DroNet

Inspection • Public Security • Delivery

First in Singapore to be approved for Beyond Visual Line of Sight (BVLOS) flights, DroNet solution enables diverse applications such as facility or perimeter security, site inspections, deliveries and more.

Introducing DroNet

The DroNet Solution is developed by ST Engineering for Beyond Visual Line of Sight (BVLOS) flight operations to augment the human operators through multi-UAV operations, safer workflow automation, wide aerial data collection and smart analytics.

The system is the first in Singapore to be approved by the Civil Aviation Authority of Singapore to conduct BVLOS flight operations for surveillance and monitoring of reservoirs in year 2019. Unlike the conventional drone operation where a drone is operated within the pilot's visual line of sight, the BVLOS capabilities enable DroNet to cover far greater distances to collect more data in less time.

The DroNet System has been deployed and operated in several applications such as fenceline patrol for intruder protection, remote islands maintenance surveillance, industrial area security surveillance, water activities monitoring at the reservoirs as well as shore to ship deliveries. At present, the DroNet system has flown and clocked over 5000 hours of flight time.

FULL-PACKAGE SOLUTIONS

The DroNet solution includes the smart analytics, anomaly alerting and data storage suites, making it an end-to-end package.

BVLOS

Designed for Beyond Visual Line of Sight flight operations in urban environments.

SAFE

Incorporated with robust flight management features and redundancies for safe flights.

QUICK TURNAROUND

Rapid payload and battery-swapping mechanisms ensure mission continuity.

SMART ANALYTICS

User is provided with the most relevant data to make well-informed decisions.

DRONE AGNOSTIC

DroNet can be compatible for use with other commercial, off-the-shelf drones.

The DroNet solution comprises of the DrN series unmanned aircraft (UA), the DroHub centralized control station, the DroPort docking station and DroConnect smart web platform for flight monitoring, data analytics and real-time data distribution. These sub-systems are interlinked through the public/private 4G LTE network (provision for 5G in future), Radio Frequency (RF) and satellite communication to form the core network infrastructure to provide robust connectivity with cybersecurity protections.

DrN Series Drones

The **DrN series UAs** are autonomous Vertical Take-off and Landing (VTOL) aircraft platforms designed to meet the safety regulatory requirements for BVLOS operations. The Flight Control Computer (FCC) and the Guidance, Navigation and Control (GNC) software are developed by ST Engineering to customise several safety features such as hardware and sensors redundancy, automated failsafe handling features, collision avoidance and flight template confinement to meet diverse regulatory requirements around the world for safe BVLOS flight operations. The DrN Series UA has a payload bay that can carry a basic 2-in-1 Electro Optical and Infra-Red (EO/IR) camera. This allows the UA to be used for day and night operation. The payload bay is configurable to carry different sensors for different applications.

Safety features

Navigation sensors and communication link redundancy	1
Flight template confinement	2
Obstacles Detection and Collision Avoidance	3
Approved for BVLOS flight operations in Singapore and specific countries	4

DrN-15L

Design for maximum payload capacity.

Take-off Weight
Up to 16.6kg

Endurance
Up to 46 minutes
(without payload)

Flight Operation
BVLOS via 4G (dual
sim) and RF datalink

Operating Altitude
3500 feet AMSL

Payload Weight
Up to 4.2kg

Payload Compatibility
Payload-swappable and
compatible with EO/IR,
Hyperspectral, LiDAR and
methane detectors etc

Safety Features
Navigation sensors and datalink
redundancy, Obstacle Detection
and Avoidance (Forward only),
Flight template confinement

DrN-15DL

Designed for on-demand operation with DroPort.

Take-off Weight
16.6kg

Endurance
Up to 39 minutes
(without payload)

Operation Mode
BVLOS via 4G (dual sim)

Operating Altitude
3500 feet AMSL

Payload Weight
Up to 1.9kg

Payload Compatibility
Payload-swappable and
compatible with EO/IR,
Hyperspectral, LiDAR and
methane detectors etc

Safety Features
Navigation sensors and
datalink redundancy,
Obstacle Detection and
Avoidance (Forward only),
Flight template confinement

DrN-15DH

Designed for on-demand operation with DroPort over populated area.

Take-off Weight
16.6kg

Endurance
Up to 38 minutes
(without payload)

Operation Mode
BVLOS via 4G (dual sim)

Operating Altitude
3500 feet AMSL

Payload Weight
Up to 1.3kg

Payload Compatibility
Payload-swappable and compatible
with EO/IR, Hyperspectral, LiDAR
and methane detectors etc

Safety Features
Flight Computer, Power
Distribution, Navigation
sensors and datalink
redundancy, Obstacle
Detection and Avoidance,
Flight template confinement

DrN-35LS

Designed for delivery operation.

Take-off Weight
36.3kg

Range
Carrier Box – 14Km
Winch – 16Km

Payload Weight
Carrier Box – 7kg
Winch – 3Kg

Operating Altitude
5000 feet AMSL

Operation Mode
BVLOS via 4G (dual sim)
Satcom (add-on option)

Safety Features
Navigation sensors and
datalink redundancy,
Obstacle Detection and
Avoidance (Forward only),
Flight template confinement

Satcom

Communication add-on
option

Delivery option

Winch

Carrier Box

DroHub

The DroHub is an integrated and scalable command and control hub that makes multiple UAVs control possible. Equipped with smart analytics capabilities, users can track concurrent missions in real-time.

Adaptable to Various Uses

Modular apps and customisable user interface make it adaptable to different use cases
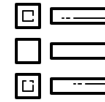
Multiple Drone Control

Multiple UAV missions can be carried out simultaneously for better efficiency

Ease of Mission Planning

Click-and-fly waypoint marking and automated route planning
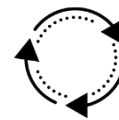
Collaborative

Hand/take-over of mission control is possible across all DroHub terminals

Cross-Compatibility

Usable across different electronic devices

UAV-Agnostic

Easily adaptable to other commercial drones

DroPort

The DroPort is a secured docking station (drone-in-a-box concept) for UAs that allows permanent on-site deployment of DroNet at remote places. The DroPort enables automatic launch and recovery of the DrN-15 series UAs.

Drone Storage

- 4G-enabled all-weather drone station for safe automated drone storage.

Battery Swap

- Automatic battery replacement in between flights without need for on-site operator.
- Spare batteries are on standby, enabling quick turnaround for subsequent missions.
- Depleted batteries are automatically charged once they are removed from the drones.

Payload Swap

- Automatic payload swapping enhances drone's adaptability to new scenarios mid-operation.
- Different payloads can be swapped to cater to different applications.
- "Plug-and-play" concept enables quick turnaround.

Operation Modes

- Highly reliable precise landing capability with up to centimetre precision.
- Precise landing in all weather conditions.
- Range extension through DroPort hopping.

DroConnect

The DroConnect Smart Web Platform is an intelligent, web-based portal. It provides real time UAs statuses, live video stream, and data analytics using Artificial Intelligence.

Security

- Automatic human detection, identification and tracking.
- Automated object (vehicle and weapon) detection, identification and tracking.
- Real-time alerts with accurate geospatial information post to operators.

Inspection

- Powerline and solar panel defects detection and classification.
- Aircraft general visual inspection.
- Reservoir monitoring.

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