

SINGAPORE'S **SPACE** SECTOR NEXT BOUND OF DEVELOPMENT

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Singapore's
Space Sector



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FOREWORD



As Singapore continues to advance our position as a global hub for innovation and technology, space will be part of our vision for the future. *Singapore's Space Sector: Next Bound of Development* announced at the Global Space Technology Convention & Exhibition (GSTCE) on 26 February 2025 sets out how Singapore will address the priorities of strengthening our national capabilities in space, and creating pathways for Singapore to participate in and contribute to the rapidly growing global space economy.

As a small nation, Singapore has consistently demonstrated that size is not a barrier to ambition and success. Just as we have built a global reputation as a thriving hub for trade, finance, and technology, we are now seeking to build capabilities to participate in the space sector. Our approach will be anchored on our key strengths: a globally competitive economy, a strong Science, Technology, Engineering and Mathematics (STEM) research ecosystem, a highly skilled workforce, and a strong international network; to forge meaningful partnerships and create high value opportunities.

We are not just consumers of space technology, but aspire to be active contributors to the global space ecosystem. Singapore has a growing number of local enterprises and multinational corporations that provide cutting edge space technologies, products, and services, as well as a dynamic pool of talents that drive innovation and research across diverse space domains. We want to expand this ecosystem to deliver impactful space-related innovations and solutions to the world.

The journey ahead will require the collective efforts of industry, academia, government, and international partners. We believe that we can achieve greater progress by working together instead of going at it alone. This will also ensure that we stay relevant and responsive to the fast-evolving space economy.

The future of space is one of limitless possibilities. Singapore is ready to play an active role in shaping this exciting frontier and in so doing, create new opportunities for our economy, society, and globally.



Mr. Gan Kim Yong
Deputy Prime Minister and Minister for Trade and Industry

WHY SPACE?

Space innovations have a **profound impact on our world** and are **fundamentally important to our daily lives**.

Satellites enable global communications, supporting television broadcasts and internet connectivity that keep us connected across vast distances. Satellites are also crucial for navigation, providing precise location information to guide airplanes, ships, and drivers, helping people and goods to reach destinations efficiently and safely. Additionally, satellite precision timing is essential for secure digital financial transactions, ensuring accurate synchronisation of clocks across global networks and maintaining the integrity of the global financial system.

Satellite data and imagery enable us to tackle climate threats by offering real-time, accurate information to observe, measure, and understand the complex processes impacting our planet. This includes weather forecasting to predict weather events like floods and heatwaves, as well as earth observation to track essential climate variables like carbon dioxide and sea levels to analyse climate change and provide ground insights to guide emergency response and rescue efforts.

Space exploration has pushed the boundaries of our understanding of our solar system, the universe, and our very own existence. It is a source of inspiration and scientific excellence for humankind.

Global trends in space are opening new opportunities for talents, companies, and countries like Singapore. The lower cost of launching and manufacturing space objects has reduced barriers of entry, and advances in data analytics and artificial intelligence have created new products and services around satellite data.

The global space economy presents significant potential for Singapore to capture economic value in the space sector.

The rapidly growing global space economy is expected to triple its size and contribute over US\$1.8 trillion by 2035, up from US\$630 billion in 2023.

Source: McKinsey & Company, "Space: The \$1.8 trillion opportunity for global economic growth", 8 Apr 2024

SINGAPORE: THE PLACE FOR SPACE

Our Journey

Singapore's space journey dates back several decades with the installation of our first satellite ground station on Sentosa in 1971 and the launch of our first communications satellite in 1998. The Office for Space Technology & Industry, Singapore (OSTIn) was established in 2013 to drive the development of small satellite capabilities, with an expanded mandate in 2020 to develop Singapore's space industry, foster innovation, and grow international partnerships.

As a leading global hub for businesses and space-adjacent sectors such as aerospace, microelectronics and precision engineering, Singapore is well placed to capitalise on global momentum in the space sector. This includes the use of space technologies to enhance communications and connectivity services, as well as to drive innovation in the green and digital economy, strengthening Singapore's business competitiveness.

Singapore's Space Sector: Next Bound of Development articulates the next stage of Singapore's space journey as we amplify our national pursuit to harness the tremendous potential of space technologies and unlock new opportunities in the space economy.



Vision

Be a global leader in space, propelling innovation, enriching lives, and securing a sustainable future for Singapore and the world.

Mission Statement

Develop the next bound of Singapore's space sector to promote economic growth, advance scientific discovery, and inspire a new generation of innovators.

