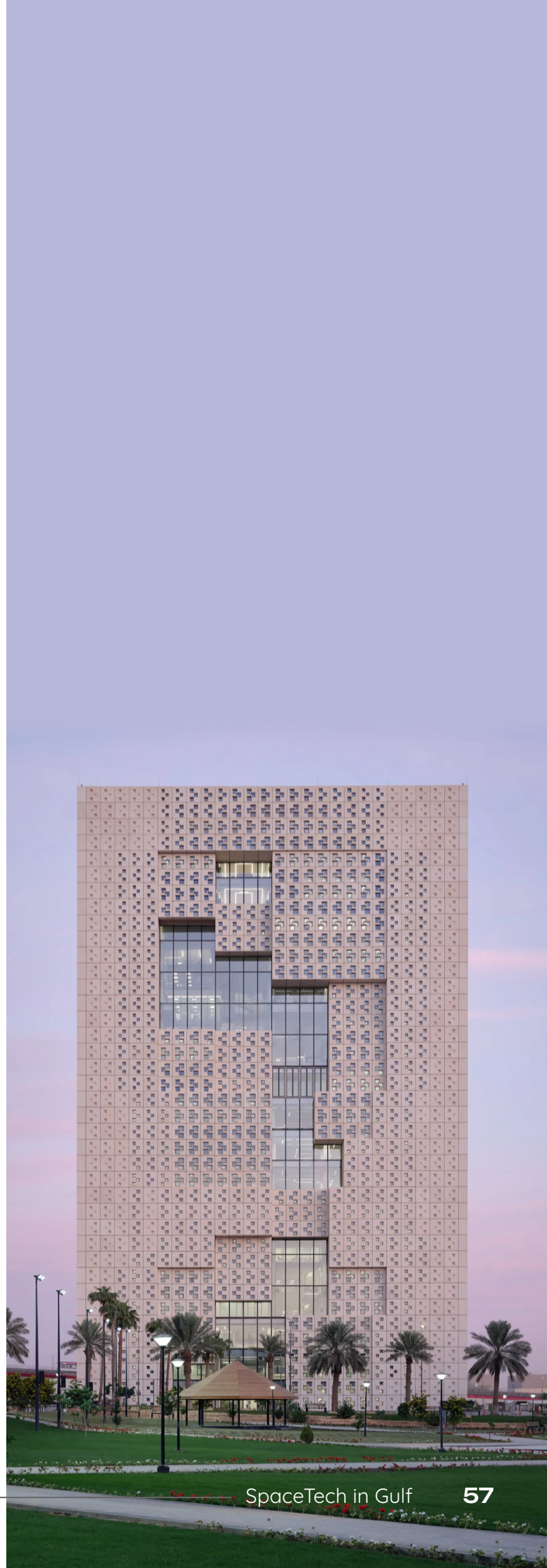
*The KACST-Stanford bridge transfers Deep Tech through co-located labs and the Deep Tech Commercialization Bootcamp. This partnership shifts research from academic milestones to investable assets, using Silicon Valley expertise to license aerospace patents. Successful projects transition to The Garage incubator in Riyadh, where startups receive venture funding and access to KACST's national labs. This ecosystem ensures Saudi-led innovations reach the market as commercial products, directly fueling the Kingdom's 2030 space sector & aviation industry goals.*

**How does the CEAA collaborate with other national entities to provide critical Earth observation data for the Kingdom's "Giga-projects"?**

*The CEAA collaborates through the National Center for Remote Sensing at KACST, providing high-resolution satellite imagery to entities like Red Sea Global and NEOM. This data is integrated into GIS and BIM systems to monitor construction progress and environmental health. Through the "Saudi Arabia from Space" platform and global partnerships with Maxar, KACST delivers hyperspectral intelligence for urban planning and carbon tracking, ensuring Giga-projects meet their regenerative and sustainability goals.*

**KACST recently celebrated the graduation of several deep-tech startups. What role does the CEAA play in incubating new Saudi companies specifically within the aeronautics and space-tech sectors to ensure a sustainable commercial ecosystem?**

*The CEAA provides the technical foundation for space-tech startups by feeding aerospace patents into the KACST Venture Program. It transitions projects from labs to The Garage incubator, where researchers are trained to treat IP as investment assets. By providing access to National Labs for prototyping and aligning research with the Saudi Space Agency priorities, the CEAA ensures new companies are market-ready and support a localized aerospace supply chain.*





**Dr. Ayoub  
Alsubehi**

The Founder of Falak for  
Space Sciences and  
Research

Founder & CEO of Falak for Space Science & Research; Principal Investigator of Falak Mission FRAM2. Affiliations & Past Roles: Leader in nonprofit sector advancing Arabic science content; designed and directed the first Saudi nonprofit space research mission (eye microbiome).

