Singapore Geospatial Master Plan 2024-2033

FOREWORD

The second iteration of this Singapore Geospatial Master Plan developed jointly by the Singapore Land Authority (SLA) and the Maritime and Port Authority of Singapore (MPA) embodies Singapore's commitment to harnessing the power of geospatial information and technology for the benefit of our nation.

Since the inception of the National Spatial Data Infrastructure (NSDI) in 2008, geospatial data has played an increasingly pivotal role in shaping Singapore's urban and environmental planning and development. With the inaugural Singapore Geospatial Master Plan released in 2018, we embarked on a transformative journey aimed at using geospatial insights to drive progress across the government, industry, and society over the subsequent five years. The second Singapore Geospatial Master Plan reflects our commitment to better integrate and drive geospatial innovation in both the maritime and terrestrial domains.

Today, as we stand before the next inflexion point of Singapore's geospatial development, we recognise the profound impact that geospatial information and technology has had on decision-making processes and societal advance-ments. From enhancing policy decision-making and promoting business growth to empowering individuals with geospatial literacy, our collective efforts have propelled our nation towards becoming a Geospatial-Empowered Singapore.

The second Singapore Geospatial Master Plan charts an ambitious course for the next decade, guided by a vision of Singapore as a Leading Global Geospatial Hub.

This Master Plan is not a static document but a living blueprint that will evolve in response to emerging needs, challenges and opportunities. It outlines strategies aimed at increasing geospatial adoption, deepening core capabilities, and positioning Singapore as a thought leader on the global stage.

The joint development of the Master Plan with MPA underscores the importance of marine geospatial analysis in our work to protect our coastlines and environment and grow our maritime industry in a safe, sustainable, and efficient way. The integration of land and sea further reflects the ever-expanding frontiers of Geospatial Singapore – from the land and built environment, to our waters that span across the sub-sea, surface, air, space, cyber, and sustainability domains. Consequently, the potential for geospatial innovation abounds.

We extend our gratitude to all stakeholders who have contributed to the development of this Master Plan and look forward to working together to realise our shared vision of Singapore as a Leading Global Geospatial Hub.

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INTRODUCTION

The Singapore Land Authority (SLA), as Singapore's national geospatial agency, established the National Spatial Data Infrastructure (NSDI) in 2008. In 2018, SLA unveiled the inaugural Singapore Geospatial Master Plan, mapping the path towards a Geospatial-Powered Singapore, over the subsequent five years.

Since its inception, the adoption of geospatial information and technology has surged, significantly impacting decision-making across government, the industry, and wider society.

1. GeoSmart Government
- Leveraged geospatial for policy decision-making, operations, and services.
- Key initiatives included data sharing platforms GeoSpace and OneMap, the Geospatial Capability Centre and the National 3D Mapping Programme.

2. Thriving GeoIndustry
- Promoted business growth, innovation, and a well-connected geospatial community through conferences, industry events and networking sessions, led by GeoWorks.

3. GeoEmpowered People
- Enhanced geospatial literacy, skillsets, and competencies across various education stages.

The Maritime and Port Authority of Singapore (MPA)'s mission is to develop Singapore as a premier global hub port and international maritime centre. MPA recognises the role that marine geospatial information plays in promoting a vibrant maritime innovation ecosystem to advance Singapore's strategic maritime interests.

In 2019, MPA, in collaboration with eleven other government agencies and Institutes of Higher Learning, spearheaded GeoSpace-Sea, Singapore's national marine spatial data infrastructure that integrates and provides access to authoritative and consolidated marine and coastal geospatial data.

