THALES

Integrating UAS Into Your Airspace:
The System-of-Systems Approach to UAS Integration

ICAO Second Unmanned Aircraft Systems – Remote Piloted Aircraft Systems Implementation/Regulation Workshop

29 September 2021

OPEN

Thales Snapshot

83,000

employees

Presence in over

68 Countries

Sales in 2019

19 billion $

A balanced revenue structure

50% Defense Civil

1.4 billion $

Self-funded R&D* 2019

* Does not include R&D funded externally

AIR TRAFFIC MANAGEMENT MARKET
GLOBAL REACH, LOCAL EXPERTISE

UAE

South Africa

France
Germany
Italy
United Kingdom

Australia
China
Singapore

Brazil
USA

Sensing & data gathering

Data transmission & storage

Data processing & decision making

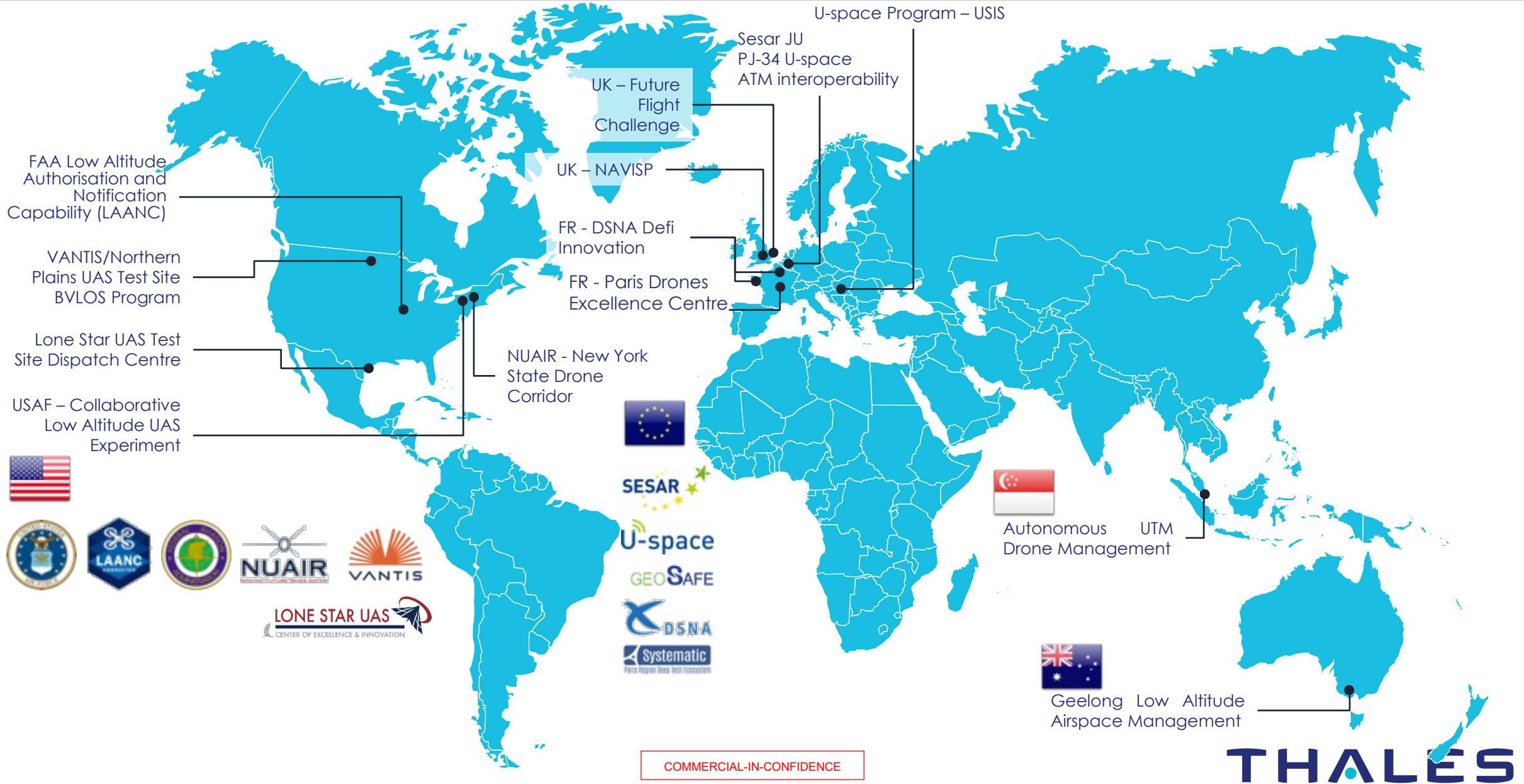Digital Identity and Security

Defence and Security

Aerospace

Space

Ground Transportation

We help customers master decisive moments by providing the right information at the right moment

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Thales possesses the technology, experience, and leadership to define a path toward sustainable UAS integration.

U-space Program – USIS

Sesar JU PJ-34 U-space ATM interoperability

UK – Future Flight Challenge

FAA Low Altitude Authorisation and Notification Capability (LAANC)

UK – NAVISP

VANTIS/Northern Plains UAS Test Site BVLOS Program

FR - DSNA Defi Innovation

FR - Paris Drones Excellence Centre

Lone Star UAS Test Site Dispatch Centre

NUAIR - New York State Drone Corridor

USAF – Collaborative Low Altitude UAS Experiment

Autonomous UTM Drone Management

Geelong Low Altitude Airspace Management
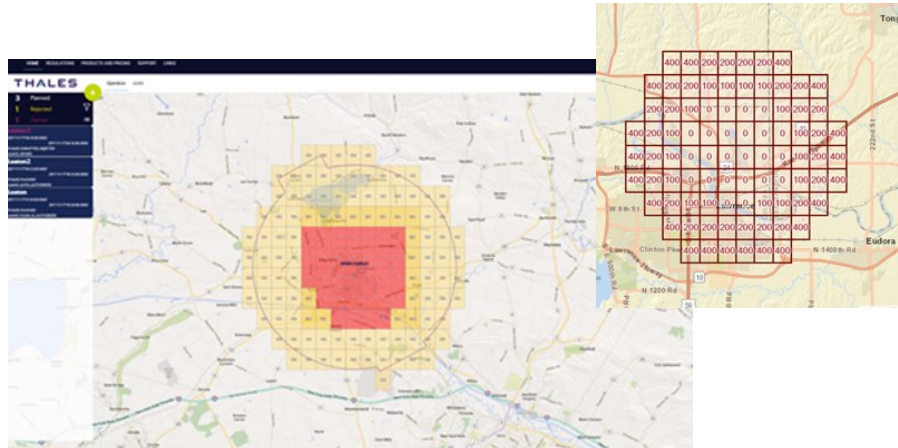
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BVLOS is the greatest economic value driver for commercial UAS.

	VLOS >	BVLOS
Example		
Capability	LAANC automates the application & approval process for airspace authorizations.	A statewide UAS network incorporates physical and virtual infrastructure that connects UAS to the airspace management system.
