

ICAO

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IFATSEA
International Federation of Air Traffic Safety Electronics Associations

AIR NAVIGATION WORLD

COMMUNICATIONS, NAVIGATION, SURVEILLANCE, AND SPECTRUM

CNSS 2026

12 - 15 October | Kotor, Montenegro

COMMUNICATIONS SESSIONS 1,2,3,4,6 & 7

Setting the Scene

Raza Ali Gulam | Technical Officer CNS, ICAO | CP-DCIWG Secretary

Mr. Raza Ali Gulam



CNSS Technical Officer/ ICAO

Mr. Raza Ali Gulam is a Technical Officer for CNS and Spectrum within ICAO's Air Navigation Bureau and Secretary of the Communications Panel Data Communication Infrastructure Working Group (CP-DCIWG). His career spans over three decades across aviation and telecommunications, specializing in aeronautical communication systems, spectrum coordination, and digital infrastructure.

Joining ICAO in 2007 as Regional Officer CNS in the Middle East Office, Raza supported States with the development and implementation of regional air navigation plans as well as frequency coordination, before transitioning to ICAO Headquarters in Montreal in 2016. A certified ICAO instructor, he regularly delivers specialized technical training courses globally.

Raza holds a Bachelor's degree in Electronics and Communication Engineering and a Master of Business Administration (MBA). His technical foundation is complemented by extensive expertise in software development, aeronautical datalinks, and complex international project management.

Setting the Scene: Modernizing Aeronautical Communications

Communication: The First & Foremost Pillar in Aviation

The digital bedrock connecting the sky, continental routes, and airport surfaces.

We fly in the sky, cross oceanic expanses, and land safely on the runway surface. Communication is the primary operational bedrock enabling every dynamic trajectory and collaborative decision.

Moving the Big Rocks: Overcoming spectrum bottlenecks, transitioning legacy analog links to IP, and delivering resilient connectivity from high altitude to touchdown.

Programme Storyline

A Deliberate Progression: From Sky to Ground to Global Standards

1 DOMAIN 1 SPACE & OCEANIC

Bridging remote & oceanic airspaces:

- **Session 1:** Space-Based VHF (oceanic voice & datalink without avionics retrofit)
- **Session 2:** Advanced SATCOM (ATS Baseline 2 operations & TBO support)

High-altitude coverage & continuity

2 DOMAIN 2 TERRESTRIAL & SURFACE

Modernizing ground & runway infrastructure:

- **Session 3:** Terrestrial LDACS (broadband, spectrum efficiency & IP ground links)
- **Session 4:** Surface AeroMACS (runway status lights & vehicle intrusion prevention)

High throughput & runway safety

3 DOMAIN 3 NETWORKS & STANDARDS

Digital backbone & global alignment:

- **Session 6:** Network Architectures (ATN/IPS transition, VoIP & cyber resilience)
- **Session 7:** Standards Round Table (harmonization with RTCA, EUROCAE, SAE, EASA)

Interoperability without fragmentation

Purpose of the bridge: Connect the contributions across all 6 panels — not repeat the technical presentations.

Complementary Speakers • One Coherent Story

Track Execution & Working Arrangements

6 Sessions • 45 Minutes Each: Time-Disciplined & Interactive

With tight timelines across all 6 sessions, our panels prioritize strategic exchange over slide reading, with dedicated time reserved for audience engagement.

45 Min

Strict Pacing

Strict 45-minute limits to focus on real deployment barriers and actionable solutions.

Audience Q&A

Ask questions at session end by raising hands or submitting live via the Event App.

Move the Big Rocks

Tackling core challenges: spectrum limits, avionics equipage, and global harmonization.

Session 1 Handover

Station in the Sky: Spais primed and ready to begin.ce-Based VHF panel

Let us commence Session 1: Station in the Sky.

Moderator: Raza Ali Gulam, Technical Officer CNS, ICAO

Thank You


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Session 1:

Station in the Sky: Extending Space-Based VHF to Remote and Oceanic Airspace

Moderator:

- Mr. Raza Ali Gulam, Technical Officer, CNS, ICAO

Panelists:

- Mr. Andrew Yang, NAV CANADA
- Mr. Mario Garcia, ENAIRE
- Mr. Juan José Cornejo,Startical.
- Mr. Craig Benson, Skykraft
- Mr. Michael Garcia, AIREON

WHY IT MATTERS

The operational gap is geographical, not technological

Across oceanic, remote and polar airspace, communications still depend on a different mix of systems and procedures than continental operations.

Today

- Limited terrestrial VHF coverage.
- HF and SATCOM dependence.
- Procedural constraints.

With SB-VHF

- Direct VHF voice and data.
- Wider operational continuity.
- Common user experience.

Goal: continental-like communications where ground infrastructure is impractical

WHAT IS THE PROBLEM?

OCEANIC and REMOTE areas have LIMITED VHF infrastructure.



For seamless global service without performance gaps, VHF capabilities in oceanic and remote areas must be equivalent to those in continental airspace.

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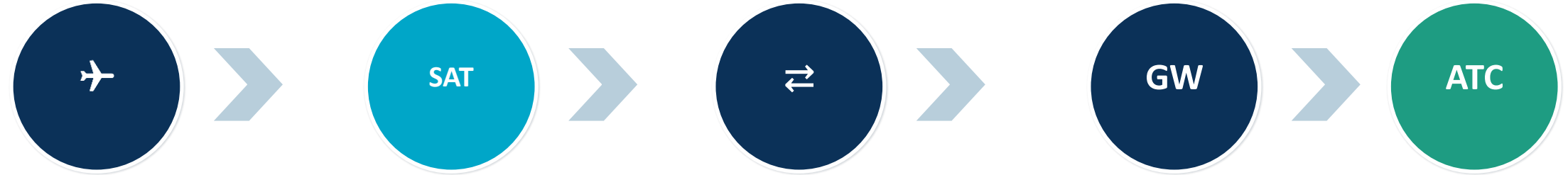
SB-VHF will provide GLOBAL COVERAGE of A/G VHF COMMUNICATIONS SERVICES (VOICE and DATA) including OCEANIC and REMOTE AREAS, complementing ADS-B.



Global coverage is crucial for enhancing operational ATC communications in oceanic and remote areas, potentially increasing efficiency and capacity while ensuring the necessary safety standards. It may also provi ased communications resilience (backup, in continental areas.

End-to-End Relay Architecture

A VHF station in motion, engineered as one continuous service



Existing avionics and antennas

Transparent satellite handover

Standard ANSP interfaces

Operationally, the user should experience SB-VHF as another VHF facility, not as a new cockpit communication system.

Core Engineering Pillars | 1 of 2

Link geometry and Doppler: keeping a reliable signal from a moving platform

01 Link geometry

Continuously changing slant range, elevation and antenna gain.

02 Doppler

Voice is comparatively tolerant; VDL Mode 2 requires active mitigation.

Design principle: manage complexity inside the service so the aircraft and controller interfaces remain familiar.

Core Engineering Pillars | 2 of 2

Spectrum and continuity: maintaining coordinated, uninterrupted service

03 Spectrum

Large footprints require regional and inter-regional frequency coordination.

04 Continuity

Satellite handover must be invisible to active voice and data transactions.

Design principle: manage complexity inside the service so the aircraft and controller interfaces remain familiar.

SERVICE MODEL

One infrastructure layer, two communication services

VHF voice

- Direct controller-pilot communication.
- DSB-AM, half-duplex operation.
- Voice quality, latency and PTT continuity.
- Emergency and non-routine communications.

VHF data

- VDL Mode 2 and ACARS compatibility.
- CPDLC, ADS-C and AOC exchanges.
- Seamless transition from ground VDL.
- Performance managed through SLA metrics (DCPC) and through RCP when dictate.

Complemented by space-based surveillance to unlock operational benefits

PANEL DISCUSSION • ROUND 1

Global Standards & Regulatory Framework

Theme: Global Harmonization

PANEL FOCUS • ANDREW YANG & MARIO GARCÍA

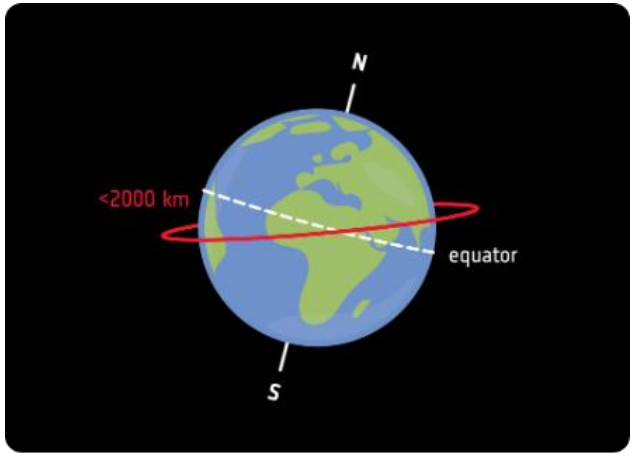
How do we establish globally harmonized SARPs and ensure cross-border frequency protection?

SUMMARY

Annex 10 SARPs: Amendments for aeronautical mobile satellite route service underway.

Doc 10228 Manual: Technical guidance harmonizing implementation.

Inter-Regional Coordination: Preventing co-channel interference between space footprints and ground VHF.



Target: ICAO SARPs Applicability targeting November 2028.

PANEL DISCUSSION • ROUND 2

Constellation Architecture & In-Orbit Validation

Theme: Technical Validation



Test evidence demonstrates full backwards compatibility with legacy aircraft avionics.

PANEL FOCUS • J.L. CHINCHILLA & CRAIG BENSON

What technical milestones have in-orbit flight demonstrations proved so far?

SUMMARY

Demonstrated Link Budgets: Sufficient RF power flux density without onboard power penalties.

Active Doppler Compensation: Seamless reception on unmodified Collins and Honeywell airborne radios.

Dual Service Capability: Simultaneous DSB-AM voice and VDL Mode 2 data transmission.

PANEL DISCUSSION • ROUND 3

CNS Integration & Space Surveillance Synergy

Theme: System Synergy

PANEL FOCUS • MICHAEL GARCIA

What operational lessons from Space-Based ADS-B translate to Space-Based VHF deployment?



SUMMARY

Unified CNS Chain: Pairing space surveillance with direct voice closes the safety loop.

Tactical Intervention: Instant controller intervention enables reduced separation minima.

Resilient Architecture: Space VHF acts as a high-availability backup for continental outages.

Completes the transition from procedural oceanic control to full radar-like tactical separation.

Live Audience Interaction



'In 30 seconds or less:

What is the single biggest bottleneck standing between us and operational Space-Based VHF—spectrum allocation, the business model, or operational harmonization?

In what year will Space-Based VHF realistically be operational and routinely used in daily air traffic control?'

Any questions from the floor

Thank You


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Session 2:
Evolution of Space-Based Technologies
Advanced SATCOM

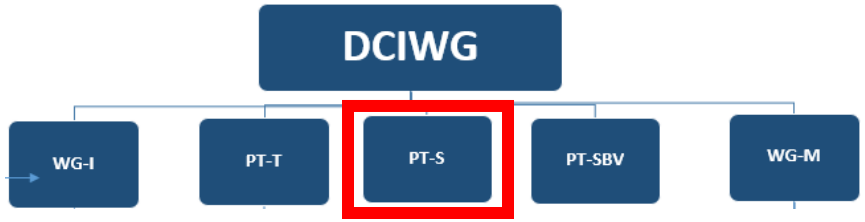
Panelists:

- Raza Gulam, COM Panel DCIWG Secretary, ICAO
- Danny Bharj, Director Aviation Solutions Engineering, Viasat
- Kathy Torrence, Director (A) NAS Systems Engineering & Integration Office, FAA
- Jean-Michel Crenais, Datalink Program Director, DSNA
- Thierry Lelievre, Iris Sales Manager, ESSP
- Khaled Eltanany, Senior Manager CNS Technology, IATA

Moderator:

- Nikos Fistas, CP-DCIWG PT-S Rapporteur, EUROCONTROL

L Band SATCOM Activities in ICAO



ICAO SATCOM Material

- AMS(R)S SARPs: Annex 10 Vol. III, Ch. 4
  - Amendment 82 / 2007)
- Doc 9925: Manual on the Aeronautical Mobile Satellite (Route) Service

AMS(R)S SARPs

- State Letter SL 2025/51
- ANC Final review in June 2026
- Council adoptions expected in Q4 2026
- Applicability date: 25 November 2027

COM Panel

- Jobcard CP-DCIWG.009.03 (Satellite Communication Systems in support of ASBU Blocks 1 and 2) to update the ICAO SATCOM provisions
- Project Team SATCOM (PT-S): PfA benefiting from increased performance capabilities of already operational new constellations (support for ATS B2 data services, DCPC voice services, …)

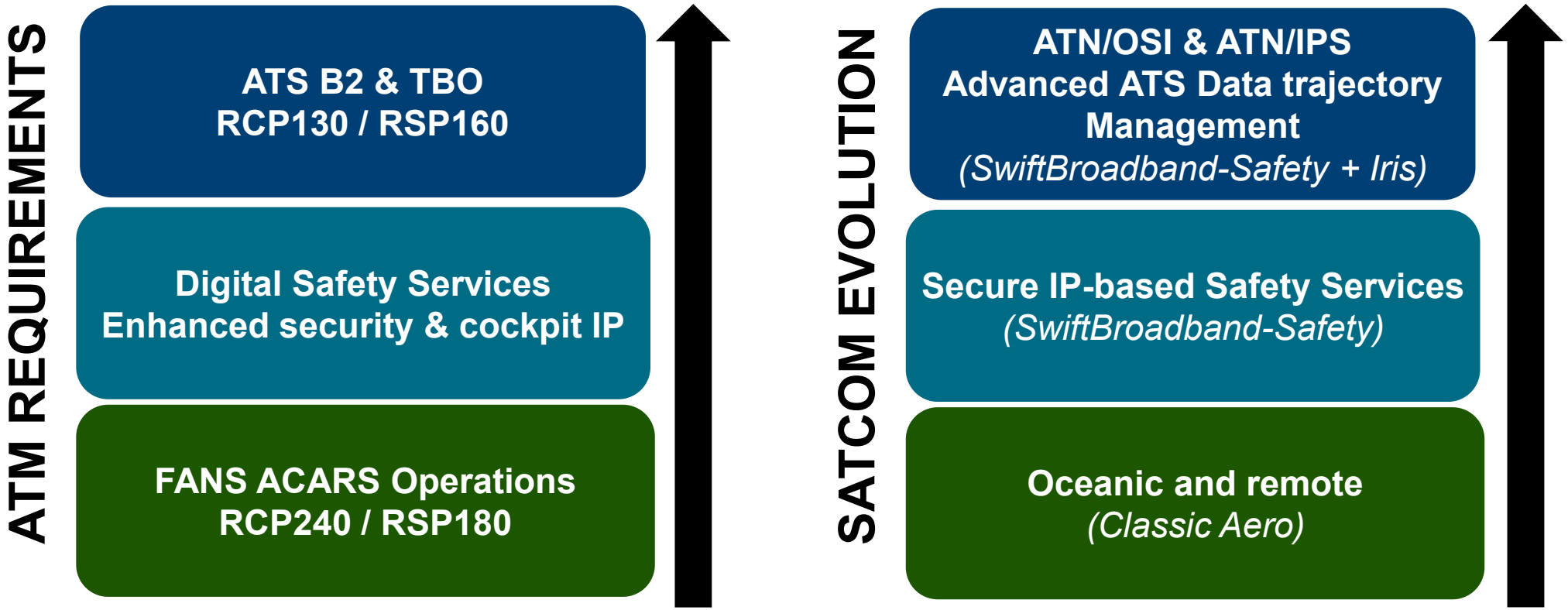
AMS(R)S Manual

- 5 parts
  - Part I: General
  - Parts II and V: Iridium specific
  - Parts III and IV: Viasat (Inmarsat) specific
- Drafts under final PT-S review and then DCIWG approval
- Availability / Publication expected in Q2 2027

Viasat

Evolving safety communications to support next-generation ATM

Each generation builds on existing capabilities enabling new ATM standards while maintaining support for established operations.