**Expertise:** Space life sciences, microgravity biology, outreach and training, science education. Selected Achievements: Directed FRAM2 mission; built Falak as youth-focused space community in Saudi Arabia; integrated medical, biological, and space disciplines.

## What inspired the founding of Falak for Space Science and Research, and what gap does it address?

*I founded Falak for Space Science and Research with a clear conviction: the region does not lack talent—it lacks structured pathways that translate that talent into real contributions to the global space ecosystem.*

*What I consistently observed was a gap between ambition and access. Across Saudi Arabia and the Arab world, there are highly capable individuals with strong scientific curiosity, yet limited opportunities to engage in authentic, research-driven space work or to connect with leading international institutions. Falak was built to close that gap.*

*Our mission is to develop a generation of researchers who are not only inspired by space, but actively shaping its future. We do this by creating an integrated platform that combines education, applied research, and international collaboration—enabling participants to move from learning to contributing in real missions, particularly in emerging fields such as space medicine.*

*Through initiatives like the Falak Research Programs and the Falak Mission, we are positioning Saudi talent as credible contributors to global scientific advancement, rather than passive participants.*

*I am also pleased to share, through your platform, that after six years of building and leading Falak, I have stepped down from all executive and administrative roles, and now serve solely as its Founder. Today, the organization is led at the board and strategic decision-making level by a new generation of talents and experts—many of whom were developed through Falak's own programs over the past four years. This, in itself, is one of the outcomes I am most proud of.*

## Can you walk us through the goals and scientific design of the eye microbiome experiment that was launched with the FRAM2 mission?

*The ocular microbiome experiment was designed as a foundational step toward understanding how microgravity environments influence microbial behavior on the human eye—an area that remains largely unexplored despite its importance to astronaut health.*

*Our primary objective is to investigate how microgravity affects the composition, growth dynamics, and functional behavior of the normal ocular microbiota. This includes assessing potential changes in microbial proliferation, biofilm formation, and antibiotic resistance patterns under space conditions. From a scientific design perspective, we adopted a controlled, comparative model. We collected conjunctival swabs from healthy individuals to isolate and culture representative ocular microbiota. These samples were then divided into two groups: one maintained on Earth as a control, and the other sent to space aboard the FRAM2 mission for a defined exposure period.*

*Following the mission, both sets of samples undergo comprehensive analysis on Earth, including genetic and, where applicable, proteomic profiling. This allows us to directly compare how spaceflight conditions alter microbial behavior at both the phenotypic and molecular levels.*

*The significance of this experiment lies in its potential to inform future medical protocols for long-duration space missions. By understanding how the ocular microbiome adapts to microgravity, we can better anticipate infection risks, develop targeted preventive strategies, and contribute to safeguarding astronaut ocular health. At a broader level, this work also contributes to the growing field of space medicine and opens the door to translating these insights into clinical applications on Earth.*



## How do you select scientific experiments and research priorities—especially for subjects like human health in space that are still underexplored?

*Our approach to selecting scientific experiments is both strategic and evidence-driven. We start by identifying critical gaps in the current body of knowledge—particularly in underexplored domains such as human health in space—by reviewing existing literature, space agency priorities, and emerging risks observed in astronaut health. From there, we apply three key criteria.*

*First, scientific relevance, the research must address a clearly defined question with potential to advance understanding in a meaningful way, especially in areas with limited existing data. Second, translational value: we prioritize studies that can generate insights applicable not only to spaceflight, but also to healthcare challenges on Earth. This dual-impact model is central to how we design our research agenda. Third, feasibility within space constraints: space missions impose strict limitations in terms of payload, duration, and operational complexity. Therefore, experiments must be carefully engineered to deliver high-value data within these constraints.*

*In addition, we place strong emphasis on collaboration working with international experts, research institutions, and mission partners to validate our approach and ensure scientific rigor.*

*Ultimately, our philosophy is to focus on research that is not only novel, but necessary—projects that answer questions we cannot leave unexplored as humanity moves toward longer-duration space missions.*

## What partnerships were critical to executing the Falak mission, and how did those collaborations work in practice?

*The Falak mission was enabled through a focused network of strategic partnerships. Internationally, collaboration with Spaceomix through the FRAM2 mission provided access to the spaceflight platform and ensured technical readiness. Locally, we were fortunate to receive support from the Misk Foundation and the Saudi Space Agency, which helped enable the mission and align it with broader national ambitions.*

*Academic partners also played a key role in refining the scientific design and supporting post-flight analysis.*