To achieve this, our key thrusts are:

Thrust 1: Growing Singapore's Space Sector

Building on our existing strengths in business and talent, we aim to become a regional leader in space technologies. This includes developing research, promoting innovation, and ensuring the right policies are in place to support industry.

Thrust 3: Developing Space Programmes in Focus Areas

From improving food security to helping in disaster relief, space technologies can solve real-world problems. We also plan to use space technologies to strengthen our position as a global hub for aviation, maritime, connectivity, and sustainability.

Thrust 2: Building International Partnerships

Space belongs to everyone. We seek to deepen our collaboration with like-minded partners in the international space ecosystem to advance mutually beneficial partnerships and ensure the safe and sustainable use of space for future generations.

THRUST 1: GROWING SINGAPORE'S SPACE SECTOR

We will facilitate the growth of the local space sector, including space professional services, which forms the foundation to achieve our mission.

Booster 1 – Growing Businesses

Singapore stands out for our strengths in space-adjacent technological and service sectors, and the ease of doing business. We will help companies invest in and capture growth opportunities in the region from Singapore, and develop and internationalise local enterprises with differentiated space technologies, tapping on various resources and schemes such as those offered by the Economic Development Board and Enterprise Singapore.¹

Today, Singapore has about 70 space companies and has been a major satellite services hub for over a decade. Most of the top 10 satellite service providers in the world have their regional headquarters based in Singapore.

¹ These include providing guidance on government support schemes, facilitating connections to potential partners, and providing selected assistance to increase capacity and build new capabilities.

Adding Value to the Singapore Space Economy

Addvalue is a Singapore homegrown satcom and connectivity solutions company established in 1996 to provide state-of-the-art satcom terminals, custom design engineering, and integration services to customers.

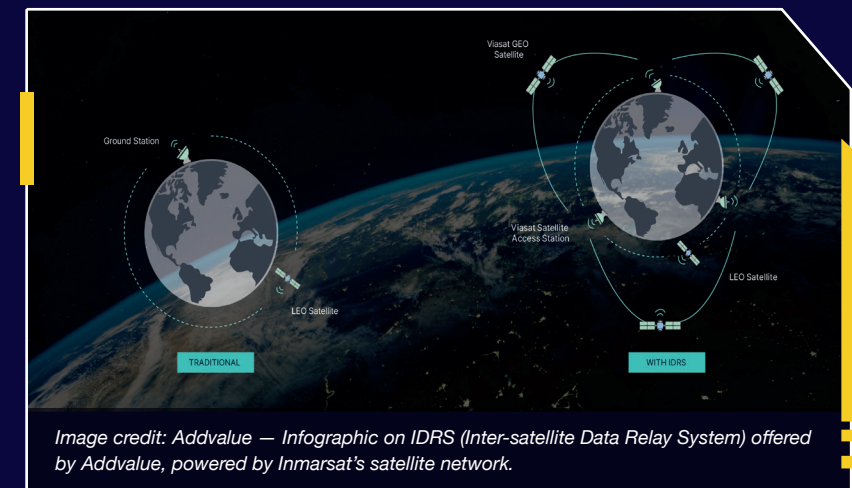
In December 2015, Addvalue's Inter-satellite Data Relay System (IDRS™) was successfully demonstrated via the Nanyang Technological University (NTU) VELOX-II 6U satellite. IDRS™ was developed with the support of OSTIn and in close technical partnership with global satellite telecommunications leader Inmarsat (now Viasat).

Working through technical challenges, Addvalue achieved the first commercial service commissioning and activation of an IDRS™ terminal on 12 November 2020, enabling Low Earth Orbit (LEO) satellites to maintain 24/7, on-demand contact with ground control operations through LEO and Geostationary Earth Orbit (GEO) inter-satellite links (ISL) via Viasat's BGAN network.

On 12 November 2024, Addvalue marked four years of IDRS™ operation, celebrating the world's first commercial L-band LEO-GEO ISL, providing real-time connectivity for LEO assets and achieving plug-and-play functionality for sustained space operations.

Continuous R&D and commercial translation efforts have enabled Addvalue to expand its international footprint, partnering with satellite constellation companies around the world. In February 2024, Vast, an American aerospace company that is a pioneer in space habitation technologies, selected Addvalue to provide IDRS™ for Haven-1, expected to be the world's first crewed private space station, scheduled to launch in 2025. More recently, D-Orbit, a market leader in space logistics and transportation services headquartered in Italy, selected Addvalue's IDRS™ for its In-Orbit Now (ION) satellite carrier in-orbit demonstration mission also due to launch in 2025.