Aligned with evolving ICAO AMS(R)S and ATN/IPS requirements for future ATM operations.

Viasat

The Iris Programme

55,831

Iris connected flights

January 2024 – August 2026

Airline customers

easyJet · Jet2.com Friendly low fares · ITA AIRWAYS · transavia

ANSP customers

EUROCONTROL · skyguide · DFS Deutsche Flugsicherung · dgac DSNA

ANSPs cover 70% of core area, supporting 40% of European Traffic

System Availability

99.98 %

IRIS ATN/OSI
Service Level 1 (CPDLC)

	Air to Ground	Transit Time
Within 9 secs	SL1 C(8) ≥ 95% 99.55 % on 165593 samples (≥200)	SL1 TT (95) ≤ 9s 5.1 s

IRIS ATN/OSI
Service Level 2 (ADS-C)

	Air to Ground	Delivery Time
Within 7 secs	SL2 C(6) ≥ 95% 97.94 % on 46807 samples (≥200)	SL2 TT (95) ≤ 7s 6.0 s

Agreed with EASA and ESSP and in line with ICAO.

dgac DSNA

European ANSP Perspective

Why SATCOM is important in Europe ?

- **Mitigate risk of VDL2 bandwidth saturation**
  - ✓ expected within 5 - 10 years in European Core Area, as a consequence of the constant increase of CPDLC and ADS-C/EPP
- **Allow emergence of Multilink Concept (dual-link)**
  - ✓ increase datalink service continuity in case of failure of one link
- **The only available air/ground technology certified for ATC Datalink (since 2023), in addition to VDL2**
  - ✓ no warranty when a third option will be available soon to cope with future European ATC Datalink needs (ATS B2 & TBO)
- **Compliance with European SES2+ regulation**
- **Allow secured air/ground ATC communications enabling future IPS migration**



dgac DSNA

European ANSP Perspective

SATCOM Benefits & challenges



- **Global & seamless coverage over Europe**
  - ✓ except Northern latitudes
- **Good performances compared to current VDL2 performances**
  - ✓ although to be confirmed when more aircraft will be equipped
- **Environment friendly**



- **Costs**
  - ✓ in particular for ANSPs outside European Core area (expecting later VDL2 saturation)
- **Performances to be confirmed when more aircraft will be equipped**
- **Sustainability of the business model**
  - ✓ if deployment is slow / delayed (both ground and airborne sides)

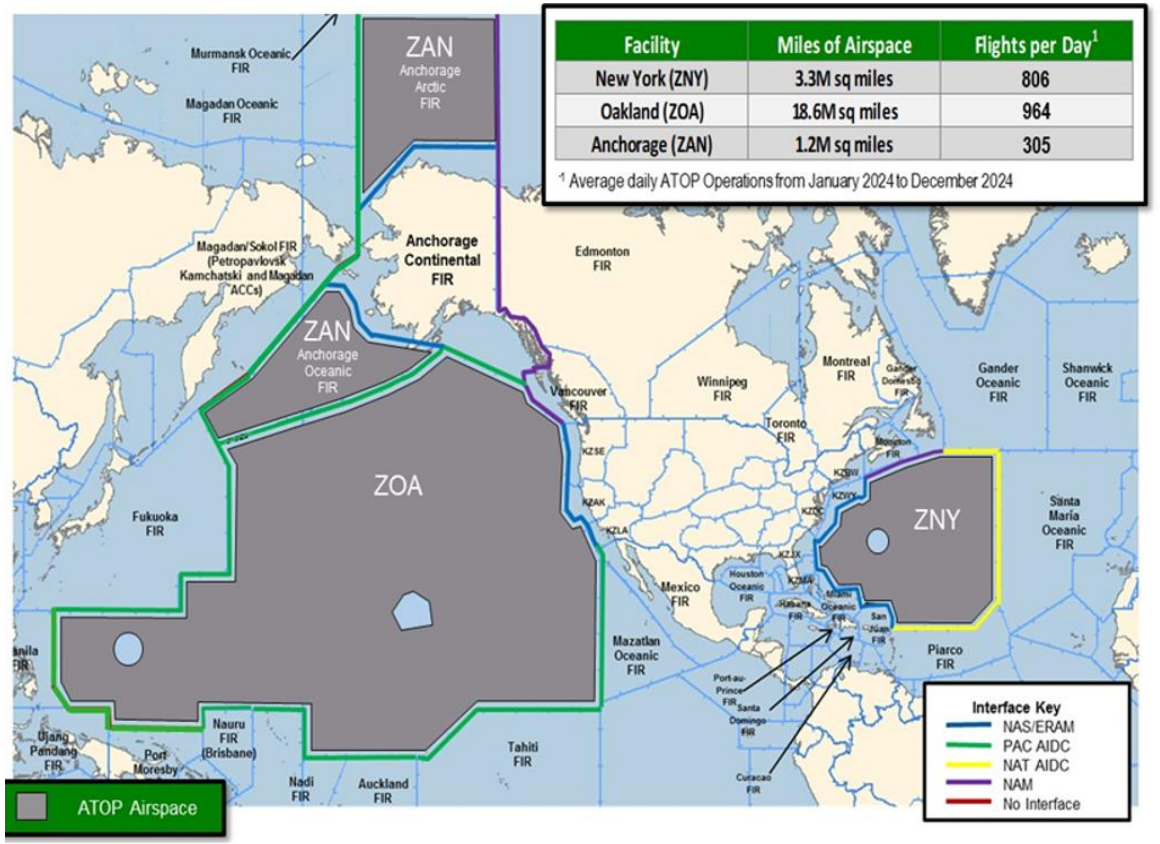
For the FAA today, SatCom Class C is primarily used as a specialized link for remote, oceanic, and polar regions where ground-based radios cannot not reach.

Connectivity in FAA Oceanic and Remote Airspace Coverage

- In non-radar, oceanic domains (such as the Atlantic and Pacific flight corridors governed by the FAA), traditional ground-based High Frequency (HF) radio is notoriously susceptible to atmospheric noise, interference, and signal drops.

SatCom enables:

- Controller-Pilot Data Link Communications (CPDLC): Direct text-based messaging between pilots and controllers.
- Automatic Dependent Surveillance-Contract (ADS-C): Automatic transmission of precise position and altitude reports, allowing the FAA to safely reduce oceanic aircraft separation standards
- Satellite Voice: High-reliability satellite voice links for emergency or priority controller-pilot communication.



Connectivity in FAA Continental Airspace

- For a subset of approved aircraft not equipped with VDLDm2, the FAA allows CPDLC communications between pilots and controllers allowing participation and insight into SatCom performance over the CONUS
- Additionally, the FAA allows a subset of CPDLC messages to be transmitted over SatCom while transition to/from Oceanic airspace
- Otherwise, the FAA has not yet approved SatCom for domestic CPDLC communications

SatCom Challenges

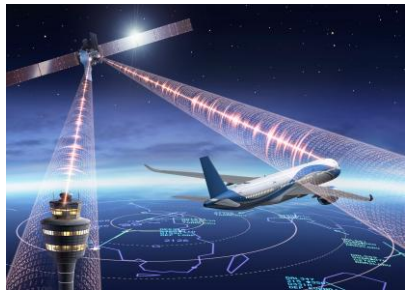
- Performance challenges include satellite line-of-sight issues resulting in disconnects and failed messages with SatCom Class C
- Concerns exist over service status monitoring and real-time issue identification and root cause analysis

Future Functionality

- Planned support for IPS
- Evaluating SatCom Class B (IRIDIUM Certus) for aviation safety communications
- Considering the use of commercially available Satellite systems to meet Performance Based requirements
- Exploring connectivity through non-aviation links directly to and from the cockpit, turning the aircraft into a fully integrated node in the FAA's digital network

ESSP

"Iris Satcom Data-link Communication Service is key enabler for the ATM Modernization in Europe and Beyond "

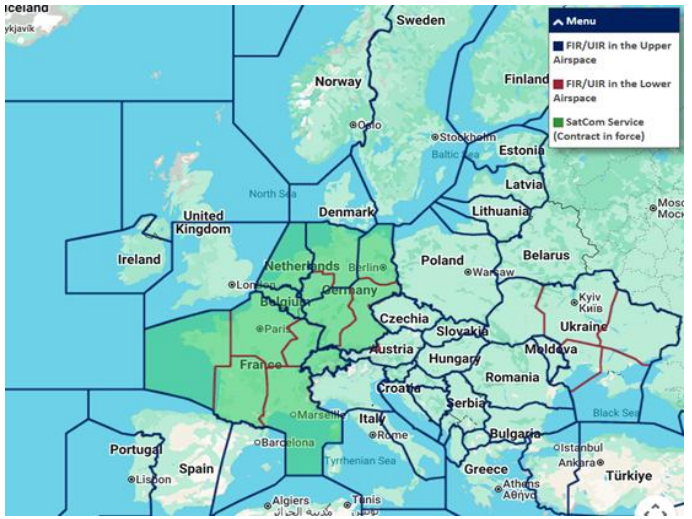


EASA CERTIFIED

- **Global and seamless air-ground connectivity:** Enables continuous data communications worldwide, including oceanic, polar and remote regions where terrestrial networks are unavailable.
- **Improved performances, safety, security, capacity and resilience of existing data-link network:** Provides a interoperable and resilient data-link communication system alongside terrestrial ones (Multilink approach).
- **Foundation for air-ground data link - driven ATM:** Supports key capabilities for ATM Modernization such as CPDLC and ADS-C (*and AOC*) services, enabling advanced operations during all phases of flight (e.g. "Gate to Gate" Trajectory-Based Operations (TBO)).
- **Iris Satcom is easy to deploy:** no complex ground infrastructure is required. Only connectivity to ATN Network.

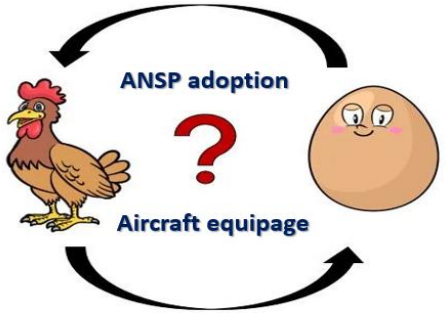
Iris Capable flights

2024	4134
2025	18173
Jan. to Aug. 2026	33524
	55831



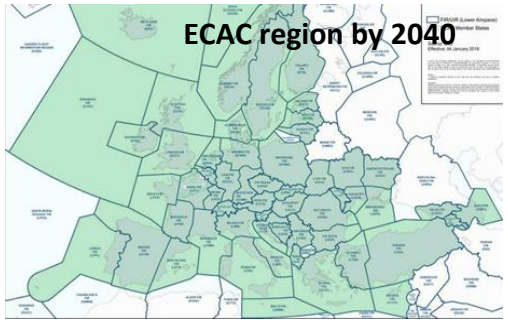
ESSP

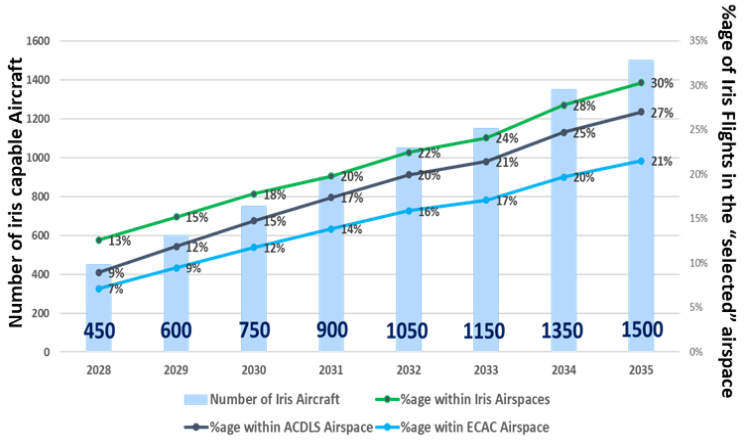
The technology is ready, the service is operational, the performances are met and the benefits are about to be proven. The remaining challenge is to accelerate ANSP adoption and Aircraft Equipage to ensure the sustainability of Iris Satcom service



- **Achieving Critical Mass for ANSP and Airline adoption:** The biggest challenge is not the technology itself but achieving critical mass across the aviation ecosystem.
- **Building a Sustainable Business Model:** Sustained adoption is fundamental to maintaining a robust, certified, and continuously evolving service.
- **Demonstrating Measurable Operational Benefits:** Demonstrating tangible operational value remains a key driver for future growth.
- **Maintaining Aviation-Grade Performance:** Delivering highly reliable, secure and predictable data-link communications that satisfy safety, security and regulatory requirements that become more and more stringent.

Our objectives in Europe by 2035+





What matters to airline as SATCOM evolves?

Potential operational contribution of Advanced SATCOM beyond additional bandwidth

Airline Operational Perspective

Building on today's essential connectivity, Advanced SATCOM to demonstrate measurable contributions to safety, operational value, and network resilience

Desired end state

A globally interoperable and resilient communications network providing seamless, reliable connectivity.

Global Reach

Consistent connectivity across oceanic, remote and increasingly continental operations.

Trajectory Efficiency

Preferred trajectories, improved climb/descent profiles and fewer tactical restrictions.

Predictability and Value

Reduced delay and workload exposure, measurable fuel and time benefits and improved AOC connectivity.

Operational Resilience

Continuity during terrestrial outages, congestion, or disruptions, with fewer reroutes and restrictions.

AIRLINE DECISION RATIONALE

Will the combined fuel, time, operational, and resilience benefits justify the total fleet-level lifecycle cost?

IATA

What must be addressed for airline to consider adoption?

Challenges are manageable when standards, deployment, equipage and service assurance are planned as part of a coordinated transition.

Fleet Integration

Aircraft-specific upgrade paths; SATCOM, FMS, communications management, security, and certification must be assessed end to end

Fragmented Deployment

Premature or differing regional requirements can duplicate avionics, approvals, training, and subscription costs

Service Assurance

Coverage alone is insufficient; end-to-end performance, cybersecurity, restoration and accountable interfaces are needed.

Credible Business Case

Benefits must be measurable, operationally realizable, and attributable at the fleet and route level before investment.