*In practice, these collaborations were structured around clear roles, early alignment, and continuous coordination—ensuring both scientific rigor and operational efficiency.*



*A group photo of the 2026 Falak Society volunteer cohort at their inaugural meeting. The 100 volunteers, selected from 800+ applicants, mark the start of their journey supporting Falak's mission to build a community connected to the universe.*

## What were the biggest challenges you faced, and how did you overcome them?

*The primary challenge I faced as a researcher was securing financial support for the mission and it remains, to this day, the most persistent barrier.*

*From my experience, the ideas are there, the researchers are there, and access to knowledge is no longer the limitation. What often stands in the way is the ability to translate those ideas into funded, executable projects.*

*Beyond funding, we also had to navigate strict technical requirements, limited payload constraints, and complex regulatory and safety standards, in addition to coordinating across multiple international partners.*

*We addressed these challenges through a structured approach—building the right partnerships, aligning early with stakeholders, and refining the experimental design to meet spaceflight constraints without compromising scientific value.*

## How are the results being analyzed, and what early findings or impacts can you share?

*The analysis is being conducted through a comparative framework between space-exposed samples and ground controls. We are applying genomic techniques, including sequencing, to evaluate changes in microbial composition, growth patterns, and potential functional shifts following exposure to microgravity.*

*At this stage, the study is still in its analytical phase, so we are cautious about drawing definitive conclusions. We anticipate that initial findings will be announced in the coming period, following completion of the analytical phase and necessary scientific review.*



**How does Falak balance its research ambitions with its educational and community engagement activities?**

*At Falak, we don't see research and education as separate tracks—they are intentionally integrated. Our model is designed so that education feeds directly into research. Through our training and outreach programs, we identify, develop, and prepare talent, then provide pathways for those individuals to transition into real research projects and missions. This creates a sustainable pipeline where community engagement builds capacity, and research provides purpose and direction.*

**What strategies do you use to involve and inspire youth, students, or early-career scientists in space research—and what have been the most impactful programs so far?**

*Our primary strategy is to move beyond inspiration into structured empowerment by providing clear pathways from learning to real participation in space research. The most impactful initiative in this regard has been the Falak Enrichment Program. It is designed to equip participants with both foundational knowledge and applied experience, combining scientific content, mentorship, and exposure to real research challenges. What makes the program effective is that it doesn't stop at education. It actively identifies high-potential individuals and integrates them into advanced research tracks and mission-level work. This approach has allowed us to build a growing community of young researchers who are not only interested in space, but are actively contributing to it.*

**Looking ahead, what are Falak's next major projects or research areas?**

*Falak is expected to continue advancing its work across research and mission-driven initiatives, including future space experiments and potential expansion into broader domains within the space sector. As for me, I will continue to support Falak in its future missions. However, my primary focus moving forward is on building a specialized research trajectory—both within and beyond Falak—centered on human health in space and its translational applications on Earth. My aim is to contribute to the scientific understanding of how space environments affect biological systems, and to position this work within a rigorous, globally relevant research context.*

**How do you see Falak's work contributing to Saudi Vision 2030 and to global scientific knowledge?**

*Falak contributes to Saudi Vision 2030 by developing human capital in the space sector and creating structured pathways for young researchers to move from education into real scientific contribution. By building a pipeline of trained talent and engaging them in applied research and mission-driven work, Falak supports the Kingdom's ambition to become an active contributor to the global space ecosystem. Through initiatives like our programs and space experiments, we are contributing early-stage data and building capacity that can integrate with global efforts in understanding human health in space. Ultimately, Falak's role sits at the intersection of national capability building and global scientific contribution—ensuring that Saudi talent is not only prepared for the future of space, but actively shaping it.*

### Bioethics Beyond Earth: Who Should Govern Medicine Made in Space?

**As microgravity becomes a platform for biomedical discovery and future pharmaceutical manufacturing, emerging space nations must think early about ethics, safety, access, and public benefit.**

Nobody in the space medicine world is quite sure what the rules are yet. That is partly exciting and partly alarming, depending on how you look at it.

For most of the history of human spaceflight, biomedical research in orbit was a narrow field focused on astronauts, and specifically on keeping them alive and functional in an environment that is, by every biological measure, hostile. Bone loss, muscle atrophy, radiation exposure, fluid shifts, sleep disruption: the human body does not love space, and decades of research have been dedicated to understanding and managing that.