GeoSpace-Sea supports various applications including port, marine and coastal planning, monitoring and understanding the impact of climate change, and supporting the protection of the marine environment.
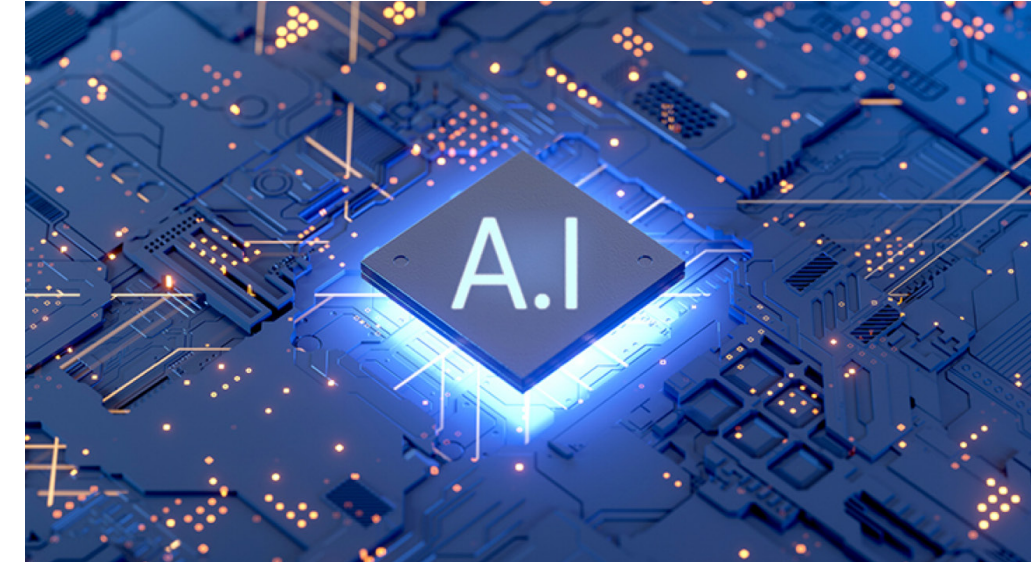
TRENDS AND OPPORTUNITIES

Integration with the wider economy

Geospatial information and technology is transcending traditional sectors in defence and urban planning, and becoming integral to various sectors such as healthcare, social, retail and real estate. Businesses leverage geospatial insights for strategic decision-making, enhancing competitiveness and operations efficiency.

Synergy with AI

The intersection of geospatial technology and AI is transforming decision-making. Machine learning algorithms analyse geospa-tial data to uncover hidden patterns and correlations, enabling predictive capabilities and new applications in government, businesses, and citizen services. These also serve to increase the safety and efficiency of maritime operations.
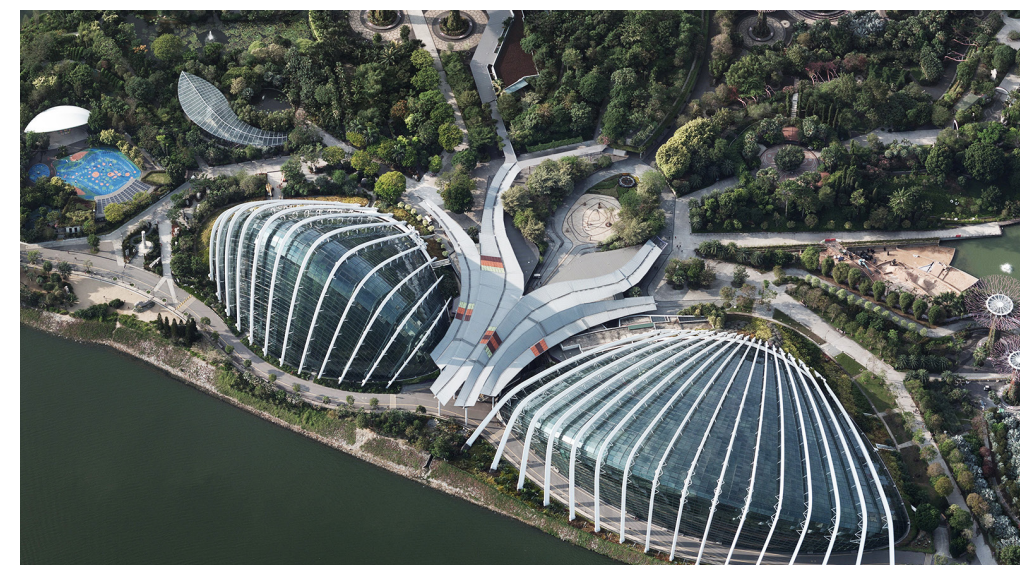
IoT and Autonomous Systems

High-speed connectivity and sensor technology integration with geospatial systems facilitate real-time data sharing on a massive scale. This enables the operation of autonomous systems such as drones, autonomous vehicles, and robotic systems.