Currently, with over 18 local and international commercial customers, Addvalue has amassed more than 25 flight models (FM) launched into space, and over 44 FM units in the installation stages awaiting launch.



Booster 2 – Developing Talent

Today, space companies can tap on a robust pool of talent with experience in the space sector, and many more in adjacent sectors. We will grow our space talent pool by working with partners to develop new courses, upskill mid-career professionals, and inspire careers in the space sector.

Singapore has around 2,000 professionals and researchers working in the space sector, and companies can also tap into talent in adjacent sectors.

Growing our Space Sector Workforce

Singapore is committed to nurturing a steady pipeline of future space professionals through workforce development and STEM outreach programmes in collaboration with key partners.

The Singapore Economic Development Board Industrial Postgraduate Programme (EDB-IPP) provides opportunities for postgraduate students to engage in industry-relevant research with companies, including those in the space sector. This helps students to acquire cutting-edge skills necessary for space technology development while growing the talent pipeline for the space sector.

For our youth, the Integrated Space Programme is an initiative which aims to inspire pre-tertiary students to pursue STEM education through hands-on exposure to space and satellite technology. In addition to space lessons and coursework, students have the opportunity to design and develop their own space mission, working under the guidance and mentorship of professional space engineers to build a flight-ready satellite for launch and operation in 2026.

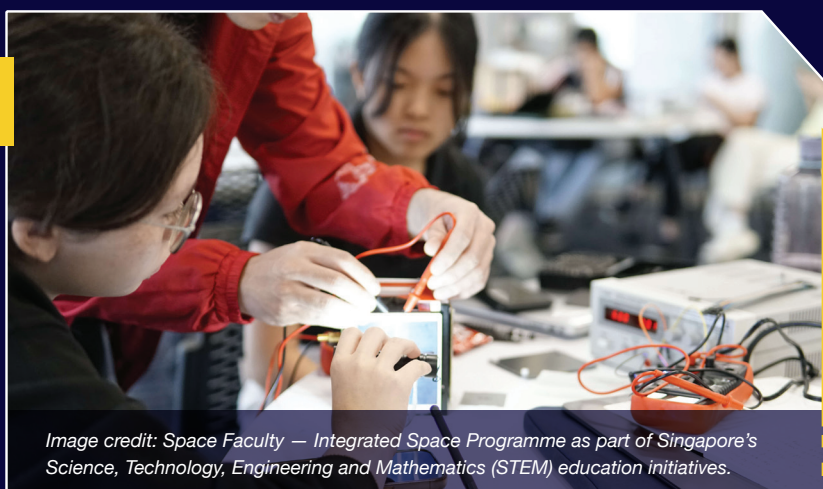


Image credit: Space Faculty – Integrated Space Programme as part of Singapore's Science, Technology, Engineering and Mathematics (STEM) education initiatives.

Booster 3 – Supporting R&D

Singapore is a location of choice for space companies to create new products and services. We have strong fundamentals in engineering and a robust space R&D ecosystem comprising a healthy pool of researchers across our leading institutions, such as the National University of Singapore (NUS), Nanyang Technological University (NTU), Agency for Science, Technology and Research (A*STAR), and DSO National Laboratories.

We will catalyse and support space R&D and commercial translation through our Space Technology Development Programme (STDP).

For a start, from 2025, Singapore is injecting S\$60 million to the STDP, in addition to the S\$150 million announced in 2022, to continue efforts in space technology projects. Focus areas include compact Synthetic Aperture Radar (SAR), optical payloads, Very Low Earth Orbit (VLEO) platforms as well as exploitation of satellite data for Earth Observation, and space-based Quantum Key Distribution (QKD) to enable secure communication across continents. As projects develop and scale, we expect corresponding resource commitments as well.

Booster 4 – Strengthening our Regulatory Environment

A facilitative regulatory environment for space provides consistency and clarity, and supports the growth of a thriving space industry, while upholding the international rules and norms for space.

We regularly review our guidelines for Singapore-related space activities, satellite spectrum, and network filings, and are progressing towards more comprehensive space legislation, taking reference from international best practices² and industry consultation.

² Such as the Guidelines for the Long-Term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space, which were adopted in 2019.

THRUST 2: BUILDING INTERNATIONAL PARTNERSHIPS

As a responsible but nascent spacefaring country, Singapore is committed to ensuring the peaceful, sustainable, and safe use of space. Singapore supports the development of international norms and an open, inclusive, and rules-based international regime governing space activities to promote responsible behaviour in outer space. Collaboration is crucial in ensuring the safe and sustainable use of space for all. We will accelerate the fulfilment of our mission through beneficial international partnerships.