That work continues. But something has shifted in the last several years that deserves a wider conversation than it is currently getting. Space is becoming a place where we do not just study medicine. We may make it. One example makes the issue less abstract. Merck researchers, led by Paul Reichert, used the International Space Station to study crystallization of pembrolizumab, a monoclonal antibody better known through its use in cancer therapy [1]. This was not a futuristic thought experiment about “medicine in space.” It was a real pharmaceutical question: could microgravity help scientists understand a drug’s structure well enough to improve how it is made, stored, or given to patients? This is where the ethical question becomes real. If scientific research in space can influence how a medicine eventually reaches patients, then space is no longer just a research setting; it becomes part of the medicine-development pathway.

The United Kingdom has already started treating this as a regulatory category, not just a science story. In 2026, the UK Space Agency, MHRA, the Regulatory Innovation Office, and the Civil Aviation Authority announced support for in-orbit pharmaceutical manufacturing. The statement named BioOrbit, a startup developing a scalable system to crystallize biologic drugs for cancer treatments, and described work on regulatory guidance, case studies, a re-entry regulatory sandbox, and supply-chain engagement [2]. This matters because the UK is not waiting until the first space-made medicine reaches patients; its regulators are already trying to understand the safety, manufacturing, return-to-Earth, and supply-chain questions while the field is still being built.



## Dr. Taghreed Al-Turki

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The UK statement does not answer all the questions. But it shows that medicine made in space is now being treated as a real regulatory issue. Once governments recognize a new kind of medicine manufacturing, they have to decide who is responsible for setting the rules.

### The Manufacturing Problem

Consider what "manufacturing a medicine" involves on Earth: quality control at every stage of production, validated processes, stability testing, cold chain management, documented supply chains, regulatory inspection, and post-market surveillance. Each of those steps gets complicated when the manufacturing environment is an orbital platform. Launch biological materials to vibration and g-forces. The spacecraft environment introduces radiation exposure. Automated manufacturing systems have to operate without real-time human intervention. Re-entry creates its own conditions. And when the product lands, wherever it lands, which country's regulatory authority takes over? The one that launched the experiment? The one that owns the platform? The one where patients will eventually receive the drug?

These aren't hypothetical edge cases. They're the actual questions that will need answers before any of this goes to patients. And right now, they don't have clean answers. The United States has at least a structural starting point; the FDA and NASA have a memorandum of understanding covering collaborative work on drugs, biologics, medical devices, and medical countermeasures [3]. But even in that context, policy analysts have noted the regulatory uncertainty that surrounds microgravity drug development when commercial companies, multiple federal agencies, and research institutions are all involved [4]. If the world's most heavily resourced regulatory system is still sorting this out, we ALL need to start thinking about it now.

### Saudi Arabia's Moment

For Saudi Arabia, this is not an abstract problem. The Saudi Space Agency and King Faisal Specialist Hospital and Research Centre signed an agreement in 2025 to advance health and biotechnology research under microgravity conditions, with an explicit goal of translating findings into practical applications [5]. The BioGravity initiative aims to enable biomedical scientists to develop microgravity research and foster scientific cooperation [6]. These are real institutional commitments, not just statements of intent. And the Communications, Space and Technology Commission has opened public consultation on space-sector regulations covering everything from crewed and uncrewed space flight to licensing, sustainability, and insurance [7].

So, the infrastructure is being built. Saudi Arabia already has pieces of the puzzle: space-sector regulation, space medicine initiatives, and national bioethics rules for biological research. The harder question is whether these pieces are being connected early enough into a clear ethical framework for space biomedicine.

This is where I pause; we know how to talk about human-subject research on Earth, and we know how to talk about pharmaceutical manufacturing on Earth. But orbital biomedicine sits awkwardly between categories. It is research, manufacturing, commercial innovation, national strategy, and public health all at once. That is exactly why it should not be treated as a technical detail to solve later.



### Familiar and Novel Ethical Questions

Some of the issues are familiar from terrestrial bioethics, even if the setting is new. Human cells, tissues, organoids, and genetic material are already used in biomedical research on Earth, including research that may contribute to drug development. But orbital biomedicine adds another layer. If biological materials are sent to space, donors may need to understand not only that their samples could support research or commercial products, but also that the work may involve international partners, commercial space platforms, return-to-Earth logistics, and intellectual property generated through a space-based process. Saudi Arabia's National Committee of Bioethics already has authority over standards for biological research ethics and controls sending biological samples to laboratories outside the Kingdom [8,9].

Whether those frameworks explicitly contemplate orbital laboratories is another question, but they are the right foundation to build from.

