

SIN SINGAPORE

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UK Science
& Innovation
Network

Some facts about Singapore



Singapore has a colloquial language called '**Singlish**' – a mixture of English, Malay, Hokkien, Teochew, Cantonese & Tamil



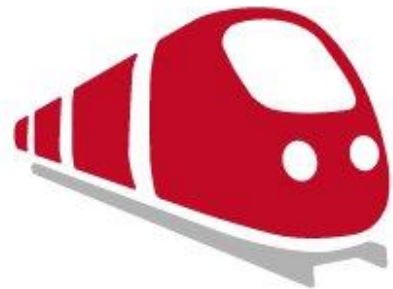
Some **5.6 million** people live in Singapore



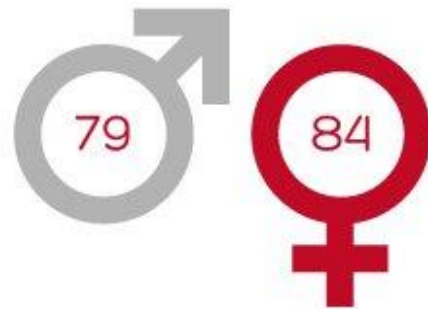
Singapore is made up of **one large island & 63 smaller islands**



Singapore is the **14th largest exporter** and the **15th largest importer** in the world



65% of commuters in Singapore use public transport



The average life expectancy is **79 years for men** and **84 years for women**



Singapore has one of the lowest unemployment rates in the world at **2.1%**



It is just **60 miles** from the equator



SPACE IN SINGAPORE

Big picture



NATIONAL SPACE OFFICE

National space office established in 2013 to grow a globally competitive space industry for Singapore

2013

\$\$90M

SATELLITE INDUSTRY DEVELOPMENT FUND

To drive the development of national small satellite capabilities and development of new sensor technologies for small satellite platforms through the management of the \$90 million Satellite Industry Development Fund (2013 – 2018)

4 SATELLITE MISSIONS

Funded 4 satellite missions in local universities and research institutes to build local manpower capabilities in advanced space technologies

215 researchers, engineers and scientists trained for Singapore's satellite industry

18

New satellite technology development projects funded

9 COMPANY PROGRAMMES

Established to expand the space business activities of the companies in Singapore

OSTIN

OFFICE FOR SPACE TECHNOLOGY & INDUSTRY

“
As a small and open economy, Singapore has always recognised the need to stay ahead of global trends and developments, to adapt and position ourselves for future growth...






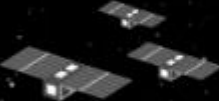

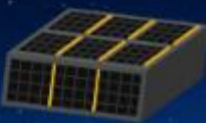





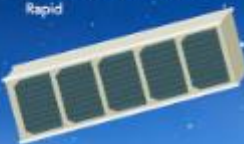

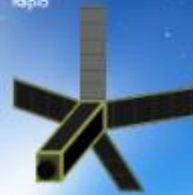


Singapore's effort to develop our space industry is an example of how we are doing so.

”
- Mr S Iswaran, then Minister for Trade and Industry (Industry),
Global Space and Technology Convention (GSTC) 2017

A burgeoning sector

- >30 Companies (local and international)
 - *Design and development of satellites and space components*
 - *Provision of satellite-based services*
- 13 Satellites launched (since 2011)
 - *First commercial satellite launched in 2015*
- Employs approx. 1000 professionals
- 13 startups grown from Singapore
- <https://www.businesstimes.com.sg/brunch/to-infinity-and-beyond-singapores-adventures-in-spacetech>

4 Singapore Satellite Missions

<p>X-SAT High-resolution imaging satellite built by NTU</p> 	<p>VELOX-I Demonstration satellite for inter-satellite communications built by NTU</p> 	<p>VELOX-CI Tropical environment monitoring satellite built by NTU</p> 	<p>TeLEOS-1 High-resolution commercial EO satellite built by ST Engineering</p> 	<p>TeLEOS-2 SAR mini-satellite built by ST Engineering and to be launched in 2021/2022</p> 	<p>Formation Flying Nanosatellite Mission Built by NUS and to be launched in 2021</p> 
<p>VELOX-PII Satellite to space-qualify new satellite components built by NTU</p> 	<p>VELOX-PIII Satellite to test components built by NTU</p> 	<p>GALASSIA Demonstration satellite for quantum encryption technologies built by NUS</p> 	<p>KENT-RIDGE 1 Hyperspectral imaging satellite built by NUS</p> 	<p>AOBA VELOX-III Demonstration satellite for pulsed plasma thruster technologies built by NTU and KIT</p> 	<p>NewSAR SAR microsatellite built by DSO National Laboratories and to be launched in 2021/2022</p> 
<p>VELOX-PII Satellite to space-qualify new satellite components built by NTU</p> 	<p>POPSAT-HIP 1 High-resolution imaging satellite built by Microspace Rapid</p> 	<p>VELOX-II Demonstration satellite for inter-satellite data relay system built by NTU in collaboration with AdValue Technologies</p> 	<p>ATHENOKAT-1 Night-vision optical imaging satellite built by Microspace Rapid</p> 	<p>AOBA VELOX-IV Demonstration satellite to observe lunar horizon glow built by NTU and KIT</p> 	<p>QKD Qubesat Demonstration satellite for quantum key distribution (QKD), built by NUS CQT and RAL Space and targeted to be operational in late 2021</p> 