Digital Twin Technology

3D virtual replicas of the cityscape are transforming the way we perceive, plan, and manage the urban environment. Digital twins provide a data-rich environment for real-time monitoring, analysis, and scenario-planning, contributing to the development of more sustainable, resilient, and smarter cities.

Climate Change & Environmental Sustainability

Sustainable development is vital for mitigating and responding to the impacts of climate change, which are particularly relevant to island-nations such as Singapore. Geospatial holds strong potential to monitor and address climate change impacts, and to meet society's current and future needs in coastal resilience, food security, biodiversity protection and more.

Singapore Geospatial Master Plan 2024-2033

In 2022/23, SLA and MPA conducted consultation sessions with stakeholders to shape the second Singapore Geospatial Master Plan. The sessions were attended by more than a hundred representatives from over fifty organisations.

Spearheaded by SLA and MPA, the second Singapore Geospatial Master Plan recognises the need for integrated marine and land geospatial development in addressing the complex challenges Singapore faces as an island-nation. The Master Plan is thus a collaborative undertaking to chart the trajectory of national geospatial development for the next ten years, towards the vision of **A Leading Global Geospatial Hub**.

This vision is driven by three key strategies:

1. **Mainstreaming** – Maximising the potential of geospatial by embedding its adoption in mainstream society. Target sectors include the social, healthcare, and economic sectors, with initiatives promoting inclusivity, preventive healthcare and innovation.

2. **Deepening Capabilities** – Enhancing core geospatial capabilities to address increasing demand. This includes strengthening data infrastructure, fostering innovation and building education pathways and talent pipelines.

3. **Going Global** – Positioning Singapore as a leading geospatial player through international engagements, partnerships, and events. Initiatives include contributing to global geospatial development, strengthening partnerships and hosting flagship geospatial conferences and events.
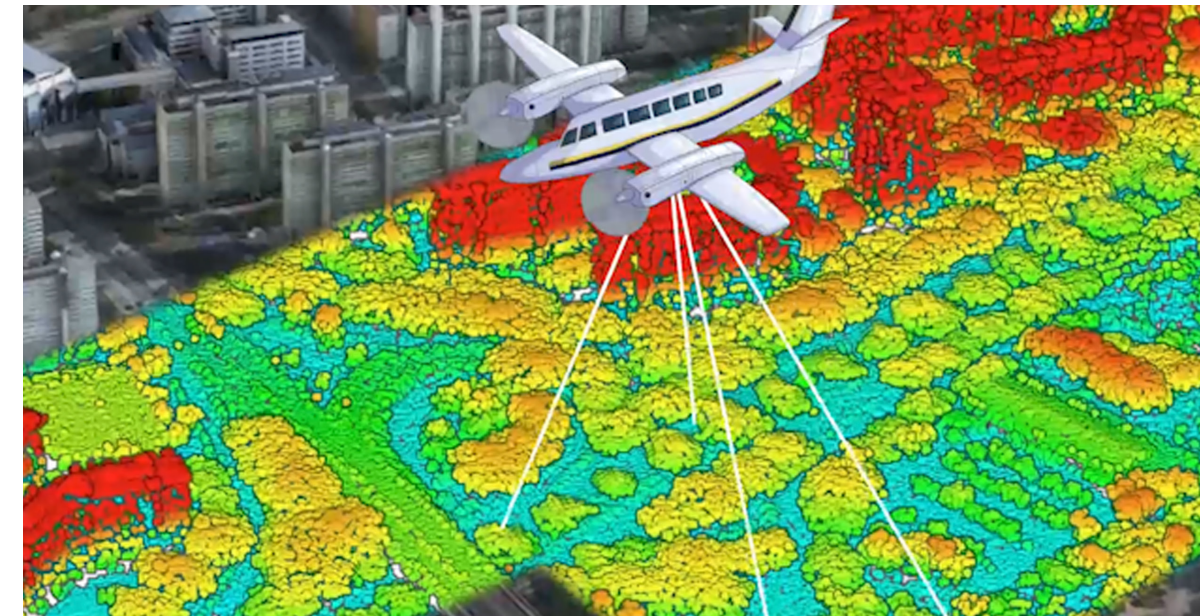
Mainstreaming

Geospatial information and technology holds immense potential across various sectors, including social, healthcare, and the economy. By collaborating closely with partners in these sectors, we aim to leverage geospatial tools and solutions to support national programmes such as HealthierSG and the Enabling Master Plan 2030.

