



SAFE SKIES.
**SUSTAINABLE
FUTURE.**



| ICAO



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Space-based Surveillance : delivering a real-time, continuous and safety-certified ATC surveillance data flow whenever the areas

Context

Space Base Surveillance needs for resiliency

Thales strategy to support next gen surveillance

Needs, solutions, treats and strenghts

Challenges and Benefits

Points of attention and possible opportunities

Context

The growing air traffic volume generates an increase in airspace density, highlighting the need to secure safe operations and prevent system disruption.

Issues and vulnerabilities of current CNS satellite or space-based solutions have to be analyzed, tracked and reported to identify countermeasures.

To sustain real-time surveillance, continuous and safety-certified ATC surveillance data flow whenever the areas, also in congested or non-radar surveyed airspaces, innovative techniques need to be implemented.

Independency from GNSS potential disruption is a key factor that ANSPs have to consider

Surveillance especially in congested airspaces or in oceanic and non-radar surveillance area, together with cyber threat protection, are the most challenging needs while keeping safe and secure navigation systems

Space Based Surveillance are essentials, but high resilience and independence from GNSS jamming and spoofing is a target and a key driver for innovation, design and deployment of robust solutions

THALES STRATEGY TO SUPPORT NEXT GEN SURVEILLANCE

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Key ATM Trends



Digitalisation



New User



ANSP Alliances



ESG Imperatives

ICAO

Future ANSP Challenges



Adaptability
& Resilience



Improved
collaboration



Openness



Automation
& Performance



Built in safety &
Cybersecurity &
System vulnerabilities



Cost of ownership

Thales Initiatives

High resilient, cyber-secured,
GNSS independent, minimum
total cost of ownership, Space
Based Surveillance

TOWARDS A RESILIENT SEAMLESS NATIONAL/REGIONAL AIRSPACE COVERAGE WITH MINIMIZED GAPS AND OVERLAPS

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SPACE-BASED MLAT

Main source or backup for any ATC En Route & Approach/Terminal airspace (incl. high density)

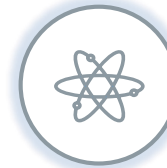
- Operational use:
 - ✓ **Main source or backup for any ATC En Route & Approach/Terminal airspace (incl. high density)**
- Requirements:
 - ✓ Latency: 1,5s
 - ✓ Update rate: 8 s @97% confidence level
 - ✓ Availability: 99,9%
 - ✓ Aircraft separation: **2,5 nm**
 - ✓ Transponders: ADS-B, **Mode S**
 - ✓ **GNSS independent + Space MLAT**
 - ✓ Safety-Certified Service

→ Full Mode S/MLAT, GNSS independent airspace coverage as potential alternative / complement to terrestrial layer for ground infrastructure rationalization



Surveillance data “as a Service”

End to end maintained & operations from provider



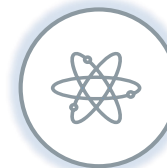
Enhanced capabilities with incremental roadmap

Dedicated optimized constellation with new service available every 5 years



Seamless national/regional airspace coverage

Minimized gaps & overlaps



Flexible integration

Seamless integration with Thales ATC systems and optional data fusion



Secured solution

Provide surveillance data independent from GNSS, cybersecured

SPACE-BASED SURVEILLANCE CALLS FOR THE SAME LEVEL OF PERFORMANCE AS GROUND-BASED SYSTEMS

7



99,9%
AVAILABILITY



<1,5s
LATENCY



8s
UPDATE RATE
AT 97%
CONFIDENCE

- **Space-based surveillance systems to comply with same regulations as ground infrastructure**
- **Significant challenges on space systems**
 - Robust network with redundant elements (availability)
 - Multiple overlapping signals processed simultaneously in particular over high traffic regions (satellite coverage, in-orbit processing, bandwidth, etc.)
 - Resilience to GNSS and to satellite base vulnerabilities

MAIN CHALLENGES

- **Space-based surveillance systems to comply with same regulations as ground infrastructure**
- **Significant challenges on space systems**
 - **Resilience to GNSS and to satellite base vulnerabilities**
 - Robust network with redundant elements (availability)
 - Multiple overlapping signals processed simultaneously in particular over high traffic regions (satellite coverage, in-orbit processing, bandwidth, etc.)

Benefits of space-based surveillance



Strategic alignment: aligned with **EU ATM Master Plan** (2024 revision) & with **Surveillance Program Management** objectives



Matching operational needs: a key enabler to **reduce coverage gaps & overlaps** and engage towards the **rationalization of surveillance infrastructures** while ensuring that EU ANSPs have the **highest resilience to GNSS disruptions & cyber threats**



Greener aviation: supporting **trajectory-based operations** (carbon & non-CO2 emissions reductions) and **reducing environmental footprint** (ground infrastructures)



Autonomous solution powered by **key European players' excellence** to develop an EU solution



European excellence dissemination: EU national & regional references to **position EU industry in the global competition**



R&D investments optimization: leveraging space & ATM R&D background while coordinating future space & ATM investments alignments

Thank You