Enabling Tech	E-registration, Mission Planning Application, UAS AIM, Airspace & Mission Rules Engine, APIs	C2 communication & surveillance; Remote ID, Traffic display; ATM integration; etc.
Result	Today, LAANC supports ~50K monthly VLOS flights in CTRs.	With Vantis, North Dakota will scale BVLOS statewide by 2023.

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BVLOS connects communities, reduces emissions, and improves the daily lives of citizens.

Certified UAS

- Attract UAS Manufacturers and UAS businesses
- FAA Certified Airframes
- UAS for Government Use

Training / Education

- Reimagine future workforce
- Training for UAS services jobs
- University programs
- STEM in K-12 education

Connected Communities

Increased Industrial Productivity

VANTIS UAS Network

- Leverage public investment
- Infrastructure to support "Drone-ports"
- Regional Operations Center for UAS Operations

Electrification

- "Drone-ports" across the State
- New fuel sources
- Logistics hubs to increase access for rural citizens

UAS Operator Services

- UAS Operators using UAS network services
- UAS to support public use cases
- Logistics services

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UTM is the collaborative system that provides airspace stakeholders with the necessary services to integrate advanced UAS operations into the airspace

Case study: BVLOS inspection in North Dakota thanks to Thales UTM system

UAS Services
Weather, Geographical, AIM, Authorization, Surveillance, datalink…

Deconfliction

UAS Software Infrastructures
TopSky-UAS Airsp Mgr TopSky Tracker, Remote ID, Health Monitoring

Authority HMI

Fusion

Health / Status Monitoring

UAS Physical infrastructures
Radar, Com, MNOC, Backhaul network

Fortem Radar.   Skystation C2

In-flight

Surv.   Com.   Deconf.

