

APAC CONNECTED DRONE WORKSHOP



hi2

Call-for-proposal, coverage and SA commitments (by MNO) and rollout status

H1 2020

Singapore awarded its 5G SA licenses.

Nationwide & Local Coverage
(3.5Ghz + mmWaves)

Singtel

M1 StarHub

Local Coverage (mmWaves)

TRG

H2 2020

Singapore expressed its support for operators to deploy non-standalone 5G networks, with telcos M1, StarHub and Singtel leading the first wave.

Singtel has also launched standalone trial network for enterprises.

today

End 2022

Singapore aims to deploy standalone capabilities extending to at least half of the island.

2025

Two nationwide 5G standalone networks are planned, unlocking full-fledged 5G capabilities for businesses.

★ 5G SA launched

SG:D
EMPOWERING POSSIBILITIES

INFOCOMM
MEDIA
DEVELOPMENT
AUTHORITY

5G INDUSTRY SECTORS ROADMAP

HIGH IMPACT

LOW IMPACT

Smart Estates

- Collaborative robots
- Swarm construction
- Tele-operated machinery

Maritime

- Autonomous truck platooning
- Autonomous vessels
- **Remote pilotage**

Aviation

- Baggage handling
- Predictive maintenance

Industry 4.0

- Material handling
- Digital twin
- Real-time service & breakdown alerts

Urban Mobility

- Remote vehicle operations
- AV V2X comms
- Rail asset & operations monitoring
- Critical comms
- Unmanned traffic management
- **Drones for logistics**

Smart Estates

- **Robot/Drone inspection**
- AR-assisted as-built verification of BIM and site quality inspection
- Real-time video steaming and analytics

Consumer Applications

- High bandwidth mobile cloud gaming
- Low latency mobile cloud gaming
- High bandwidth video broadcast

Maritime

- AGV, ARTG
- AR for port operations

Urban Mobility

- Traffic flow optimization
- **Drones/robots for track inspection & maintenance**

Industry 4.0

- UHD video surveillance
- Cloud robotics
- AR/VR for Maintenance/Remote Operations
- Cloud-based AI automated visual inspection

Aviation

- AI and location based personalized retail
- AGV/ARTG
- Real-time video steaming and analytics
- Video-based search & rescue
- Flexible wireless CCTV

Smart Estates

- Cost efficient, multitasking robots
- AR-assisted prefab module installation

Consumer Applications

- Interactive live e-commerce
- High bandwidth media & advertising
- Immersive apps for events/tourism
- Prioritized comms over public network

Maritime

- Empty container handling
- Worker safety monitoring

Urban Mobility

- Mobility device comms
- Remote control of air taxis
- Enhanced rail commuter experience
- In-car infotainment

Industry 4.0

- Automated inventory management

Aviation

- Resource management

Smart Estates

- AR-assisted service and maintenance
- XR-assisted design and visual story telling
- High bandwidth data exchange
- Visual-based asset monitoring and analytics

Consumer Applications

- Flexible deployment of cellular capacity
- Immersive gaming

Maritime

- Ship-to-shore communications
- AQC
- Search and rescue

Urban Mobility

- Mobility fleet monitoring
- Autonomous repositioning
- Vehicle to infra comms
- Enhanced fleet commuter experience