Other issues are novel. Legal commentators have begun examining what happens if a medicine developed in microgravity has structural or physical properties that simply can't be replicated on Earth, and therefore can't be manufactured generically, or can only be supplied by whoever controls orbital manufacturing capacity [10]. That's not necessarily a disaster, but it raises real questions about affordability, access, and supply-chain dependence that policymakers should be thinking about before the first space-made drug reaches patients rather than after. If space-made medicines become a premium pharmaceutical category accessible mainly to wealthy health systems and private buyers, something has gone wrong. Space infrastructure is typically built on national investment and international partnership; the people who paid for the foundation have some claim on the benefit.

And then there's a boundary question that doesn't come up enough in these discussions: at what point does space medicine shift from treating illness to adapting human biology for the conditions of space itself? Drugs that protect against radiation exposure. Biologics designed to preserve bone and muscle on long missions. Interventions that modify human physiology for extreme environments. Some of these ideas are already appearing in serious discussions about future space medicine, and they raise ethical distinctions that are real and important: between medicine and enhancement, between treatment and engineering. The line isn't always obvious, but it matters, and it should be drawn by people with deep expertise in both biology and ethics, not retroactively by whoever got there first.

### **Building the Ethical Architecture**

None of this argues against the science. The case for pushing into space biomedicine is solid, the potential payoff for drug development and disease understanding is real, and countries that develop serious institutional competency in this field now will be far better positioned when it matures. The argument is simply that governance frameworks are much easier to build before a field moves than after, and much easier to shape when you're an active participant.

For Saudi Arabia, the opportunity is to treat the ethical architecture as part of the scientific infrastructure. A national framework for space biomedicine would need contributions from space agencies, health regulators, hospitals, research institutions, bioethics committees, legal experts, industry representatives, and ideally some version of public engagement. That's a lot of stakeholders, and convening them is difficult. But the alternative is letting the science outpace the ethics by a decade, which tends not to end well for anyone.

I do not think the hardest question is whether medicines will eventually be made in space. They probably will. The harder question is whether we will build the ethical conversation early enough to matter. Once the first products, patents, and commercial claims are already in motion, the discussion changes. It becomes harder to ask what should happen, and easier to ask only what is already allowed. That is a narrow way to govern a field with such broad consequences.

Saudi Arabia has an opportunity to enter this conversation before the rules are settled elsewhere. Not by slowing the science, and not by treating ethics as a warning label at the end, but by making bioethics part of the design of space biomedicine from the beginning.

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### Saudi Arabia's Space-Security Activation Era

#### A Proud Saudi Perspective on a Growing National Space Ecosystem

Saudi Arabia's space sector is entering a new stage. What makes this moment important is not only that the ecosystem is growing, but that space is becoming more connected to national priorities, commercial opportunities, security needs, and long-term economic competitiveness.

As a Saudi working closely with the space domain, I see this transformation with both professional interest and personal pride. The conversation is no longer limited to ambition or future potential. It is increasingly about execution: how space data supports decision-making, how satellite connectivity improves resilience, how Saudi talent is being developed, and how national entities are turning space capabilities into practical services.

This matters because Saudi Arabia is a country where space applications are naturally relevant. The Kingdom's vast geography, critical energy assets, remote industrial operations, maritime routes, aviation growth, giga-projects, smart cities, agricultural priorities, and environmental challenges all create real demand for space-enabled solutions. Earth observation can support infrastructure monitoring, vegetation analysis, coastal observation, urban heat mapping, and environmental risk assessment. Satellite communications and non-terrestrial networks can strengthen remote coverage, aviation and maritime connectivity, emergency response, and industrial continuity.

This is why I believe the next phase of the Saudi space sector should be viewed as a phase of market activation. **The key question is no longer only who is active in the ecosystem, but what value these actors are creating for the Kingdom. Market activation means moving from announcements to execution, from pilots to adoption, from partnerships to localization, and from data access to operational intelligence.**



## Abdullah AlGharrash

Co-Founder of  
SpaceTech in Gulf

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*He is the Co-Founder of SpaceTech in Gulf, a platform dedicated to space market intelligence across the GCC and MENA region, and the Co-Founder of PhotoEnergy-TEC, a patent-based technology company developing perovskite photodetectors for aerospace and energy applications. His expertise includes Earth observation, small satellites, technology commercialization, and cross-sector technology integration. He has also authored and presented several research papers at international forums, including the International Astronautical Congress (IAC).*

*Beyond his professional and entrepreneurial work, Abdullah founded the Saudi Space Community to support talent development, knowledge sharing, collaboration, awareness, and future opportunities across the Saudi space sector.*

One of the clearest examples of this shift is SpaceUp. The program connects space-based solutions to national challenges. Its value is not only in the opportunities it creates, but in the way it reframes the market: from “what space technologies can we build?” to “what national problems can space technologies solve?” With around USD 28 million in contractual opportunities across six challenge tracks, it represents a practical model for linking national demand with high-potential space-based solutions.