COORDINATED TRANSITION PATHWAY

Baseline
Common ICAO standards and interoperable architecture

Prove Capability
Operational trials demonstrating route-level performance and measurable benefits

Scale Deployment
Align equipage with maintenance and prioritize long-life fleets

Govern and Learn
Coordinate roadmaps, monitor performance, share lessons, and maintain resilience

Q&A

Please keep

questions brief and

answers concise

Thank You


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Session 3

Modernizing the Ground: Transitioning Terrestrial Infrastructure to LDACS

Panel Moderator:

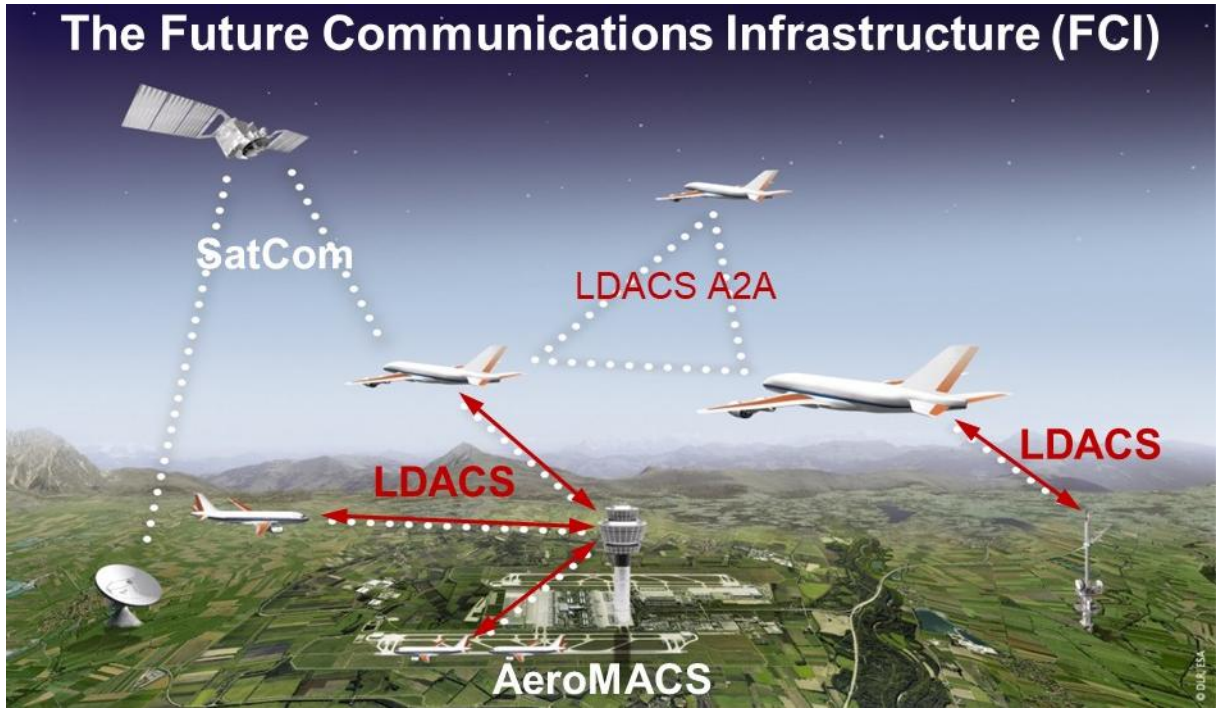
Michael Schnell

Senior Scientist
German Aerospace Center (DLR)
ICAO PT-T Rapporteur

LDACS =

L-band Digital Aeronautical

Communications Systems



Panelist of the LDACS Panel

1

Mario Garcia Cano

ENAIRE
Head Aeronautical Messaging and Datalink Department

2

Bernhard Haindl

Frequentis AG
Principal Scientist

3

Francesco Gualtieri

Rohde & Schwarz GmbH & Co. KG
ATC Product Manager

4

Mattia Nurisso

EUROCONTROL
CNS Programme Manager

5

Kai Guo

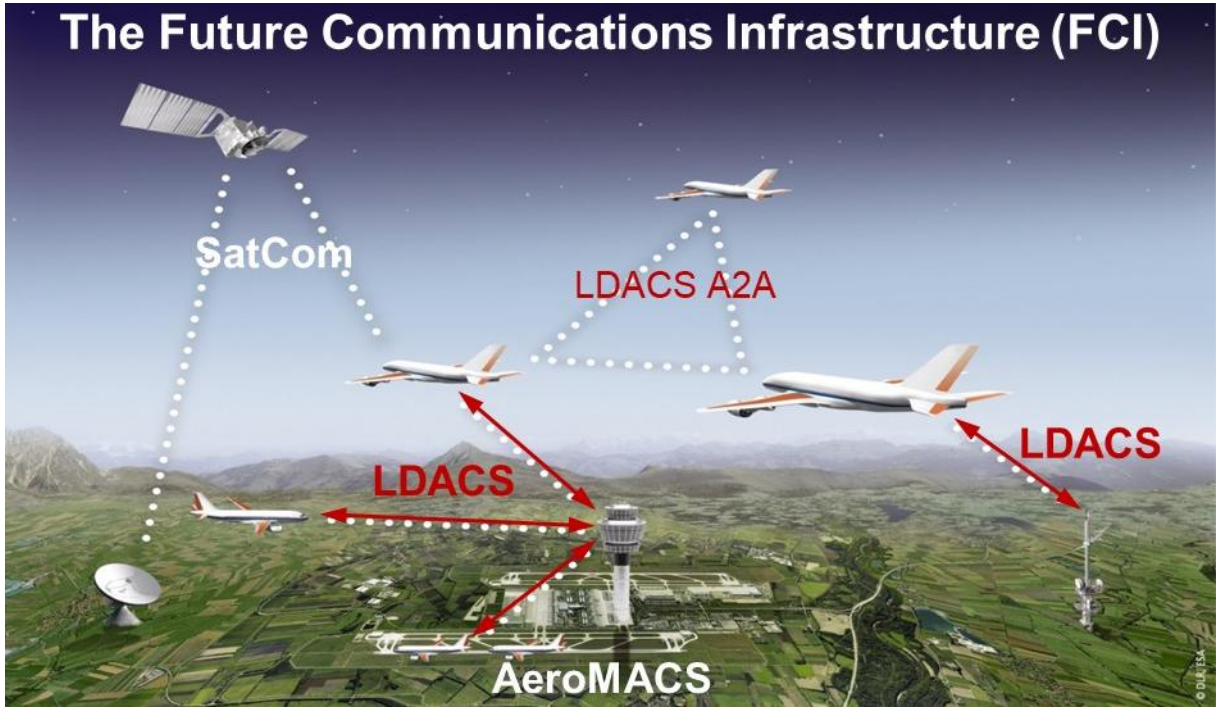
BUAA/CAAC
Associate Professor at BUAA and CNS/ATM lab of CAAC

6

Michael Schnell

German Aerospace Center (DLR)
Senior Scientist, ICAO PT-T Rapporteur, Panel Moderator

What is LDACS?



LDACS is …

- the upcoming broadband and secure ground-based communications system within the FCI multilink concept
- exclusively designed for aviation use in protected aeronautical L-band with AM(R)S allocation
- a mature technology for aviation with TRL 6 (proof for LDACS airborne station in November 2026 during SESAR MIAR flight trials)
- already tested and evaluated before in flight trials (March 2019 and July 2022)
- under ICAO and EUROCAE standardization

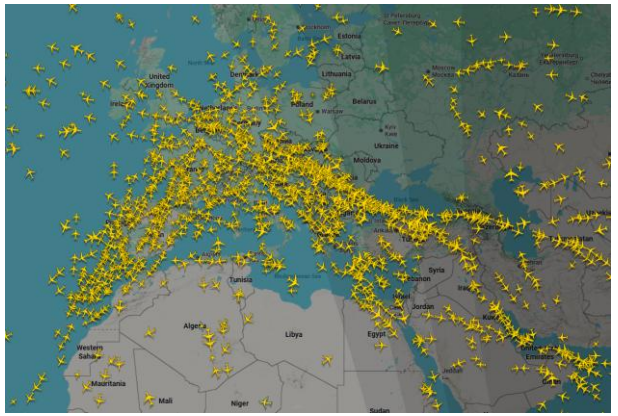
Why a New Ground-Based Datalink LDACS?



Worldwide ATM Modernization …

- for increased efficiency, flexibility, flight predictability and capacity to better handle growing air-traffic and to reduce costs
- for increased safety and security to stay number one in safety and to harden against cyber attacks
- for greener air transportation to achieve high and continuing public acceptance

Requires modern CNS technologies, especially improved and secure connectivity that LDACS is delivering



What Does LDACS Offer?



LDACS addresses the current datalink deficiencies in …

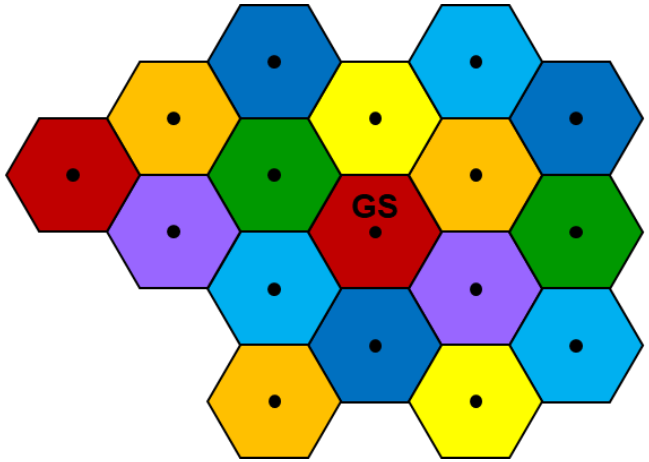
- capacity/bandwidth,
- delay performance,
- reliability, and
- security

With that, LDACS is …

- the ground-based datalink enabler for modern ATM operational concepts, like full 4D TBO and/or flight-centric operations



What are the Technical Characteristics?



The technology behind LDACS …

- is based on OFDM modulation technology which is state-of-the-art (4G/5G mobile radio) and highly flexible and scalable
- implements efficient coding and adaptive coding/modulation
  - QPSK, 16-QAM and 64-QAM
  - concatenated coding with interleaving
- achieves net data rates of 550 kbit/s – 2.6 Mbit/s (55 – 260 times VDL2)
- applies frequency-division duplex (FDD)
  - forward link: 1110 – 1146 MHz
  - reverse link: 964 – 1000 MHz
- uses a cellular approach

Main LDACS Parameters:

Number of subcarriers	64 (50 used)
Bandwidth	625 / 498 kHz
Subcarrier spacing	9,765625 kHz
OFDM symbol duration	102,4 µs
Guard interval	(4,8 + 12,8) µs
Net data rate	550 kbit/s – 2,6 Mbit/s **(55 – 260 times VDL2)**

ANSP VIEW

Why LDACS matters to an ANSP

The issue is no longer connectivity alone. It is predictable performance at scale.

Today's constraint

Narrowband capacity
Growing ATS and AOC demand
Limited margin for automation

ANSP requirement

Safety-prioritized traffic
Deterministic access and low latency
Secure continental coverage

LDACS contribution

Protected aeronautical spectrum
Broadband terrestrial datalink
Open, interoperable ecosystem

ANSP value proposition: more capacity and resilience without a "big-bang" replacement of VDL Mode 2.

OPERATIONAL BENEFITS

Operational benefits start with performance assurance

1

CAPACITY

550 kbit/s to 2.6 Mbit/s

Room for richer ATS and AOC exchanges

2

LATENCY

Coordinated access

Predictable delivery for time-sensitive traffic

3

PRIORITY

Multiple service classes

ATS traffic protected from lower-priority loads

4

SECURITY

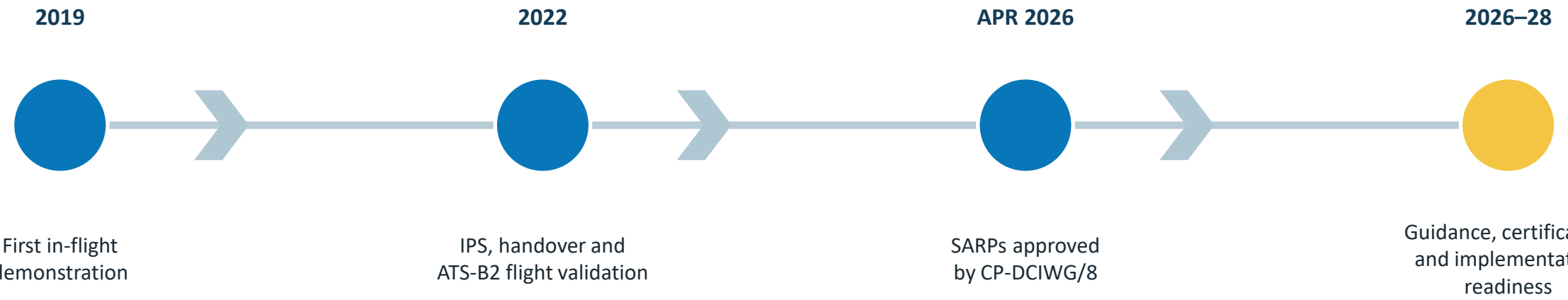
Mutual authentication

Integrity, confidentiality and trusted access

These are enabling properties. The operational benefits come from the ATS applications they make dependable.

TECHNICAL MATURITY

Mature enough to plan, disciplined enough to validate



ANSP conclusion: deployment planning can begin now, while evidence, guidance and certification close the remaining implementation risks.

TBO ENABLER

LDACS provides the terrestrial foundation for ATS-B2 and B3



ATS-B2: supported and validated

ATS-B3: performance headroom

TBO: reliable trajectory exchange

LDACS is the link layer enabler. End-to-end performance still depends on applications, networks and operational integration.