Booster 1 – Expanding Bilateral Collaboration

We are committed to developing strong and mutually beneficial space partnerships. Over the years, Singapore has built bilateral space cooperation with numerous countries and will continue to enhance bilateral collaboration with like-minded partners.

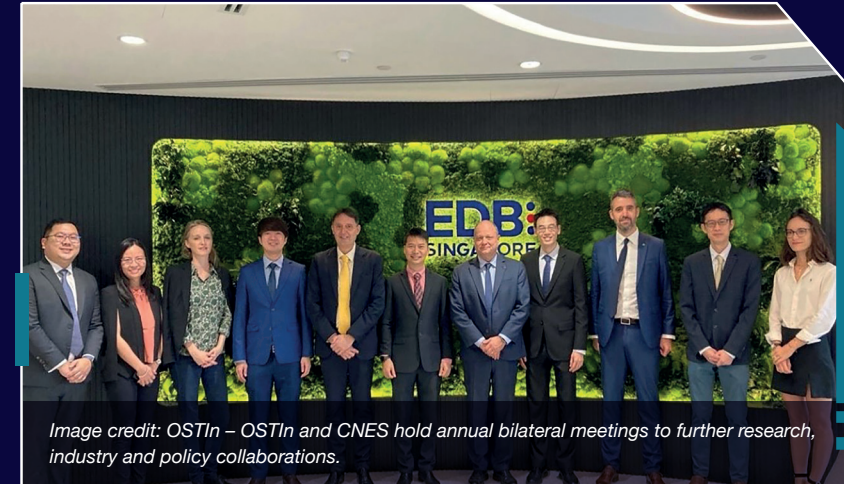


Image credit: OSTIn – OSTIn and CNES hold annual bilateral meetings to further research, industry and policy collaborations.

France and Singapore Innovating Together in Space

Building on the longstanding relations and deep bilateral links in science and technology between France and Singapore, Singapore has developed strong partnerships with the French Space Agency, the Centre National d'Études Spatiales (CNES). In 2017, OSTIn signed a Memorandum of Understanding (MOU) with CNES, which was renewed in 2022, covering a range of activities including R&D and policy and industry development.

In 2022, CNES and OSTIn witnessed the signing of a MOU between SpeQtral, a Singapore company and leading provider of satellite quantum communications technology and Thales Alenia Space, a joint venture between Thales and Leonardo that delivers high-tech solutions using space-based technologies. As part of this MOU, SpeQtral and Thales Alenia Space will research, develop, and demonstrate quantum communications from space to earth.

CNES is also plugged into Singapore's R&D ecosystem, with ongoing research collaborations with NTU and NUS.

Booster 2 – Participating in Multilateral Platforms

We will continue to participate actively in multilateral fora such as the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS), the Artemis Accords meetings, as well as the World Radiocommunication Conference (WRC) organised by the UN's International Telecommunication Union (ITU). Regionally, we actively engage in platforms such as the ASEAN Sub-Committee on Space Technology and Applications (SCOSA), and the Asia-Pacific Regional Space Agency Forum (APRSAF).

Booster 3 – Global Convenor

Singapore will continue to provide platforms that gather regional and global space participants to foster understanding and collaboration. As a global convenor, Singapore will bring together industry experts, investors, researchers, students, national space agencies, government representatives, and interested parties from around the world. Singapore is a hub to foster numerous space collaborations across public and private sector players and we will continue to support them.

THRUST 3: DEVELOPING SPACE PROGRAMMES IN FOCUS AREAS

Complementing the first two thrusts, our space programmes will focus on areas where space technologies can make a real difference, connecting upstream R&D to downstream government and commercial outcomes. This will help Singapore deliver concrete outcomes towards fulfilling our mission.

Booster 1 – Space for Sustainability

Climate change is a serious threat, with rising sea levels and extreme weather patterns. Space technologies have the potential to help us better understand climate dynamics and develop sustainable solutions to mitigate and adapt to its effects. From tracking deforestation to early warning systems for weather and water-related hazards, we will deploy space technologies to support Singapore's sustainability goals and build resilience in communities.

We will continue to pursue projects that will harness the potential of space technologies to support the Singapore Green Plan 2030³, advancing our national agenda on sustainable development and strengthening Singapore's fulfilment of the United Nations Sustainable Development Goals.

Space for Sustainability Programme

To date, we have supported projects that use space technologies to monitor water quality and harmful algal blooms in Singapore coastal waters, forest fires, smoke haze and volcanic ash emissions in the region, and sources of pollution. We also support projects that use space-based observations to improve our understanding of tropical climate and in the development and evaluation of weather and climate models, including tracking the impact of the rise in sea levels on land subsidence.