Remote ID   Noise

Clearance   Data.

Geo.   Repo.

Post-Flight

Weather

Autho.

Pre-flight

Registration

Cell Tower 4

DOT Tower

Watford City Airport SE Hill

VANTIS

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Getting to BVLOS: Anatomy of a statewide UAS network

THE VANTIS NETWORK

REMOTE INFRASTRUCTURE
- Surveillance sensors
- Command and control radios

BACKHAUL DATA NETWORK
- High reliability, low latency
- Scalable

UNMANNED AIRCRAFT SYSTEM (UAS)
- Ground control station
- Aircraft

MISSION & NETWORK
- Data correlation and validation
- Maintenance monitoring
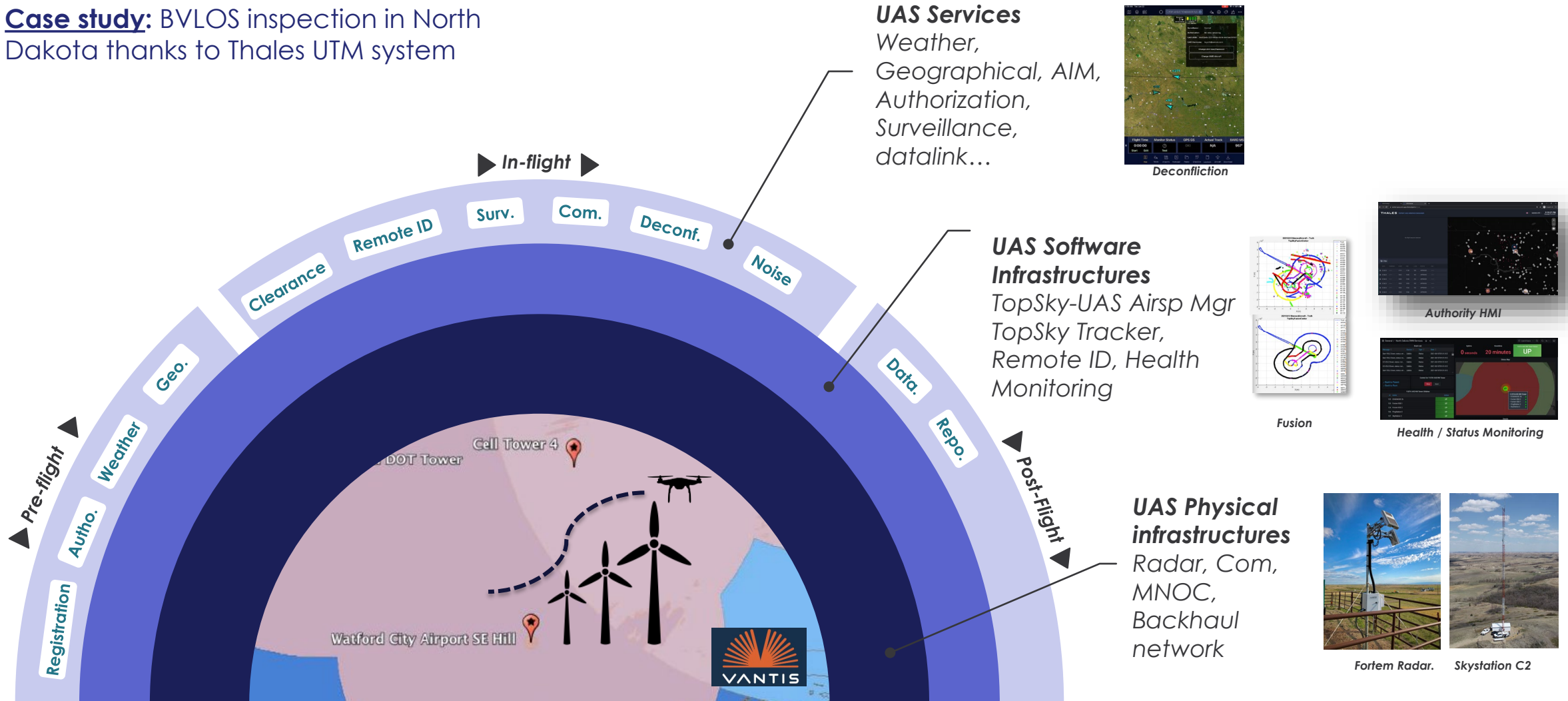- System testing