TRANSITION STRATEGY

Deploy gradually, but synchronize air and ground

GROUND RAMP-UP

1 Validate
Selected sites

2 Pioneer
High-demand area

3 Scale
Regional coverage

4 Integrate
OSI + IPS / multilink

AIRBORNE EQUIPAGE

Prototypes → certification → forward-fit / selective retrofit → fleet critical mass

BENEFITS AT SCALE

DELIVERY MODEL

CSPs make deployment scalable; regulation makes it investable

ANSPs define

Operational need
Service levels and resilience
Integration and safety case

CSPs deliver

Shared ground network
Multi-provider competition
Operations and lifecycle support

Authorities enable

Global SARPs and certification
Regional frequency coordination
Deployment incentives and obligations

The preferred model: open standards + coordinated service provision + harmonized rules

Benefits of the LDACS Ground System

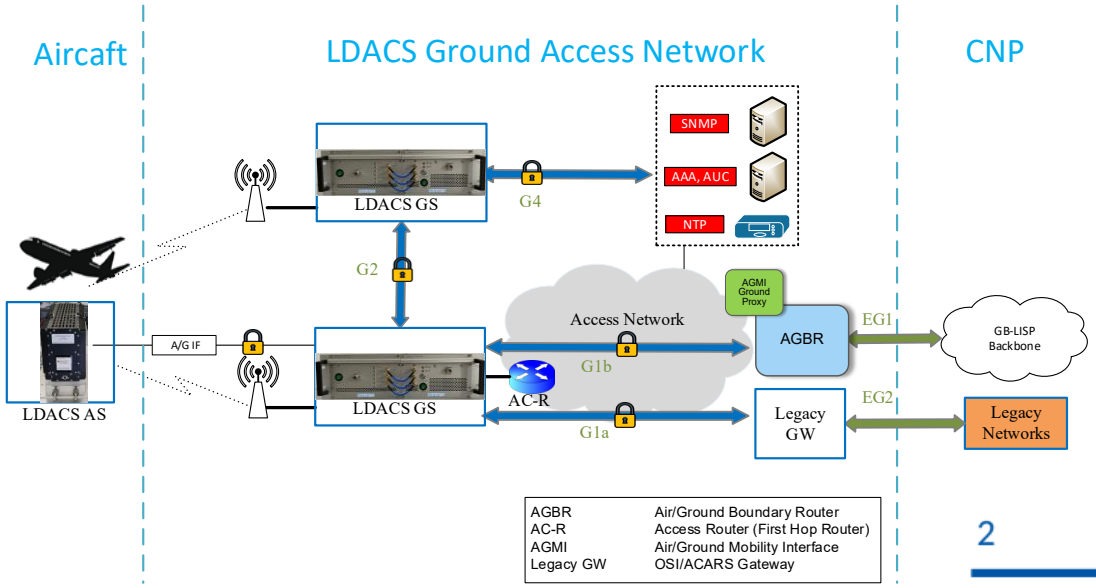
- **Resilient and scalable architecture:** The cellular design ensures high availability and scalable capacity through additional ground stations.
- **Enhanced performance:** Higher capacity and lower latency than existing aviation networks.
- **Operational flexibility:** Traffic prioritisation ensures reliable support for critical ATC and AOC services.
- **Infrastructure sovereignty:** Countries and regions retain control of critical ground infrastructure.
- **Open and competitive ecosystem:** Enables independent provider choice, fostering competition and service resilience.
- **Secure communications:** LDACS authenticates aircraft and ground infrastructure while ensuring message integrity and authenticity.

Ground Station



Antenna Masts

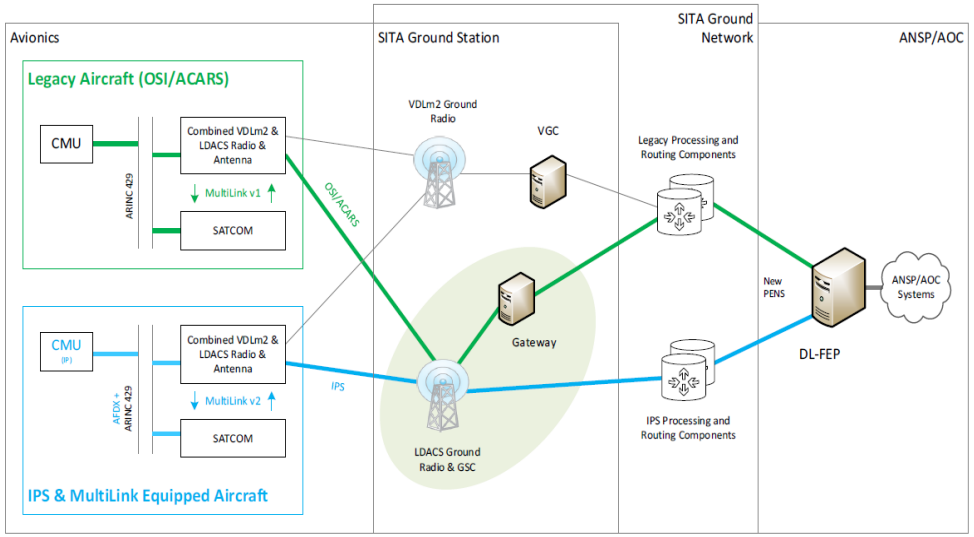


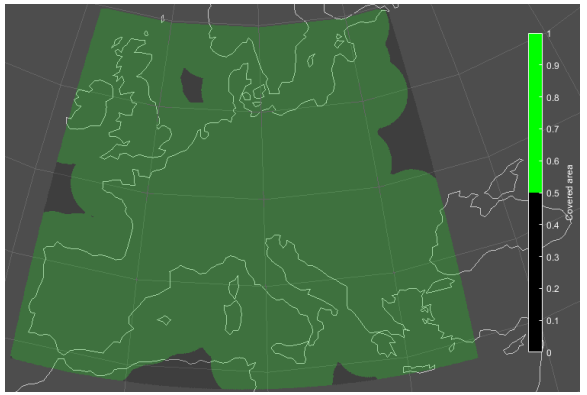


LDACS Deployment Concept ("chicken – egg" problem)

- **Infrastructure reuse and integration:** Combines LDACS capabilities and technological advantages with the existing VDL Mode 2 ground infrastructure.
- **Coverage-capacity balance:** A baseline service of approximately 300 kbps combines wide-area coverage with sufficient capacity
- **Efficient European coverage:** Over 99.9% of continental airspace coverage with approximately 100 ground stations, 15 channels, and only around 10 new sites through VDL2 site reuse.
- **Phased deployment:** Starts in high-traffic areas and expands as needed.
- **Smooth migration:** Operates alongside VDL Mode 2 during the transition.

A phased, cost-efficient deployment with minimal disruption.



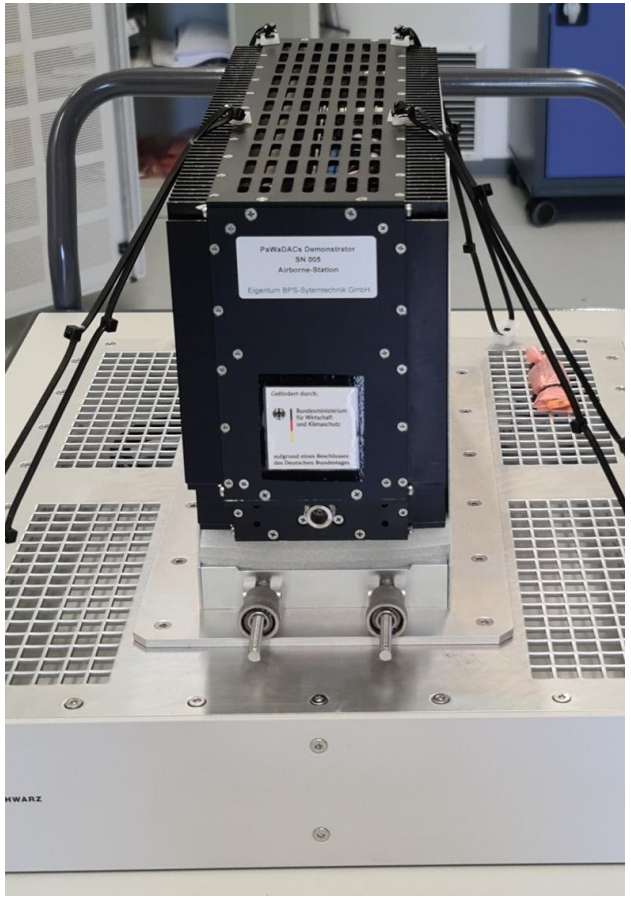


LDACS Advanced Avionic Demonstrators - STATUS

- ARINC 600 case - fully compliant to LDACS requirements
- Addressed technical challenges
  - Power management
  - Sharp spectral mask
  - Power dissipation

- Used for flight tests in SESAR projects FCDI and MIAR
- Used for ICAO IPTF spectrum compatibility tests

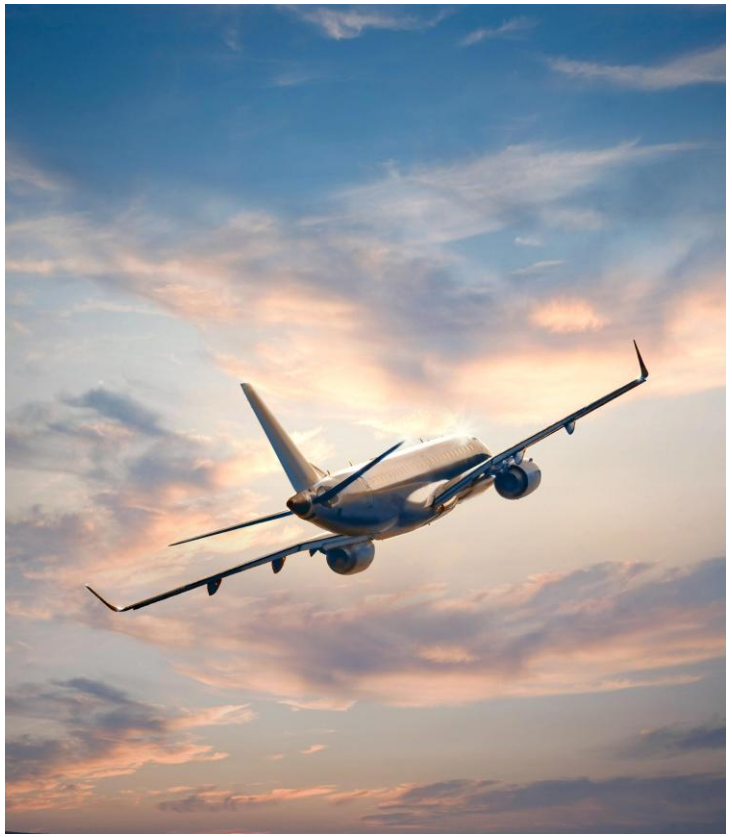
- Adaptation planned for tighter integration in the avionic in **LYCORNE** and **IR03 Early Industrialisation Demonstrator** projects



LDACS Advanced Avionic Component - Gap to deployment

- Technology-independent and application specific gaps to be closed
  - Optimal integration in the avionic bay
    - Stand-alone vs. integrated architecture
  - Antenna integration
    - Dedicated vs. shared VHF/L-band antenna
  - Integration in multilink COM on-board system
  - Address **forward fit** and **retrofit** scenarios

- Drive AEEC/ARINC standardisation



EUROCONTROL PERSPECTIVE

The question is not whether LDACS is promising

The question is when the full solution is ready to be deployed responsibly.

FROM TECHNOLOGY…

…TO A VIABLE OPERATIONAL SOLUTION

EUROCONTROL supports progress, while protecting the credibility of deployment decisions.



Evidence builds conviction. Conviction drives commitment.

DEPLOYABILITY

Five bricks must lock together

No single success, technical or institutional, is sufficient on its own.



DEPLOYABLE SOLUTION = all five bricks are complete, coherent and synchronized

EVIDENCE STATUS

Progress is real, but the evidence base is not yet complete

EUROCONTROL CNS PM is helping turn open questions into measurable deployment conditions.

SURV COMPATIBILITY

SUBSTANTIAL EVIDENCE

Testing has characterised interference mechanisms and operational boundaries.

Residual unit-specific and installation constraints remain.

NAV / DME COMPATIBILITY

WORK STILL TO CLOSE

Existing campaigns provide useful evidence, but concerns and test-plan gaps remain.

Additional agreed testing is required.

IMPLEMENTATION FRAMEWORK

MOVING FORWARD

ICAO, EUROCAE and related activities are progressing.

Frequency planning, guidance and industrial standards must converge.

Operational deployment requires both demonstrated performance and implementation readiness

Self-introduction

Kai Guo

- Associate Professor, School of Electronic Information Engineering, Beihang University (BUAA)
- Member of the **State key Laboratory of CNS/ATM** joined managed by CAAC
- Main Research Areas: aviation communication, aviation navigation, satellite navigation, space weather, etc.
- Technical advisor of the International Civil Aviation Organization (ICAO) communication, navigation and surveillance panel nominated by China

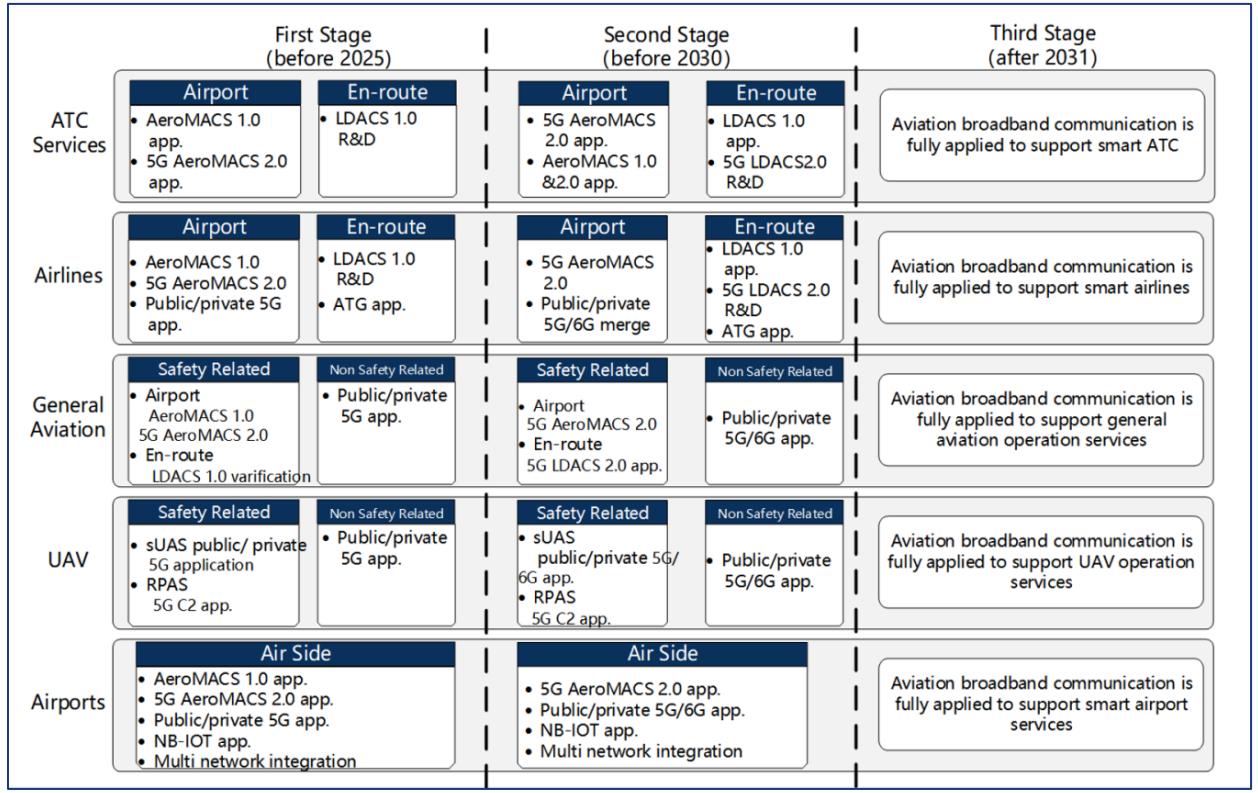
北京航空航天大學
BEIHANG UNIVERSITY

空地一体新航行系统技术全国重点实验室
State Key Laboratary of CNS/ATM

1. LDACS Roadmap in China

Aviation communication roadmap in China

- In April 2021, the "New Generation Aeronautical Broadband Communication Roadmap of China" was released by the CAAC
- The promotion of aviation broadband communication technology is divided into three stages, in which LDACS is considered as one of the main approaches for the aviation communication



CAAC: Civil Aviation Administration of China

2. LDACS Prototype Development

LDACS equipment

- An airborne LDACS equipment is developed following the ARINC600 standards
- LDACS ground station developed following the LDACS SARPs