The critical next step is converting such initiatives into clear adoption pathways. The Saudi space-security market will mature faster when government entities, national companies, and critical infrastructure operators become active customers of space-enabled services, not only sponsors of pilots. **The real market will be created when satellite data and geospatial intelligence are embedded into daily workflows:** monitoring assets, assessing road networks, supporting emergency response, tracking environmental risks, securing remote operations, and informing executive decisions.

The downstream sector may become one of Saudi Arabia’s fastest paths to space commercialization and security value. These services are close to customers, close to operations, and often faster to commercialize than infrastructure-heavy upstream activities. They include Earth observation, geospatial analytics, satellite communications, PNT services, climate intelligence, AI-powered analytics, and decision-support platforms.

Neo Space Group represents a major development in this area. The launch of Saudi Arabia’s first Earth Observation marketplace powered by UP42 strengthens the Kingdom’s downstream and geospatial infrastructure by giving public and private sector users a stronger path to access Earth observation data, analytics, and value-added services. **This matters because satellites create data, but downstream services create decisions.** Another important advancement is the growth of Saudi satellite connectivity and ground infrastructure. NSG’s deployment of advanced gateway infrastructure for NSG SATCOM, including a gateway system in Jeddah, reflects a move beyond services alone toward the operational backbone needed for resilient connectivity.

Alongside Arabsat, STC, NSG, and CST’s work on non-terrestrial networks, this points toward a future where satellite connectivity becomes part of national digital infrastructure.

Talent development is equally important. The Saudi Space Agency’s Space Academy is helping build national capabilities across space business, sciences, engineering, and space applications and data. CST’s Madarik program and broader capability initiatives are also widening the national talent base. At the university level, SARI-2 gives students hands-on exposure to small satellite design, systems engineering, testing, mission development, and project execution. The SSA’s partnership with Aramco Digital for the second edition of SARI-2 adds a valuable digital enablement layer to this capability-building effort.

Entrepreneurship is another pillar of the ecosystem’s future. The Space Entrepreneurship Alliance and CST’s regulatory sandbox help move ideas from concepts into startups, pilots, and commercial solutions. This is essential because sustainable local space economy requires companies that can serve national demand, localization, and scale regionally.

Saudi Arabia’s progress is also visible in science, sustainability, and international governance. Initiatives such as BioGravity, the Shams satellite aboard Artemis II, Madak, Knowledge Space, Abaad, Madar Impact, and SSA open-data efforts are expanding the ecosystem beyond industry alone. The Space Debris Conference and Debrisolver reflect the Kingdom’s engagement with orbital sustainability, while Saudi Arabia’s election as First Vice-Chair of the UNOOSA strengthens its role in global space governance.

Looking ahead, I believe the Saudi space ecosystem is moving in seven promising directions: downstream commercialization, demand-led procurement, resilient connectivity, talent-to-startup pipelines, digital-space convergence, localization through partnerships, and stronger participation in global space governance.

**The next chapter of Saudi Arabia’s space sector will be defined by execution, adoption, and the ability to turn national ambition into lasting national capability.**



# Saudi Space Community: Building the Human Capital Layer of Saudi Arabia's Space Ecosystem

**From curiosity to capability, and from capability to national impact**

Saudi Arabia's space sector is moving into a new stage of growth. Across government, regulation, industry, research, education, and entrepreneurship, the ecosystem is becoming more active, more connected, and more aligned with national ambitions. As this momentum accelerates, the development of human capital becomes one of the most important foundations for long-term success.

The Saudi Space Community (SSC) was founded to support this foundation. SSC is a community-driven Saudi initiative that brings together students, graduates, researchers, professionals, enthusiasts, and young entrepreneurs under one umbrella. It aims to make the space sector more accessible, connected, and actionable by helping individuals understand the ecosystem, build relevant capabilities, and contribute through research, programs, and collaborative initiatives.

**SSC serves as a complementary layer within Saudi Arabia's growing space ecosystem.** Supporting national efforts by activating the community, talent, and knowledge base needed for long-term sector development. As government entities, regulators, companies, universities, and research institutions continue to shape the Kingdom's space future, SSC focuses on connecting people to this momentum: helping students, graduates, researchers, professionals, entrepreneurs, and enthusiasts understand the sector, develop relevant capabilities, and contribute through unified efforts that transform individual interest into collective impact at a larger and more sustainable scale.



## **Building pathways, not only awareness**

SSC's role goes beyond public awareness. The community is building practical pathways that connect people to knowledge, research, programs, and opportunities.