Our goal is to ensure that geospatial-enabled innovations permeate all segments of our society, enabling us to use **Geospatial for Good.**
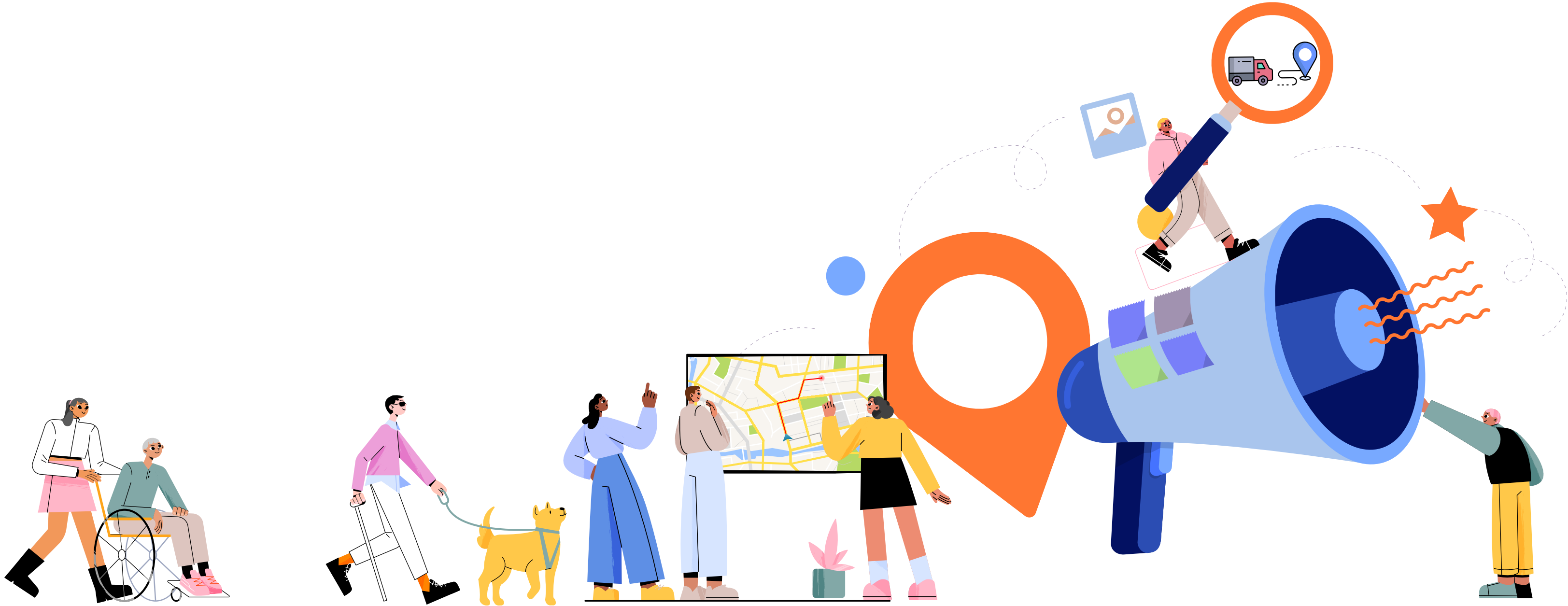
Social

Mapping Paths to Inclusive Communities

- Introduce Barrier-Free Accessibility routing on OneMap to promote a more inclusive society.

- Optimise social service agencies' operations to efficiently assist persons in need.

Healthcare

Pioneering Preventive Healthcare for a Healthier Future

- Partner SingHealth to implement the Living Asset Map and enable social prescribing.

- Partner the Ministry of Health Office for Healthcare Transformation to implement Digital Local Connect in support of preventive healthcare efforts.

Economic

Sparking Innovation in the Geospatial Economy

- Develop heavy vehicle routing to optimise logistics and enhance business productivity.

- Deploy Digital Twin Technology to enhance the safety, efficiency, and reliability of maritime operations in the Next Generation Port, and testbed the deployment of autonomous vessels through the use of high-resolution marine data.