Industry 4.0

- AR/VR training
- Real-time location

Aviation

- AR experiences
- Facial recognition
- Biometric baggage identification

LONG TERM

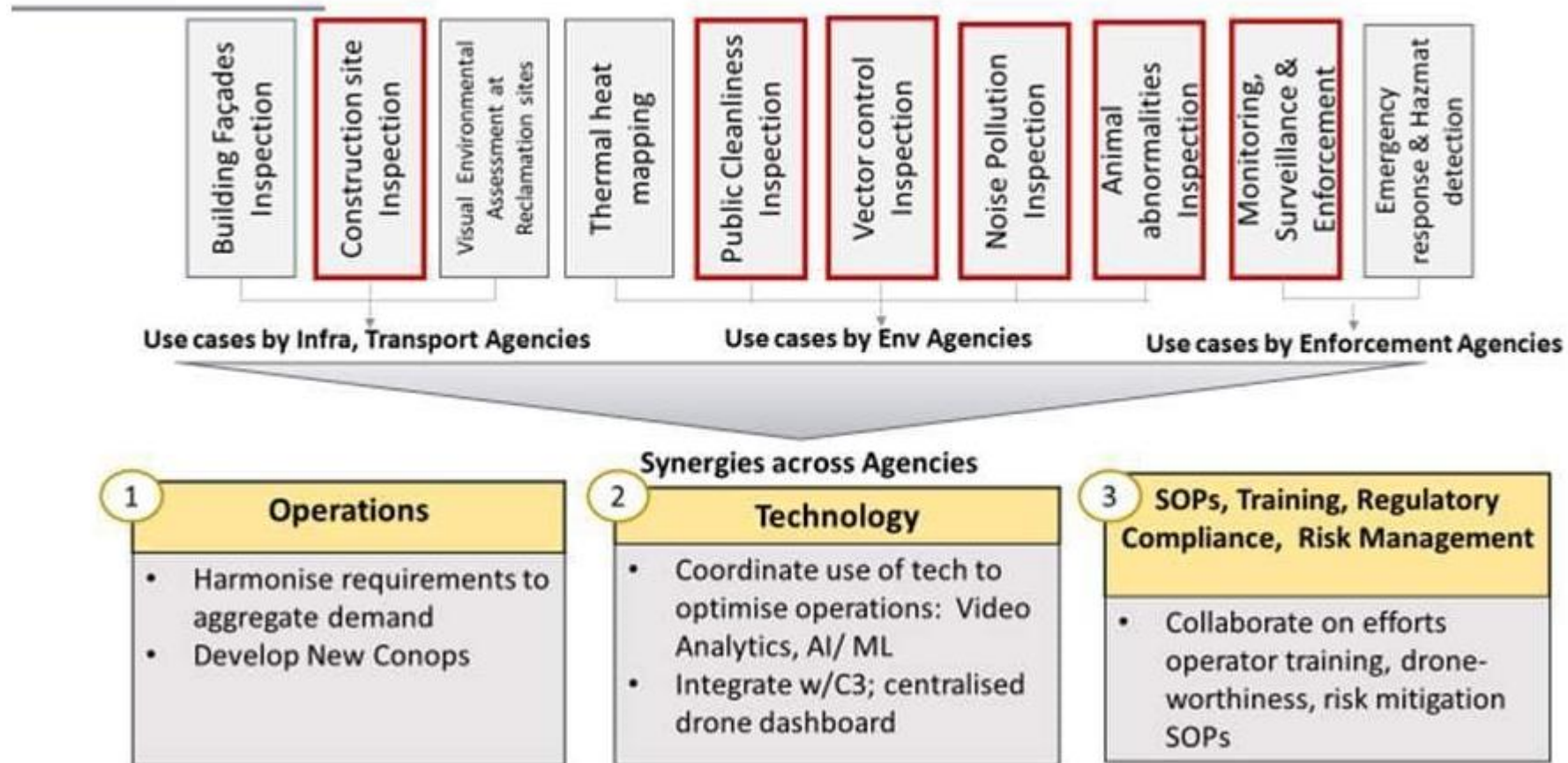
SHORT TERM

Civil Aviation Authority of Singapore (CAAS) regulates Unmanned Aircraft Systems (UAS)



















UA Mass \ Purpose	For recreation purpose	For education purpose	For business or for non-recreation / non-education purpose
≤ 250g	<ul style="list-style-type: none"> Activity Permit if flown outdoors in no-fly zones or beyond 200ft above mean sea level (AMSL) 		<ul style="list-style-type: none"> Operator Permit Activity Permit UA Pilot Licence
> 250g, ≤ 1.5kg	<ul style="list-style-type: none"> Activity Permit if flown outdoors in no-fly zones or beyond 200ft above mean sea level (AMSL) UA Registration 		<ul style="list-style-type: none"> Operator Permits (1 year) All UAS has to be manned by a Pilot and an Observer Maintain within Line of Sight (<400m) Beyond Line of Sight (BVLoS) Drones require additional set of requirements/application
> 1.5kg, ≤ 7kg	<ul style="list-style-type: none"> Activity Permit if flown outdoors in no-fly zones or beyond 200ft above mean sea level (AMSL) UA Registration Complete UA Basic Training or holds UA Pilot Licence 		
> 7kg, ≤ 25kg	<ul style="list-style-type: none"> Activity Permit if flown outdoors in no-fly zones or beyond 200ft above mean sea level (AMSL) UA Registration UA Pilot Licence 	<ul style="list-style-type: none"> Operator Permit Activity Permit UA Registration UA Pilot Licence 	
> 25kg			

Science & Technology Policy and Plans Office (S&TPPO) to support drone development