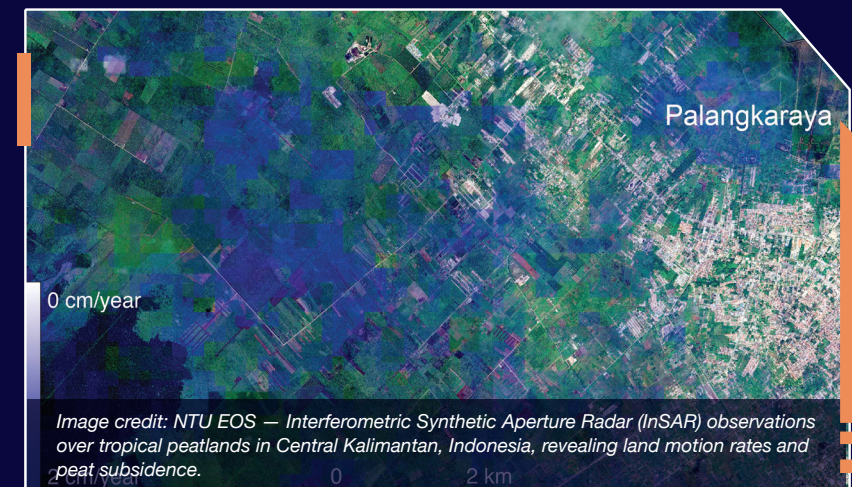
³ Launched in February 2021, the Singapore Green Plan 2030 is a whole-of-nation movement to advance Singapore's national agenda on sustainable development.

Unlocking Sustainability in Asia-Pacific through Earth Observation

The Earth Observation Initiative (EOI) aims to catalyse the use of earth observation technology to drive innovative solutions for sustainability and humanitarian goals across the Asia-Pacific region.

As a centralised platform for collaboration among intergovernmental organisations, companies, and research institutions and institutes of higher learning, the EOI will raise awareness and facilitate knowledge sharing of earth observation technologies and exploitation. This will accelerate the exploitation of earth observation data and engagement of stakeholders to shape future satellites to meet the needs of the region.

Singapore will kickstart the EOI in 2025 with workshops and engagements to develop practical use cases for earth observation data and conduct demonstration projects to showcase potential applications. Over time, the goal is to establish the EOI as the go-to Asia-Pacific effort for addressing sustainability and humanitarian challenges.



Booster 2 – Space for Connectivity and Emerging Technologies

Continued technological advancements will enable us to pursue innovative solutions to future challenges. We recognise the tremendous potential to harness space communications to develop next-generation solutions for key sectors in Singapore, including aviation, maritime, and connectivity. We also recognise the greenfield opportunity in emerging space segments, leveraging Singapore's existing strengths and talent in adjacent fields.

Space for Next-Generation Connectivity Programme

Our aviation sector will benefit from the use of space-based voice communications and connectivity to achieve next-generation air navigation services that enable seamless operations. Our maritime sector will benefit from the use of space-based remote sensing to achieve Just-In-Time and green shipping operations, and improve our maritime Search and Rescue (SAR) capabilities. Our connectivity sector, including the National Quantum Safe Network Plus (NQS⁺), will be augmented by satellites providing quantum-safe communications and high bandwidth connectivity, creating opportunities for innovation that will buttress our status as a satellite, aviation, and maritime hub.

Other Potential Space Programmes: Space for Emerging Technologies

Beyond sustainability and next-generation connectivity, there are many other opportunities in space. These include space-based infrastructure, space exploration and manned space flight programmes, satellite constellations, and related developments in adjacent fields of Artificial Intelligence and data analytics.

A CALL TO ACTION

To all Singaporeans, the space industry is one of the most exciting fields you can pursue. Whether you are passionate about technology, engineering, or sustainability, space offers endless opportunities to innovate and make a difference. We encourage you to discover the limitless possibilities of space and consider a future in the space industry.

To all businesses, we welcome local and international space companies to collaborate with us. Singapore is ready to support innovation in space technology, and we can help your business to succeed by facilitating access to Singapore's R&D ecosystem, our skilled talent pool, and our regional network.

To all international partners, we believe that space-based technologies and sciences have the potential to address sustainability challenges and enhance quality of life worldwide. We are keen to collaborate with like-minded countries and organisations to pursue these goals and foster partnerships that drive innovation for meaningful global impact.

Together, we can harness the power of space to build a brighter future for Singapore and the world.