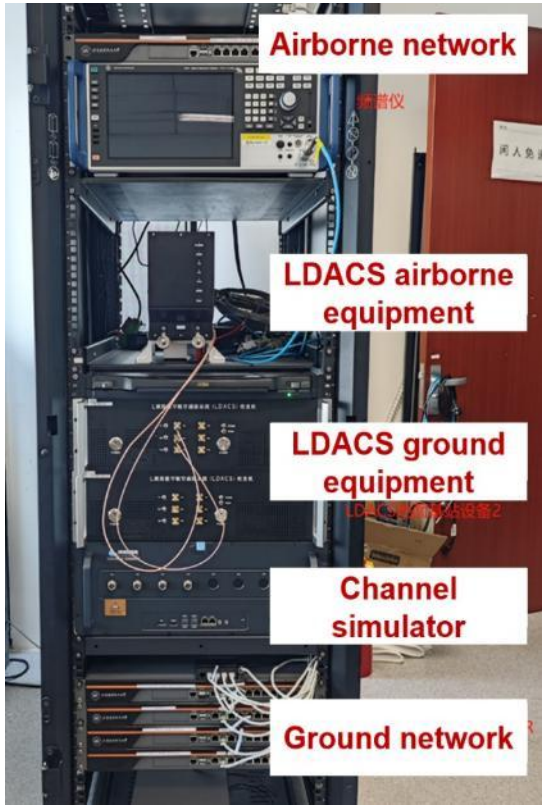


Ground antenna

3. LDACS Validation activities

LDACS test and validation in the framework of ICAO

- LDACS specification verifications
- LDACS compatibility tests with surveillance and navigation equipment
- Multilink validation in cooperation with ADCC and COMAC
- Ground station deployment and frequency assignment feasibility analysis
- …



ADCC: Aviation Data Communication Corporation COMAC: Commercial Aircraft Corporation of China

3. LDACS Validation activities

(1) Validation with drone

- An airborne LDACS equipment is mounted on the drone
- Four stations are deployed to validate the LDACS navigation performance





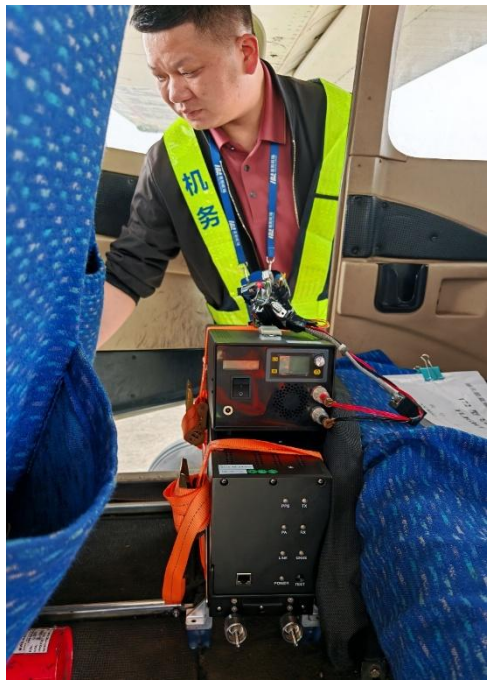
3. LDACS Validation activities

(2) Validation with Cessna 172

- LDACS communication and multilink functionality validation



LDACS GS and antenna





LDACS AS installation

3. LDACS Validation activities

(3) Validation with COMAC C909

- Two ground stations deployed at Nanchang Yaohu Airport





C909 onboard equipment installation and in-flight testing

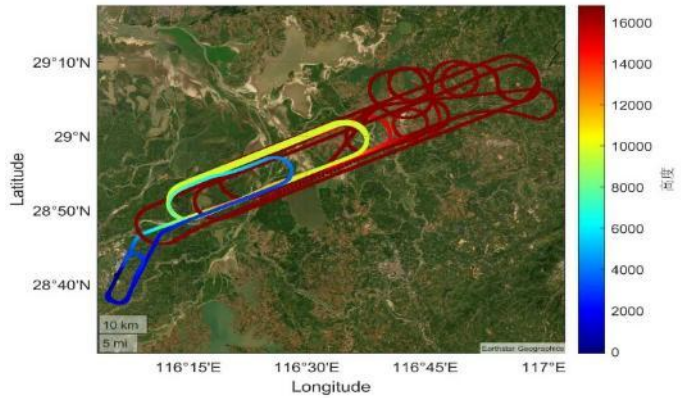
3. LDACS Validation activities

(3) Validation with COMAC C909



Pre-flight GS check







Pre-flight AS check

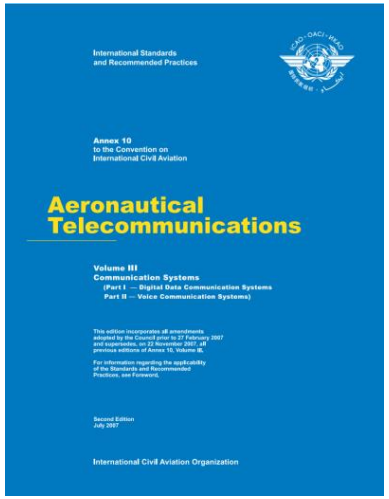


4. Future plans

Near-term plan

- Another 2 LDACS flight trials is planed by 2026 with COMAC C909 (or C919) airplanes to validate the LDACS COM and NAV functionalities
- Collaboration with COMAC to consider install LDACS radio potentially in their future aircrafts
- Validation of LDACS between China and Europe

LDACS Standardization and Development



LDACS Standardization Activity – ICAO

- LDACS PfAs for Annex 10 Vol III and V have been endorsed by ICAO Communication Panel in April 2026
- ICAO ANC preliminary review in Oct./Nov. 2026 with subsequent State-Letter-Process
- Update LDACS PfAs according to comments, ICAO ANC final review November 2027
- LDACS applicability in November 2028

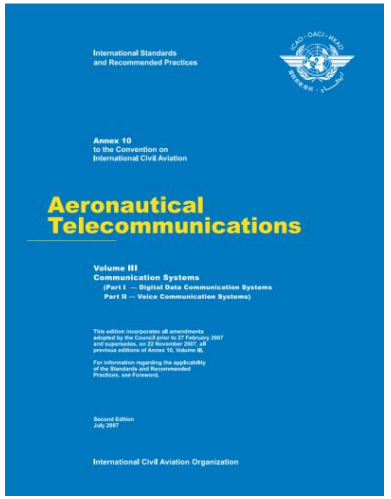
LDACS Standardization Activity – EUROCAE

- Development of MASPS, MOPS, and Interoperability Document
- MOPS and Interoperability Document: OC by November 2027, publication by May 2028
- MASPS: OC by March 2028, publication by September 2028

LDACS Standardization Activity – ARINC/AEEC

- Under initiation, start planned for end of 2026
- Planned finalization: November 2028

LDACS Standardization and Development



Development of ICAO Guidance Material

- LDACS Manual (ICAO Doc 10172)
  - Part I covers functionalities, capabilities, performance
  - Part II comprises additional guidance material
- Update of Handbook on Radio Spectrum Requirements for Civil Aviation (ICAO Doc 9718)

Next LDACS Activities

- SESAR project MIAR: Achieving TRL 6 for airborne LDACS (ground LDACS is already TRL 6)
- SESAR project LYCORNE: demonstrate ACARS over LDACS, digital voice over LDACS
- Planned LDACS industrialization demonstrator project (elevate TRL 6 to 7/8)
- LDACS flight trials in China with COMAC C909 scheduled for end of this year
- LDACS ATN/IPS demonstration in China planned for 2027

And Now: Your Questions

???

???

???

Thank You


MONTRÉAL
HQ
PARIS
Office
BEIJING
Sub-office
CAIRO
Office
MEXICO CITY
Office
DAKAR
Office
BANGKOK
Office
NAIROBI
Office
LIMA
Office
NADI
Liaison Office

Session 4

Surface Safety Redefined: High-Integrity Connectivity via AeroMACS

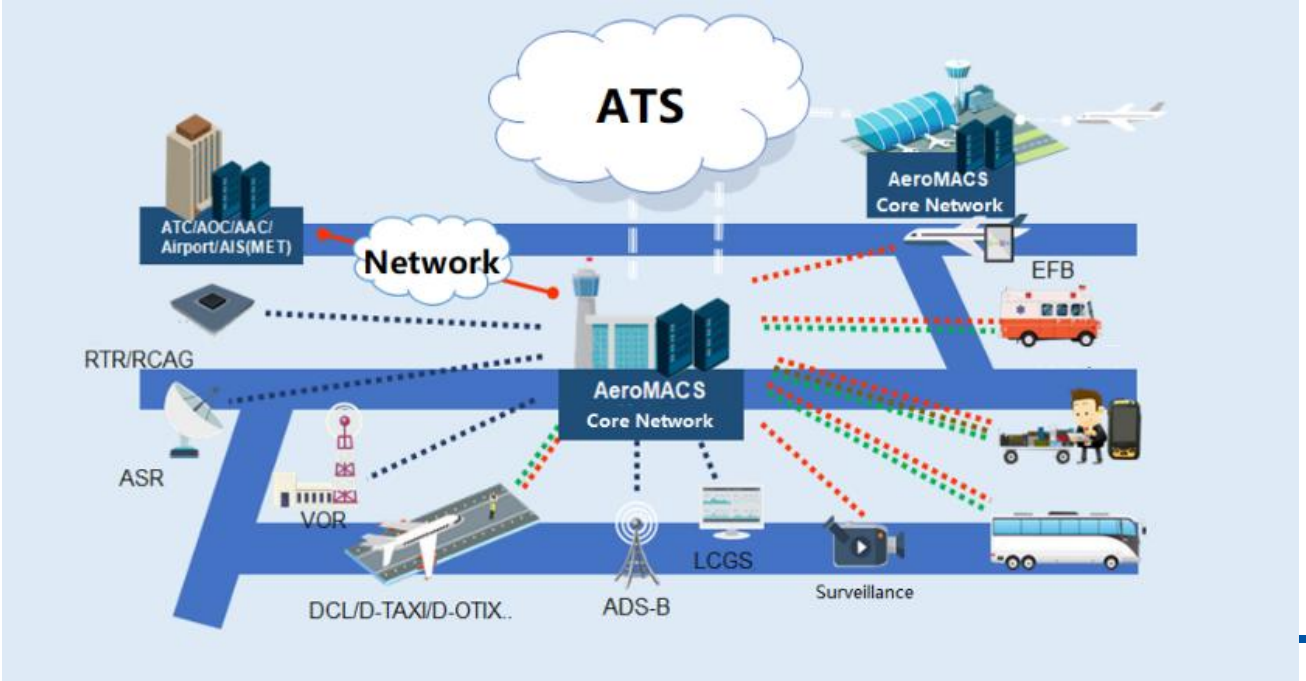
Panel Moderator:

Gulam, Raza Ali Hussein

ICAO

AeroMACS =

Aeronautical Mobile Airport Communications System



Question to audience:
Looking at airport surface communications over the next 5–10 years, where do you see the primary operational backbone?"

Slido / Mentimeter / App

A) Dedicated AeroMACS (Protected C-Band spectrum)

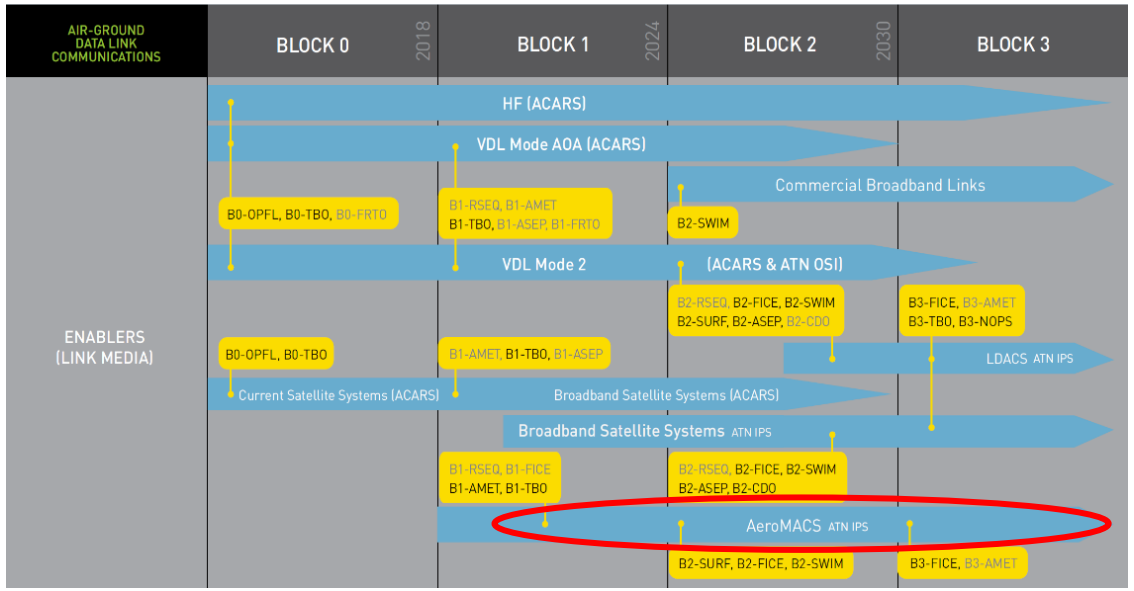
B) Commercial / Private Airport 5G / LTE

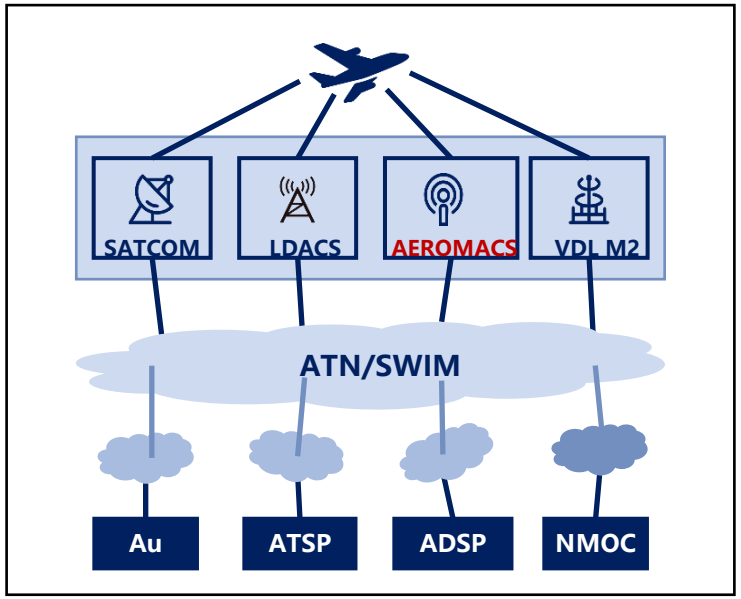
C) A hybrid model (AeroMACS for safety-critical ATC/AOC; 5G/Wi-Fi for non-safety ground ops

D) We will stretch legacy systems (VHF, TETRA, airport Wi-Fi) as long as possible