SE/SI Enablers

BVLOS ConOps, Safety Case and Supporting Policy & Procedures

System Architecture & Tooling (Security, CM, etc.)

Technologies (Non-cooperative Surveillance, C2 Links, Cloud Technologies, Communications Networks, etc.)

Industry Partners & Regulators (UND, Thales, FAA, FCC)

Current scope = supports individual BVLOS flights separated in time & space

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Getting to BVLOS: North Dakota's approach

North Dakota is building a UAS network (Vantis) to support BVLOS operations.

✓ **Phase 1**: BVLOS System Development & **Implementation Plan** Initial Deployment **for Western North Dakota**

✓ **Phase 2**: BVLOS System Technical **Engineering and Business Modeling for a Statewide System**

✓ **Phase 3**: Develop, Implement, and Operate a BVLOS System **Initial Capability ("Key Site") Deployment for Western ND**

Vantis is expanding statewide.

❑ **Phase 4**: Vantis Operations and Maintenance (O&M)

❑ **Phase 5**: Statewide expansion

Thales is the SE/SI of choice for Vantis.

• Thales selected as long-term Vantis partner

• Thales pro-actively supports legislative lobbying, business case development and customer needs.

• Thales is active on many UAS integration projects in the US (TX, NY and USAF) and internationally (FR, UK, SG and AU).
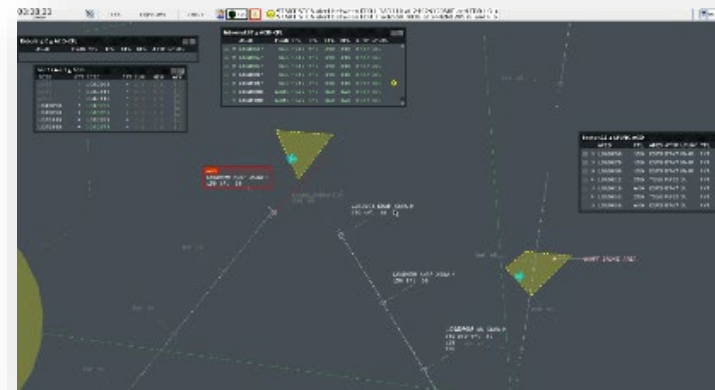
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Our "System of Systems" delivers an integrated, efficient, and secure end-to-end airspace management capability.
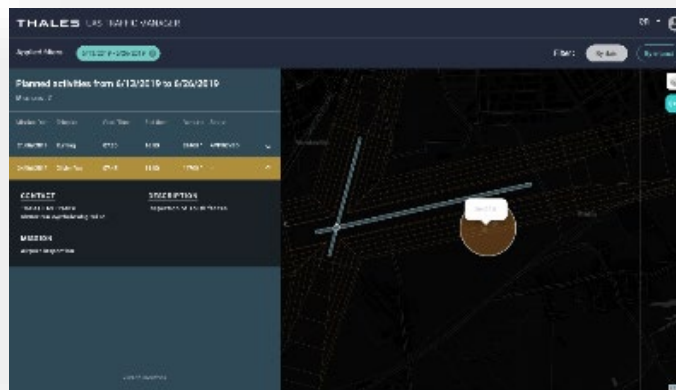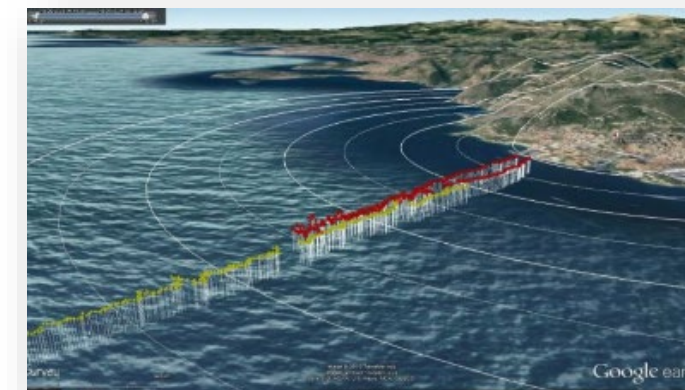
UAS Airspace Management
– flexible, scalable airspace management for drones
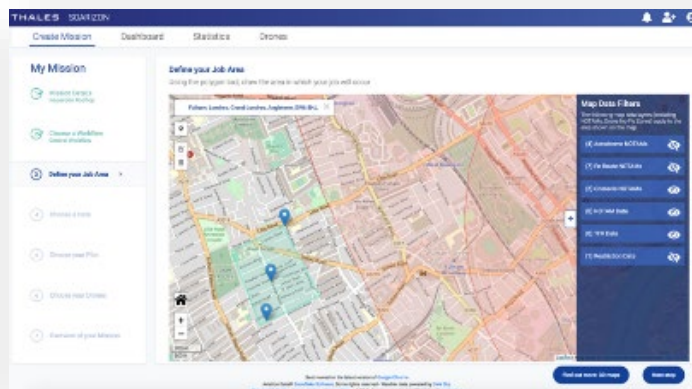