2011 - 2013

2014

2015

2016 - 2017

Ongoing

Organisations

- Office of Space Technology and Industry (OSTIn)
- Singapore Space and Technology Association (SSTA)
- Satellite Research Centre (SRC)
- Satellite Technology and Research Centre (STAR)
- Center for Remote Imaging, Sensing and Processing (CRISP)
- Earth Observatory Singapore (EOS)
- Defence Science Organisation (DSO)
- ST Engineering - Electronics
- Geoworks

Singapore Space and Technology Association



- Focuses on developing Singapore's Space and related high technology industries.
 - *Neutral platform*
 - *aims to facilitate information and communication for industry, government and academia.*
- Spearheads major trade and business-focused initiatives targeted at advancing the Space ecosystem.
 - *hosts global events that involve consumers, Space research organisations, leading and emerging technology companies, venture capitalists and Space agencies*
 - *Singapore-based organisations gain access to industry experts through the meets and other programmes organised by SSTA.*
- Talent development – creates opportunities through educational outreach, and continuous learning programmes to encourage careers in Space and high-technology fields

Satellite Research Centre (SRC) @ Nanyang Technological University (NTU)

Vision

- To be a centre of excellence in nano-satellite technology and distributed space mission for remote sensing and communication applications

Mission

- Research and develop low earth orbit (LEO) distributed nano-satellite missions
- Research in innovative space technologies for earth observation and communication applications
- Train undergraduate & postgraduate students through real satellite mission development



Satellite Technology and Research Centre (STAR) @ National University of Singapore (NUS)

Vision

- To be a world-class centre for advanced distributed satellite systems using multiple satellites flying in formation, constellation or swarm

Mission

- Support the advancement of Singapore space industry as a centre of excellence by providing the industry with state of the art satellite technology
- Training of undergraduate and postgraduate students to support the manpower needs to meet Singapore's ambition to build a new spacecraft industry
- Conduct research in mission design, subsystem and component development and qualify them in space with experimental satellite platforms to meet the scientific and engineering challenges for future innovative satellite programs and applications

Center for Remote Imaging, Sensing and Processing (CRISP), NUS

- Research centre at NUS established with funding from the Agency for Science, Technology & Research (A*STAR), Singapore.
- Mission to develop advanced capabilities in remote sensing
- Operates a satellite ground station
 - *to acquire data from remote sensing satellites*
 - *processes the archived data to standard or value-added products for distribution and research*
- Undertakes research in optical and microwave remote sensing technology and applications.
 - *Current research interest areas are: ocean and coastal studies, tropical vegetation studies, and remote sensing data processing techniques*

Earth Observatory Singapore (EOS) @ NTU

- Conducts fundamental research on
 - *earthquakes,*
 - *volcanic eruptions,*
 - *tsunamis and*
 - *climate change*
 - *in and around Southeast Asia, toward safer and more sustainable societies.*



An Institute of Nanyang Technological University

Defence Science Organisation (DSO) National Laboratories

- Singapore's largest defence research and development (R&D) organisation
- Critical mission to develop technological solutions to sharpen the cutting edge of Singapore's national security.
- Established in 1972
- DSO has evolved from a three-member team to more than 1,400 research scientists and engineers
 - *working across the domains of land, sea, air, space and cyberspace.*

ST Engineering - Electronics

- A global technology, defence and engineering group specialising in the aerospace, electronics, land systems, and marine sectors.
- Spread across more than 20 countries and 40 cities in Asia, the Americas, Europe and the Middle East.
- Leading manufacturer and solution provider of broadband IP communications
- **News**
 - *Singapore, 14 February 2019 – Singapore Technologies Engineering Ltd (ST Engineering) today announced that its electronics arm has signed an agreement with DSO National Laboratories (DSO) to set up a joint venture company (JVCo). ST Engineering's planned investment of US\$3m (about S\$4.1m) is for a 51% stake in the JVCo, with the remaining 49% to be held by DSO.*
 - *The JVCo, to be named ST Engineering Geo-Insights Pte. Ltd., will leverage the strengths of its parent companies to offer analytics, information products and value-added services based on satellite imagery to address growing global demand for timely insights that enable better and faster business decisions. The JVCo also intends to tap on emerging new space technologies to pursue potential business opportunities for low cost small satellites, or smallsat constellation design, development, manufacturing and operation.*

Singapore Land Authority - Geoworks

- Industry centre to promote business growth, drive innovation and foster a well-connected geospatial community.
- Set up by the Singapore Land Authority (SLA) in January 2018 as an initiative under the Singapore Geospatial Master Plan.
 - *Geospatial Master Plan sets out the vision, strategies and key initiatives to facilitate geospatial transformation and to pave the way towards a “Geospatial-Powered Singapore”.*
 - *The aim of the Geospatial Master Plan is to leverage emerging technologies and to build geospatial competencies to address complex challenges and create opportunities.*
- Singapore Geospatial Week - September

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SINGAPORE SPACE OPPORTUNITIES





Pushing The Innovation Frontier

6 & 7 FEBRUARY 2020 | GRAND HYATT SINGAPORE





“

Moving forward, Singapore will continue to invest in small satellite R&D, but channel our resources to build deep and differentiated capabilities in a few selected areas.

Under this new approach, OSTIn will work with various technology stakeholders to identify technology areas and establish national satellite R&D programmes.”

- Mr S Iswaran, then Minister for Trade and Industry (Industry), GSTC 2017

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