AeroMACS Techniques

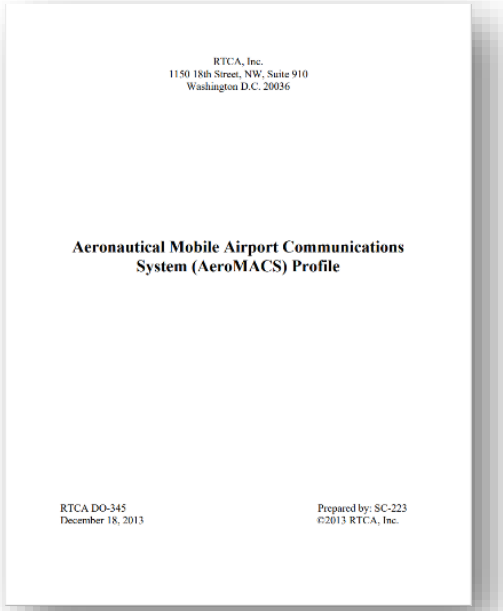
- AeroMACS: a high-capacity data link that supports mobile and fixed communications related to flight safety and regularity on the airport surface
- AeroMACS is included as the next-generation communication technologies in ICAO ASBU plan and FCI





AeroMACS Techniques

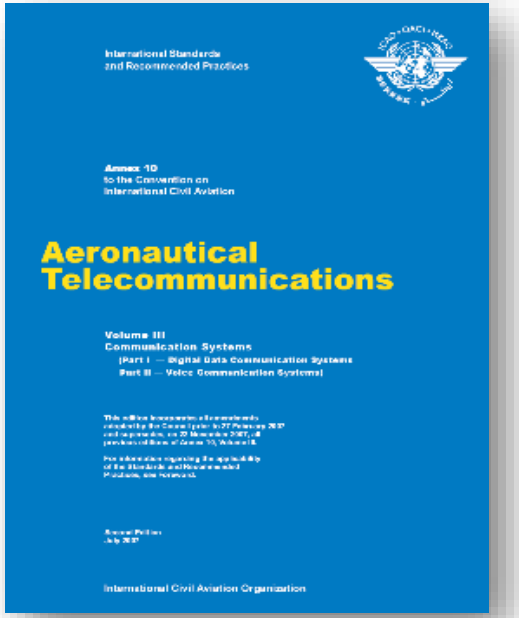
- Standard documents were developed for AeroMACS



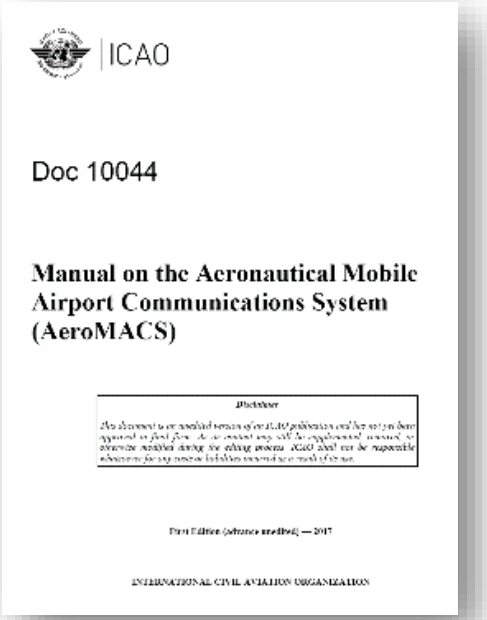
RTCA DO345



EUROCAE ED222



ICAO Annex 10 Chapter 7



ICAO DOC10044

1. AeroMACS Techniques

AeroMACS Techniques – key features

- Frequency range: 5030MHz-5150MHz
- Carrier bandwidth: 5MHz
- Supports high-speed mobility: ≤120Km/h
- Signal diffraction capability: supports non-line-of-sight transmission in multipath environments
- Flexible network architecture: flexible channel selection
- High security: supports network security system



1. AeroMACS Techniques

Current technical limitations

- WiMAX technology over 15 years
- Industrial chain still incomplete
- The low communication rate cannot meet ubiquitous interconnection





1. AeroMACS Techniques

Advanced technologies

- Fast development of air transportation system: higher requirements on communication capabilities in the aerodrome environment
- New technologies, such as 5G, offer better spectrum efficiency and performance





1. AeroMACS Techniques

Why 5G AeroMACS?

- Higher Bandwidth: high bandwidth of up to **350 Mbps**
- High-speed mobility support: **up to 300 km/h**
- Better Coverage: larger coverage range and more reliable connections across the airport's movement and operation areas
- Enabling new collaborative operations …



2. 5G AeroMACS International Standards

AeroMACS standardization in ICAO

- Oct. 2022, CP-DCIWG/6: Maintenance Working Group (WG-M) is reestablished for the maintenance of Annex 10 Vol. III
- WG-M is developing the proposal for Amendment for AeroMACS to make it technology agnostic. Six meetings from 2023 to 2026 were held.
- Validation activities are running in parallel
  - Beihang University
  - Skyblue Aviation Technology (Hefei) Co. Ltd.
  - …

3. Applications of AeroMACS

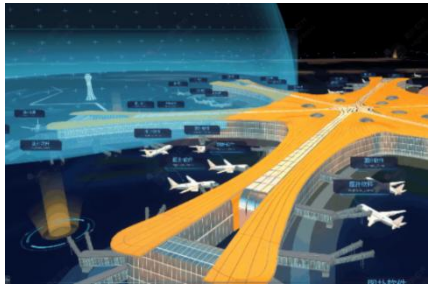
Application scenarios



Efficient Aircraft Guidance



Airport Safe Operation



Airport Apron Resource Management



Smart connected airport operations network



Remote Collaborative Management

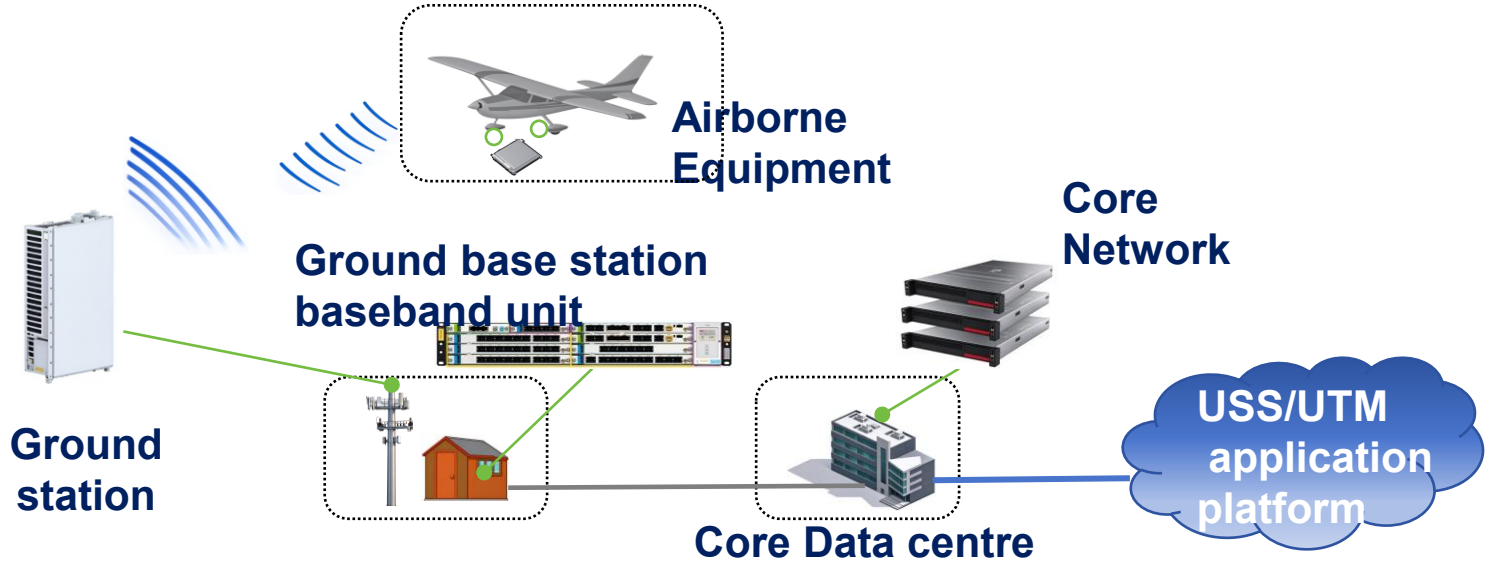
Dedicated network	→	**collaborative communication for civil aviation air traffic control, airports, airlines, and other operations**
High bandwidth	→	**high-bandwidth applications like video and images**
Low latency	→	**controlled and coordinated vehicle operation scenarios**
Mass connection	→	**scenarios with a large number of users online at the same time**



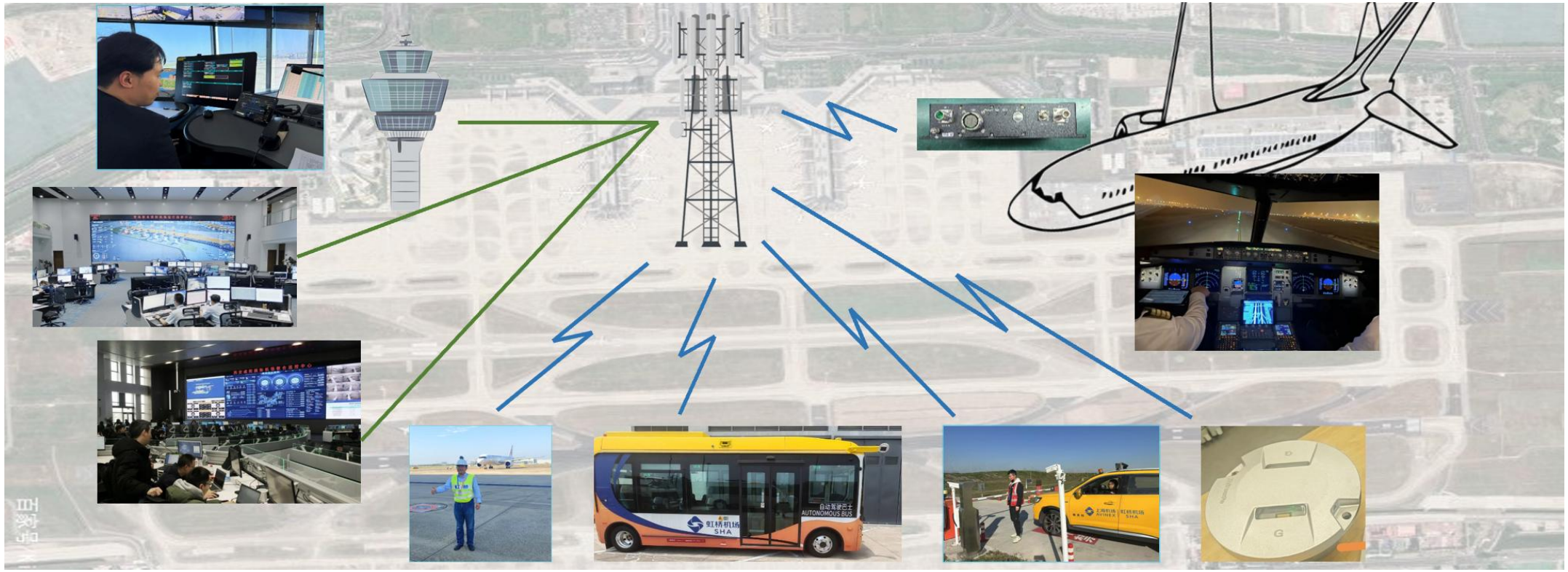
4. Potential Applications of AeroMACS

Extended applications

- Potential extend the service area from airport to approach, takeoff, and even terminal areas
- Potential extension for RPAS C2 links



Applications of 5G AeroMACS



Overview

01 Construction of 5G AeroMACS network of airport in China

02 Applications of 5G AeroMACS network in airport

03 Key Performance Results

01. Construction of 5G AeroMACS network of airport in China

2019

Initiate research on 5G AeroMACS-related software and hardware products

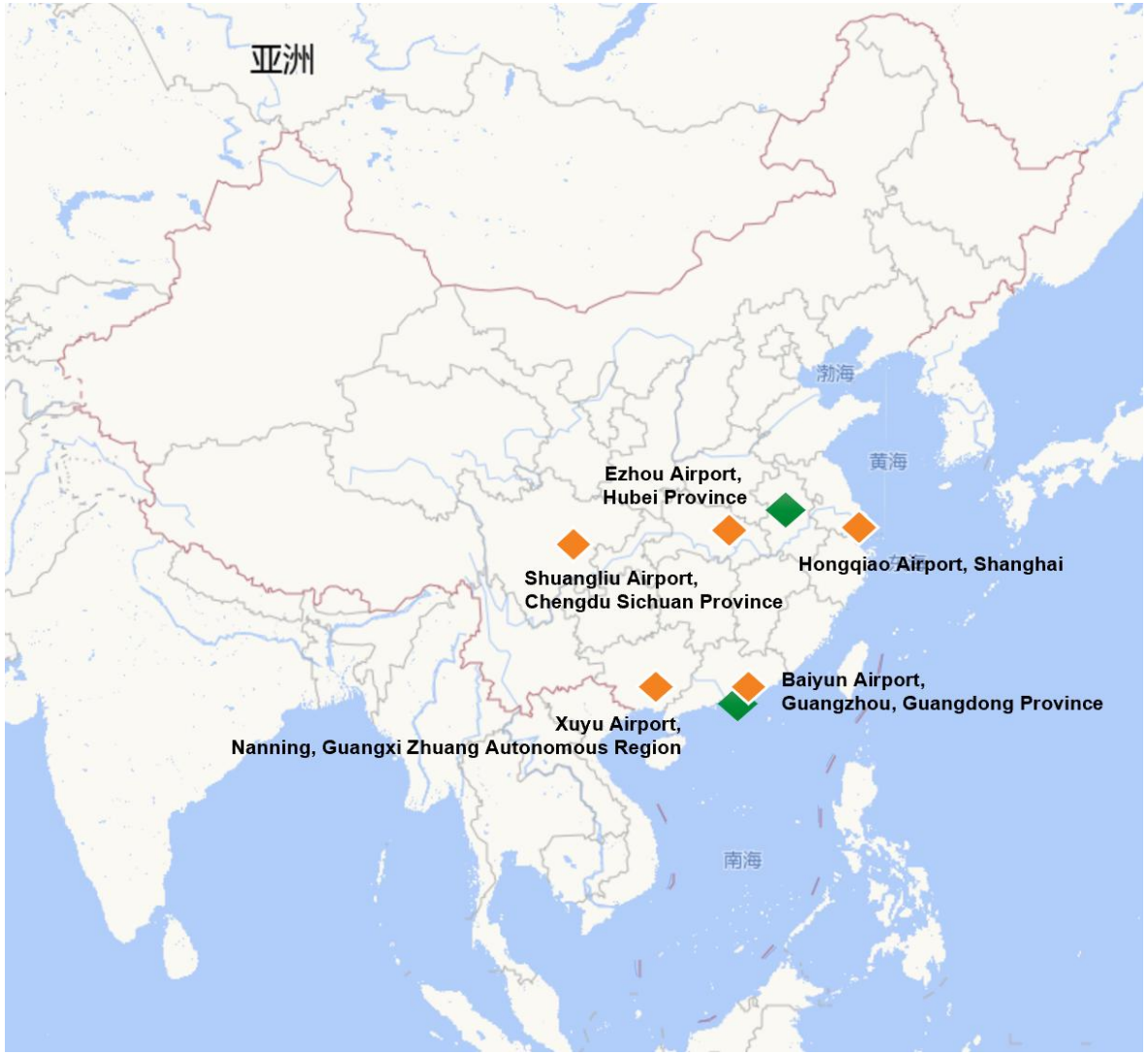
Network setup and testing at the test airport

2021

Network deployment and application testing at Shanghai Hongqiao Airport

2024

Network deployment and business scenario operation testing at more airports, including Guangzhou Baiyun airport, Chengdu Shuangliu airport and Ezhou Huahu airport.