Through lectures, workshops, and open discussions, SSC introduces members to space science, astronomy, satellite technologies, Earth observation, space policy, space medicine, space entrepreneurship, and emerging applications. One of its key engagement formats is the Saudi Space Majlis, a discussion-driven platform that brings specialists and community members together to exchange knowledge, ask questions, and explore future pathways within the space sector.

Research is another core pillar. SSC supports members in developing research skills and participating in international scientific platforms. In 2026, the community is contributing to the International Astronautical Congress through accepted papers across several tracks, including space science and astronomy, lunar missions and space infrastructure, propulsion systems, spacecraft systems and radiation environment, space education and human capital development, and Earth observation with AI for environmental applications.

**This research direction reflects one of SSC's most important ambitions: enabling Saudi talent to move from interest to contribution, and from participation to international visibility.**



## Space Talent Network: mapping national capability

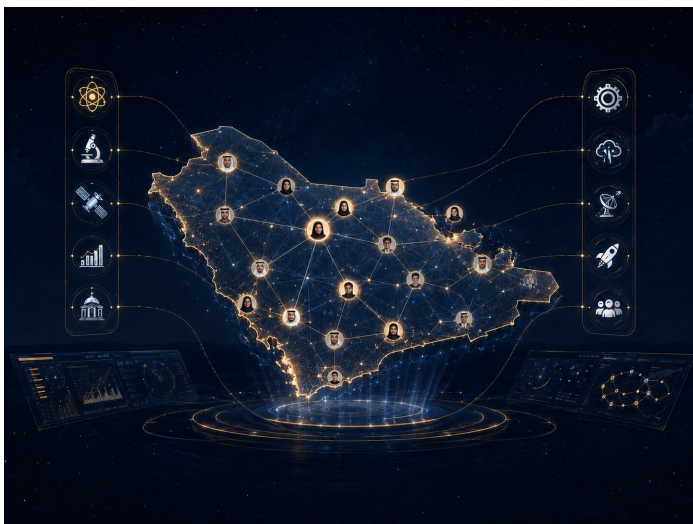
One of SSC's latest initiatives is the Space Talent Network, a community-driven platform designed to identify, map, and showcase Saudi talent interested in or working within the space sector.

The platform collects insights on specializations, skills, experience levels, professional interests, and areas of knowledge across the Kingdom. This helps build a clearer picture of the national human-capital base connected to space, while creating a bridge between talent and future professional, research, and collaborative opportunities.

**Within its first days of launch, the initiative received hundreds of applications,** reflecting the strong interest among Saudi talent and the need for a unified platform that can organize this momentum.

**For individuals, the platform increases visibility. For organizations, it creates a more structured way to discover relevant talent.** For the wider ecosystem, it supports a stronger and more informed human-capital foundation.

This matters because the space sector is not limited to one discipline. It requires engineers, scientists, data specialists, remote sensing experts, software developers, educators, policy researchers, entrepreneurs, business developers, and many other profiles. By mapping this talent pool, SSC helps connect emerging capabilities with the evolving needs of the sector.



## Programs that connect knowledge, talent, and opportunity

SSC is developing a growing portfolio of initiatives designed to serve different parts of the space community and ecosystem.

The Saudi Space Library aims to provide curated resources for learners, researchers, and professionals in Arabic. The Saudi Space Podcast is designed to document stories, insights, and experiences from people working across the sector and showcase Saudi talents in the space domain. The Saudi Space Majlis continues to serve as a space for discussion, mentorship, and knowledge exchange. SSC is also developing initiatives such as astrophotography and stargazing, linking public interest in the night sky with scientific awareness and community participation.

**Together, these programs support one direction: turning scattered interest into organized capability and impact.**

## Why SSC matters

Saudi Arabia's space ecosystem is expanding. Companies, institutions, and public-sector entities are building the infrastructure of the sector. SSC complements these efforts by focusing on the people who will learn, build, operate, research, commercialize, and communicate the value of space.

Its contribution is human-centered and ecosystem-driven. It provides early exposure for students, research pathways for emerging contributors, visibility for national talent, and engagement channels for organizations seeking to connect with motivated individuals.

**By linking knowledge, talent, research, and opportunity, SSC helps strengthen the social and human-capital layer of the Saudi space ecosystem.**

## The road ahead

The next phase for SSC is about scale, structure, and impact. The community is moving from awareness-building into a more integrated model that combines talent mapping, research support, educational programs, partnerships, and public engagement.