S&TPPO with GovTech offer Demand Aggregation (DA) Platform



Tranche 1 – 5g innovation programme

	Description	Participants
Enhancing Port Operation	To test AGVs operations, flexibility of RTG assets and Enhanced Reliability across Multiple Applications through Network Slicing and MEC.	   
5G Enabled Smart Estate @ Science Park	5G-enabled cellular vehicle-to-everything (C-V2X) to optimise traffic flow, transport passengers efficiently, reduce cost & energy.	  
Enhanced Cloud Gaming Experience	To develop 5G cloud gaming solutions, grow the gaming industry & build Singapore as the regional gaming hub.	 
Urban Air Mobility Operations	Test unmanned aircraft systems (UAS) can safety and efficiency during all phases of their flights, including operations in designated drone-fly zones.	  
Industry 4.0	To demonstrate the benefits of 5G in Industry 4.0 in manufacturing processes and test characteristics of 5G in the manufacturing process that will focus on three main use-cases.	  
Powering Autonomous Mobile Robots (AMR) Deployment & Construction Safety Analytics	The trial aims to demonstrate the benefits of 5G in AMRs and construction site safety. The project can change change Singapore last mile delivery landscape and better AMR capabilities and improve construction site safety.	  

5G marine drone estate - singapore

COMING SOON

IMDA-MPA 5G Marine Drone Estate



IMDA-SIT 5G Translation Lab



IMDA-Capitaland 5G Smart Estate

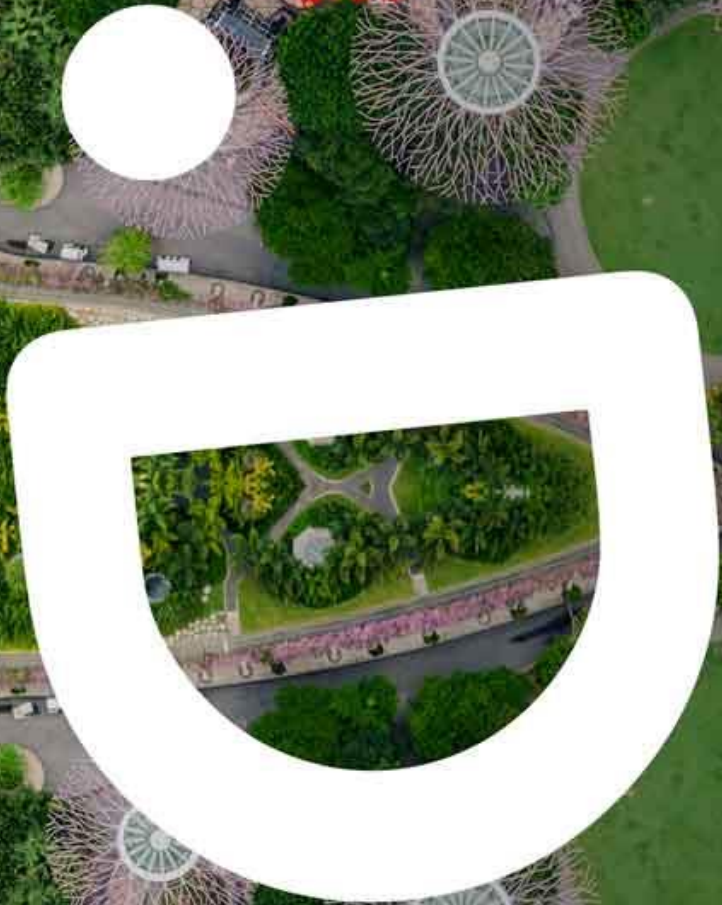


Tranche 2 – 5g innovation programme


Objectives	To accelerate the adoption and commercialisation of 5G solutions. <ul style="list-style-type: none">• Support solution providers and technology developers commercialise 5G solutions• Make the benefits of 5G more accessible to more companies, including SMEs
Area of Focus	Focuses on commercialisation and deployment of 5G solutions in tech domain areas like Robotics & IoT, AI & Data, AR/VR
Participants	The applications must be made by Singapore-registered companies. Interested parties may also form partnership consortiums to participate in the grant


FOCUS


Robotics/Drones & IoT	AR/VR	AI/Data
<ul style="list-style-type: none">• Cloud-based remote control for Factories• Swarm Construction Techniques• Autonomous Vessels• Remote Vehicle Operations• Remote inspection with Drones• Tele-operated Machinery	<ul style="list-style-type: none">• AR-assisted as-built Verification of BIM and Site Quality Inspection• AR/VR for Maintenance/Remote Operations• AR for port operations	<ul style="list-style-type: none">• Real-time Services and Breakdown Alerts• AI and Location-based Personalised Retail• Traffic Flow Optimisation• Real-time Video Streaming and Analytics




THANK YOU

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