Deepening Capabilities

With the growing adoption of geospatial information and technology, there is an increasing demand for infrastructure, policies, standards, and good quality geospatial data to support this expansion. To ensure long-term sustainability and keep pace with technological advancements, we will invest in deepening geospatial capabilities, promoting innovation, and cultivating the necessary geospatial skillsets and competencies.

Data

Enhancing Geospatial Data, Standards, and Infrastructure

- **Strengthen the Geospatial Trusted Centre** to make high quality geospatial data available for Whole-of -Government use.

- **Enhance the National 3D Mapping Programme** to support urban planning, national security, emergency response preparations, and sustainability.

- **Enhance OneMap and GeoSpace** geospatial data sharing platforms to support hyperlocal data, 3D, and future needs.

- **Develop Marine Geospatial Data Standards** to increase the shareability and usability of geospatial data of Singapore waters.

- **Implement the Next Generation of Maritime Data Products** to support safety of navigation and the protection and sustainable use of the oceans.

Innovation

Engineering Innovative Discovery & Growth

- **Establish the Centre of Geospatial and Geomatics (C2G)** to deepen capabilities, promote innovation, and encourage geospatial adoption.

- **Build a Marine Geospatial Knowledge Hub** by integrating real time marine datasets, adopting open APIs, and developing applications to drive insights of our marine and coastal environments.

- **Leverage the Integrated Ops Hub @ WAVES** to integrate systems and capabilities from space, air, surface, subsea, cyber, and the sustainability domains to achieve comprehensive maritime awareness.

- **Ensure Safe and Efficient Alternative Fuel Bunkering** by developing multi-domain capabilities for emergency preparedness and incident management, supporting maritime decarbonisation.

Education

Building Education Pathways & Talent Pipelines

- **Embed geospatial in education** to raise geospatial competencies and spark interest in learning.

- **Collaborate with the Ministry of Education** to expand the Map Our World Programme to more students.

- **Develop professional certifications and adult learning opportunities** to build a robust talent and manpower pipeline.

Going Global

Geospatial is increasingly relevant to the world, and Singapore is poised to play an essential role in supporting international geospatial development. We aim to establish Singapore as a preeminent global geospatial hub for geospatial innovation, by expanding its international presence through thought leadership, strategic partnerships, and flagship events.

Thought Leadership

Contributing to Global Geospatial Development

- **Actively engage in regional and global geospatial forums** to promote Singapore's geospatial expertise and thought leadership (e.g. Singapore is the co-chair of the UN Expert Group on Land Administration and Management for UN-GGIM, and the co-chair of the UN-GGIM Working Group on Marine Geospatial Information).

Partnerships

Forging International Connections and Collaborations

- **Foster collaborations** with international partners to drive joint initiatives.

- **Enhance the GeoWorks industry promotion programme** to strengthen networks and connections, fostering a vibrant geospatial ecosystem.

Flagship Events

Convening Large-Scale Geospatial Conferences and Events

- **Host and support high-signature geospatial events,** including Geo Connect Asia and the Singapore Geospatial Festival, to facilitate knowledge exchange and connections on a global scale.

Acknowledgements and Credits

Accounting and Corporate Regulatory Authority
Building and Construction Authority
Civil Aviation Authority of Singapore
Department of Statistics
Economic Development Board
Energy Market Authority
Enterprise Singapore
Infocomm Media Development Authority
Government Technology Agency
Housing and Development Board
Home Team Science and Technology Agency
JTC Corporation
Land Transport Authority
Ministry of Education
Ministry of Health
Ministry of Defence
Ministry of Law
Ministry of National Development
Ministry of Manpower
Ministry of Social and Family Development
Ministry of Sustainability and the Environment
Ministry of Transport
National Environment Agency
National Heritage Board
National Parks Board
Public Utilities Board
Science and Technology Policy and Plans Office
Singapore Civil Defence Force
Smart Nation Group
Singapore Police Force
Urban Redevelopment Authority

BIMAGE Consulting
BuzzAR
Container Depot and Logistics Association (Singapore)
City Data Solutions
Dassault Systèmes
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Enterprise Vision
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FATOS
Garuda Robotics Pte Ltd
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NextBillion AI
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Schoolber Pte Ltd
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Singapore Technologies Engineering Ltd
Synspective
Trimble APAC
Urban Network Lab
Volocopter

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