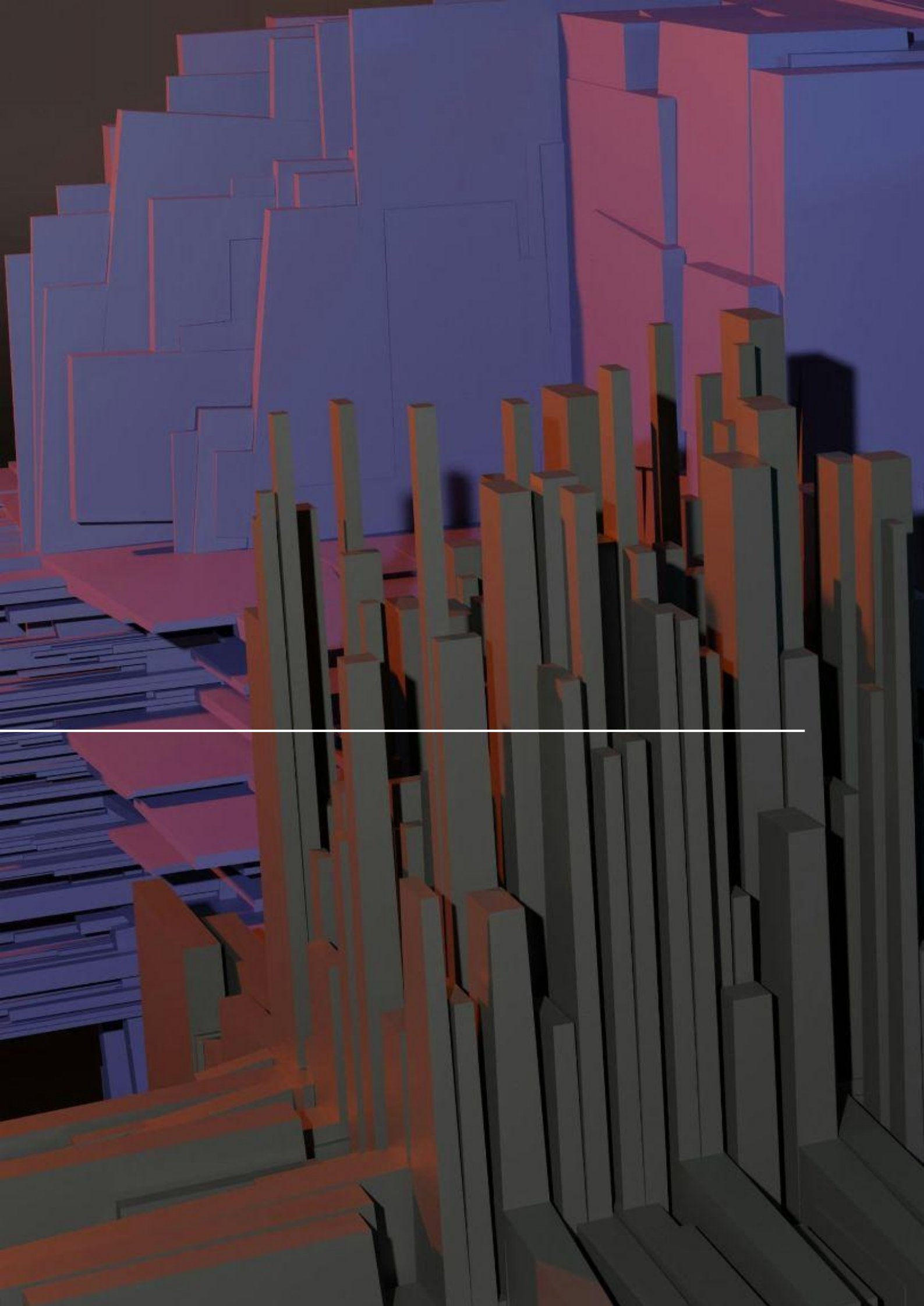
Its long-term ambition is to become a Saudi community platform for space knowledge, talent, research, and initiatives — supporting the development of Saudi scientists, engineers, researchers, entrepreneurs, educators, and professionals who can contribute to the Kingdom's space future.



**SPACETECH  
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# About us

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# About Us

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## About SpaceTech in Gulf

SpaceTech in Gulf has solidified its position as the leading analytics and space market intel company in the Middle East and North Africa (MENA) specializing in strategic communications and market intelligence within the space domain.

With a particular focus on the MENA region, the company offers expertise and insights into the unique challenges and opportunities that exist within this rapidly evolving sector. By leveraging its extensive knowledge and network, SpaceTech in Gulf helps its clients navigate the complexities of the SpaceTech landscape and develop successful business strategies that drive growth and innovation.

Contact us to learn more about how we can help you achieve your goals in the SpaceTech industry.

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## How we can help your space business?

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