Air Traffic Management
– integration of drone operations into traditional controlled airspace/systems

Sensor Networks
– market-leading sensors + C2 capability to protect airports & critical areas

Applications
– mission & fleet management to plan, prepare, assure and deliver, safe missions

Connectivity
– secure connectivity solutions for drones from a world-leader in digital identity and IoT

OPEN

U1 LEVEL	U2 LEVEL	U3 LEVEL
Pre-tactical geofencing	Tactical geofencing	Dynamic geofencing

Risk Management
– high integrity, geo-fencing capability based upon flight avionics heritage

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Thales acts as a Systems Integrator, bringing together a safe, secure, and seamless solution that incorporates best-in-class partner technologies.

Your Org

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| Vehicle Performance | UAV & Pilot Registration | Ground Infrastructure | Airspace Design | Mission Plan / Approve | UAV & Fleet Management | Secure Connectivity | Airspace Monitoring | Critical Area Protection | Value-Added Services |

TopSky
UAS Airspace Management

APPAREO

Botlink

uAvionix

Gamekeeper
AVEILLANT
A Thales company

SOARIZON

FORTEM TECHNOLOGIES

TERMA®

airspacelink

ATMOSPHERE

ScaleFlyt

TopSky
ATC

JVIATION
A WOOLPERT COMPANY

| Strategic | Tactical | Post-Operation |

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Let's get to BVLOS together.

PHASED IMPLEMENTATION: Getting to BVLOS is a long-term project that requires significant investment and a shared vision for a fully integrated UTM/ATM capability delivering seamless airspace operations. Thales has defined a phase implementation approach to ensure the success of our partnership.

ORIENTATION
Understand national and local regulations, data sources, work flows, procurement processes, and other elements needed for successful implementation.

PILOT PROJECT
Establish basic UAS mission planning and approvals within a limited scope to validate/test value and ensure regulatory compliance.

NATIONAL ROLLOUT
Integrate lessons learned and feedback from the pilot project into system for national deployment. Deploy industrial cloud for large scale operation under service-level agreement.

ENHANCEMENT
Monitor, learn, and improve the system to meet field experience and evolving national & local regulations. Move from strategic / static capability to real-time dynamic operations.

SEAMLESS AIRSPACE
Extend UAS integration platform to integrate with ATM and other external systems to create seamless airspace operations.

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