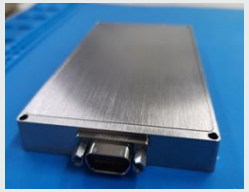
Network construction

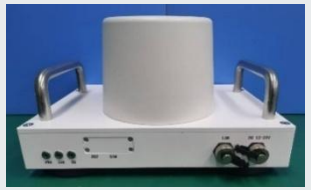
Supported by CAAC

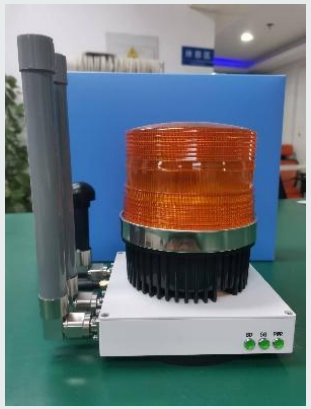
The 5G AeroMACS network covering the airport has been established **5**

A verification network for 5G AeroMACS has been established **2**









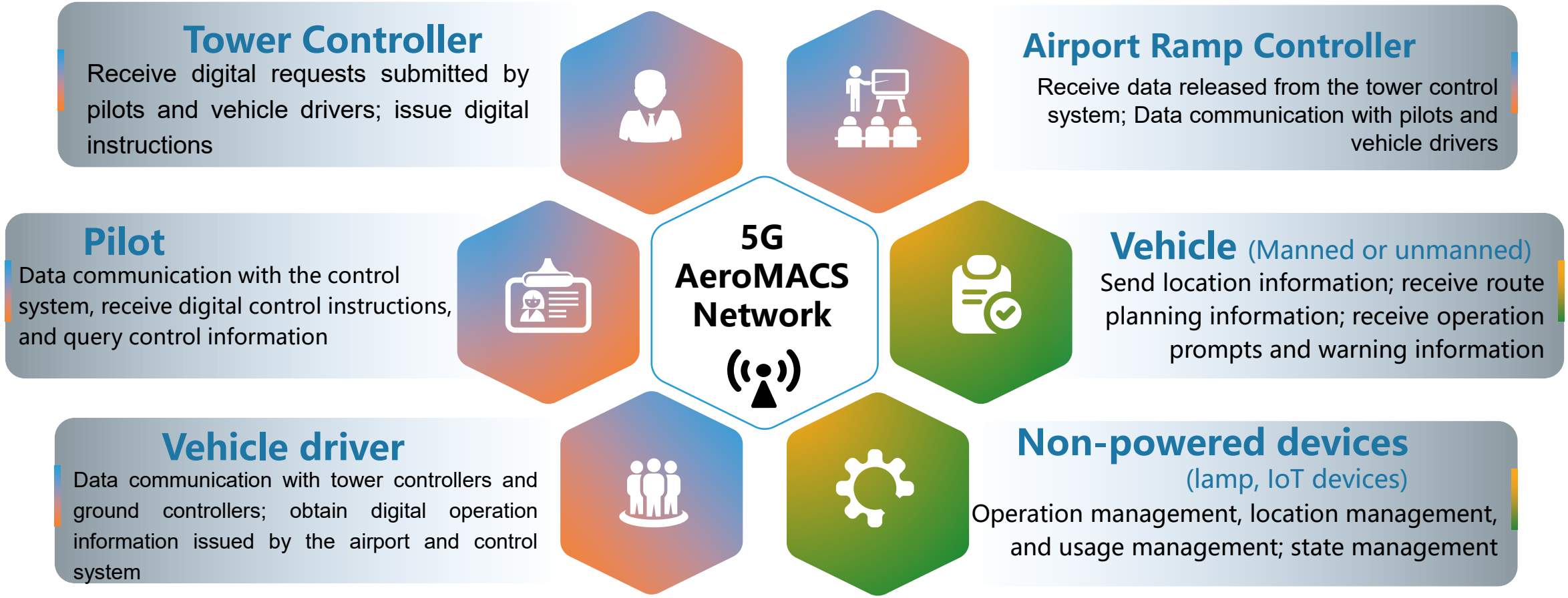

Hardware

1) Ground station
2) Avionics/antenna
3) in-vehicle terminals
4) outdoor terminals
5) navigation lights
6) 5G AeroMACS module

5G AeroMACS ground station **130+**

5G AeroMACS terminal **600+**

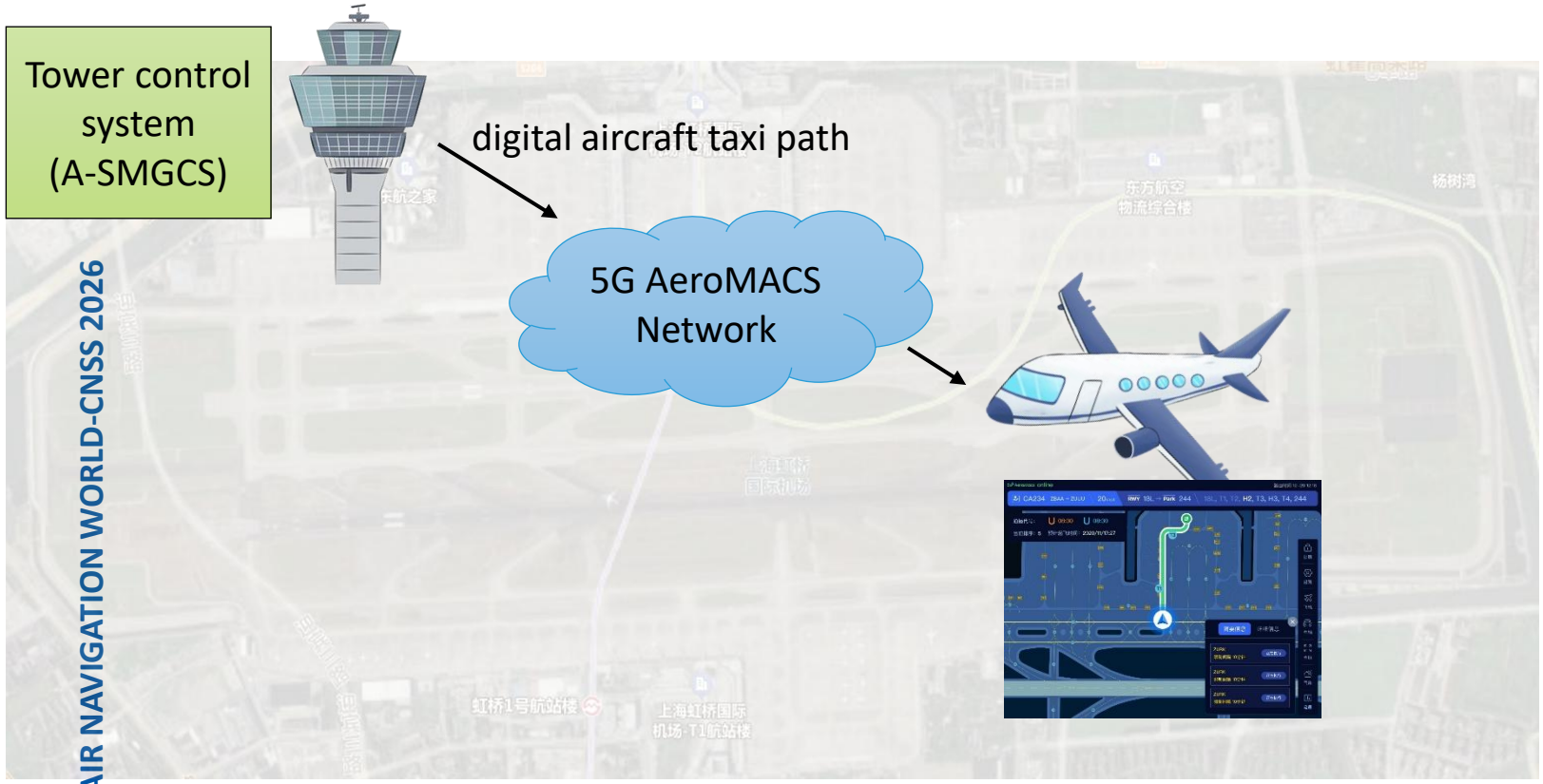
02. Applications of 5G AeroMACS network in airport



Application scenario:

1. Advanced airport surface guidance

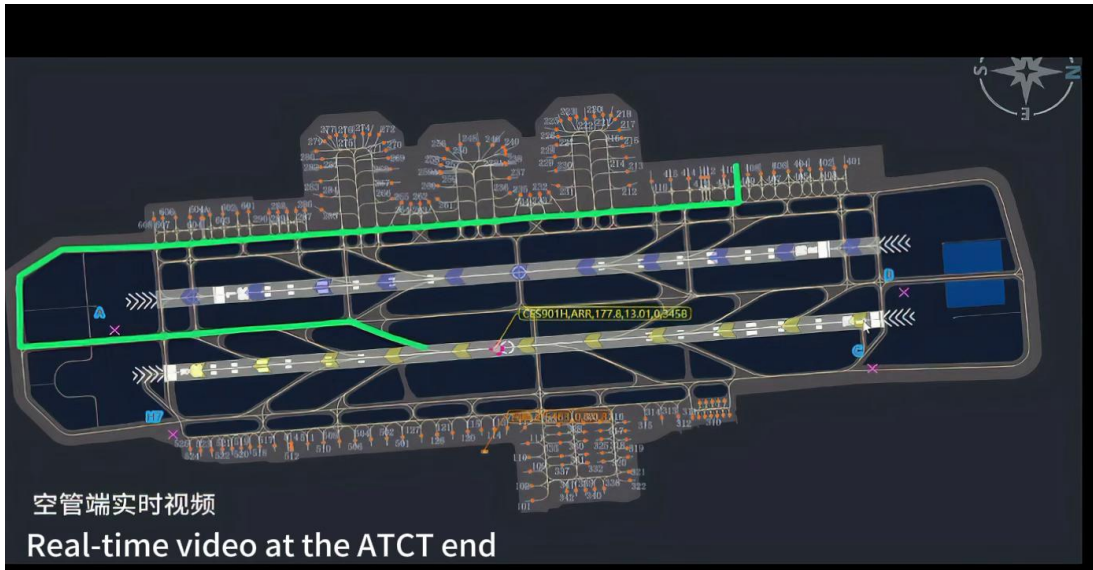
- Cockpit visual guidance for TAXI

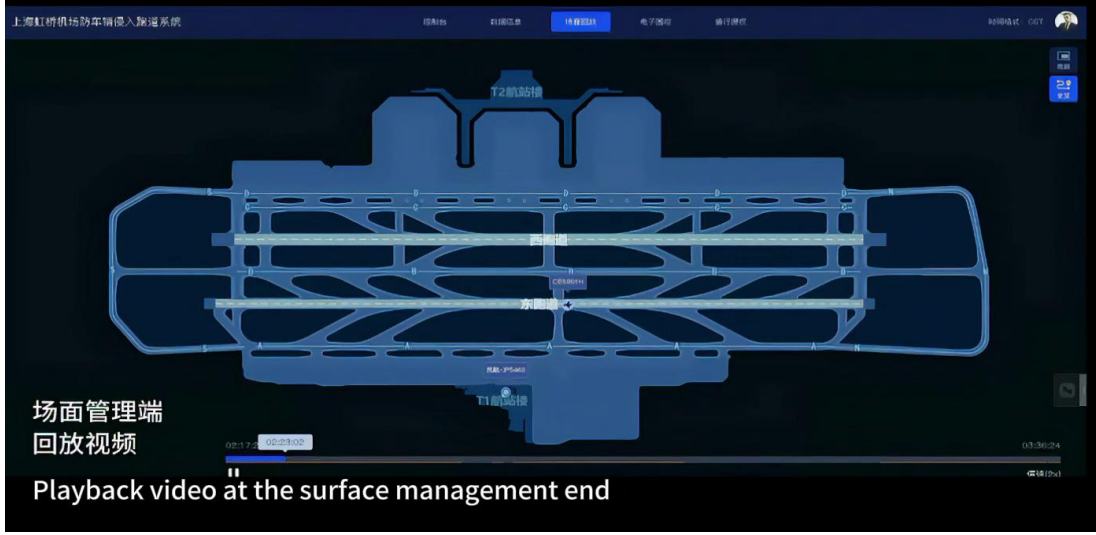




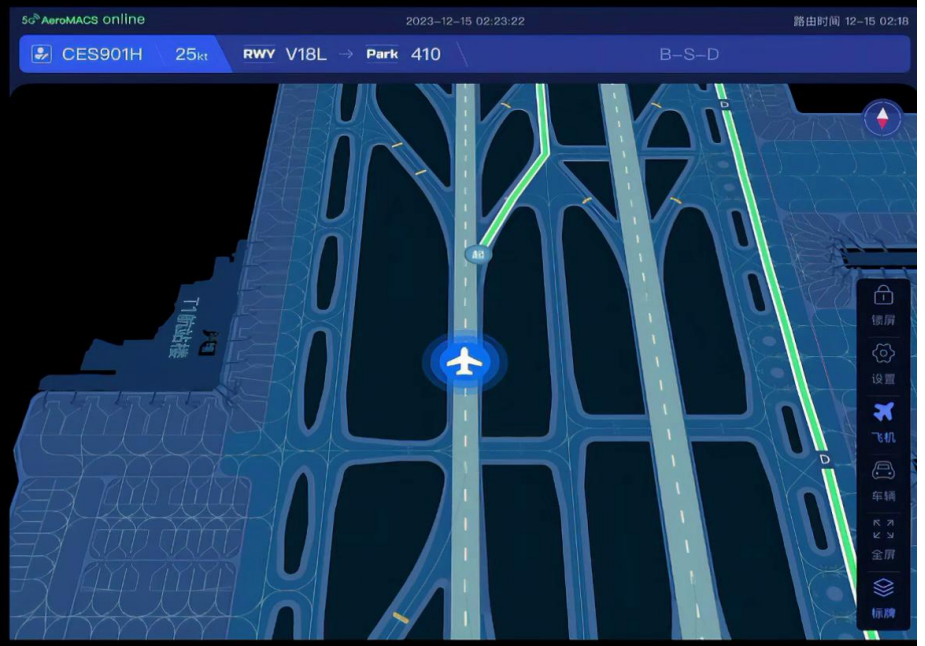


Cockpit visual guidance





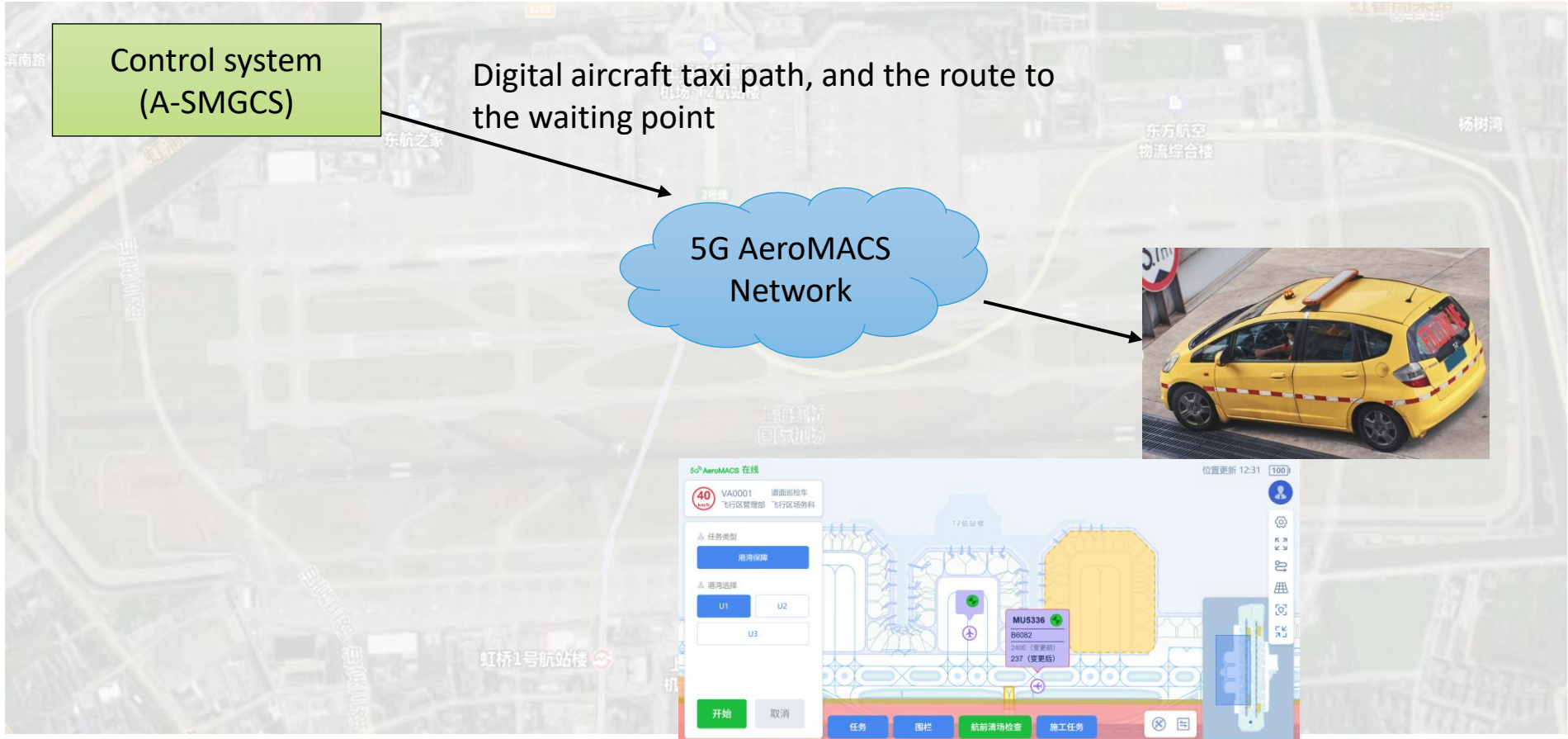
Real-time video at the aircraft end (with voice broadcast)
航空器端实时视频（含语音播报）



Application scenario:

2. Advanced airport surface guidance

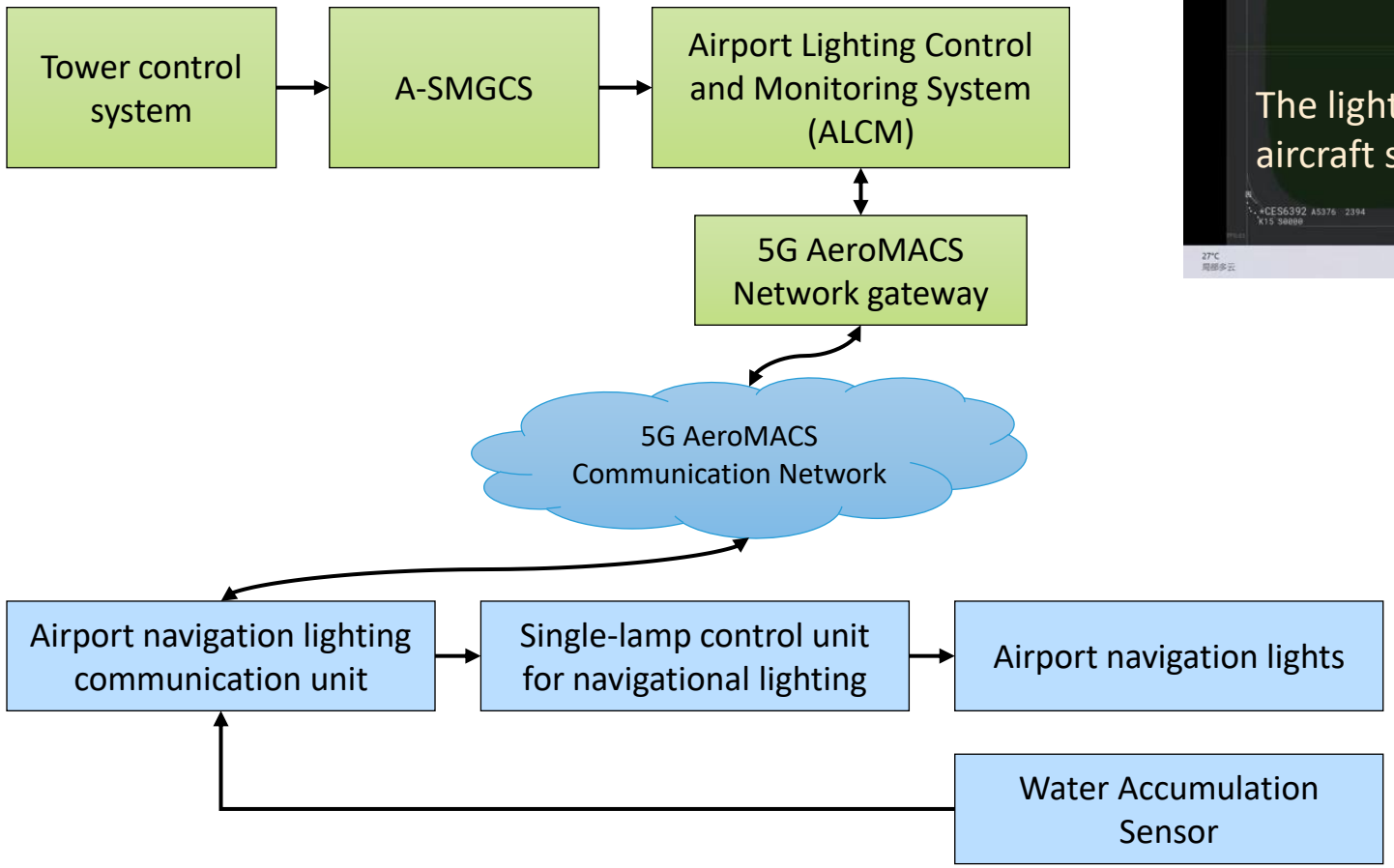
- Visual guidance for follow me car



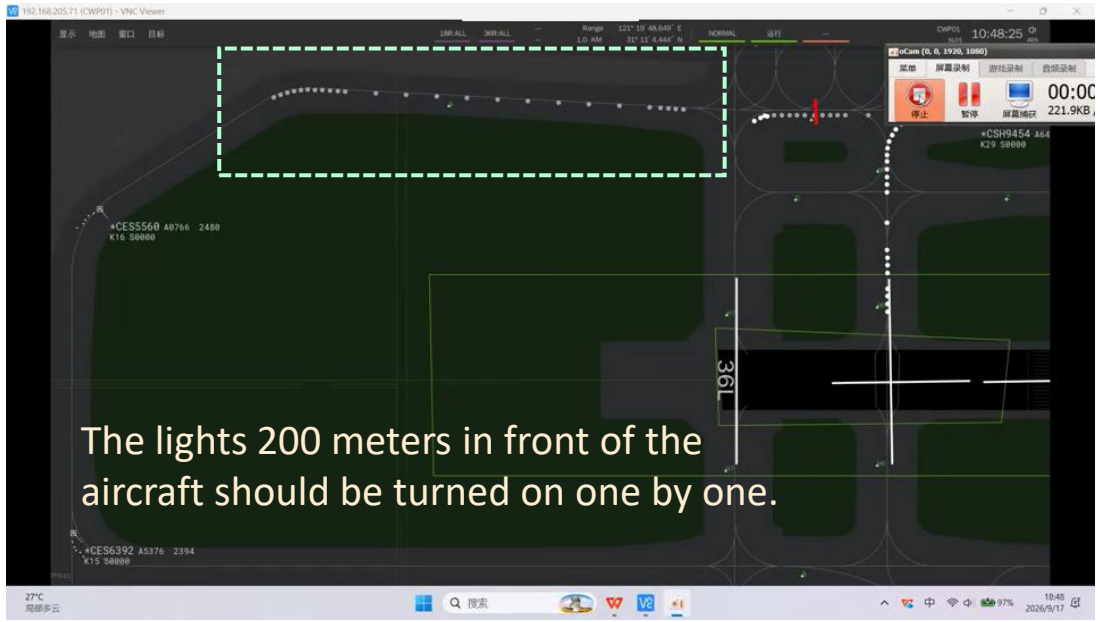
Application scenario:

3. Advanced airport surface guidance

- Wireless navigational lighting



Enable wireless control of each individual light

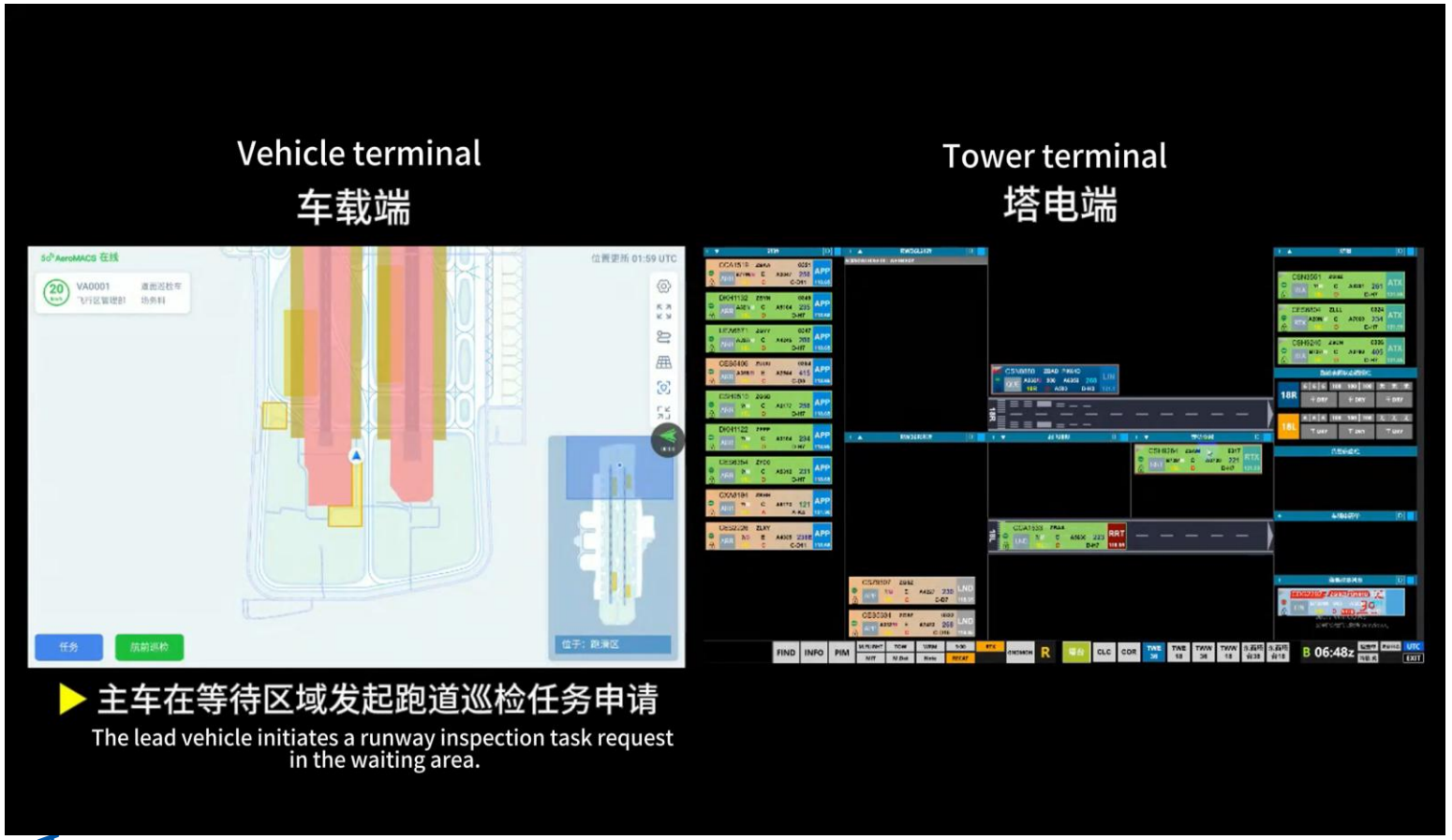






Application scenario:

4. Runway Incursion Prevention for Ground Vehicles





Runway inspection



Pre-flight clearance inspection

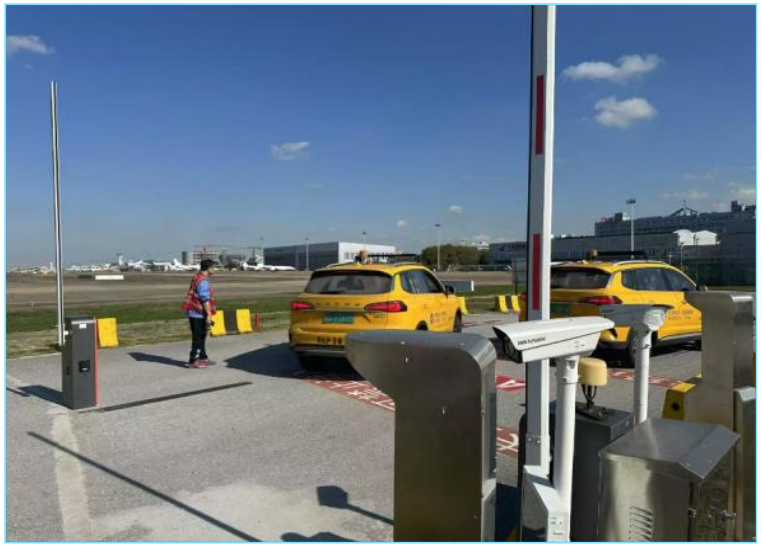
Application scenario:

5. Runway Incursion Prevention for Ground Vehicles

- Smart barrier gate

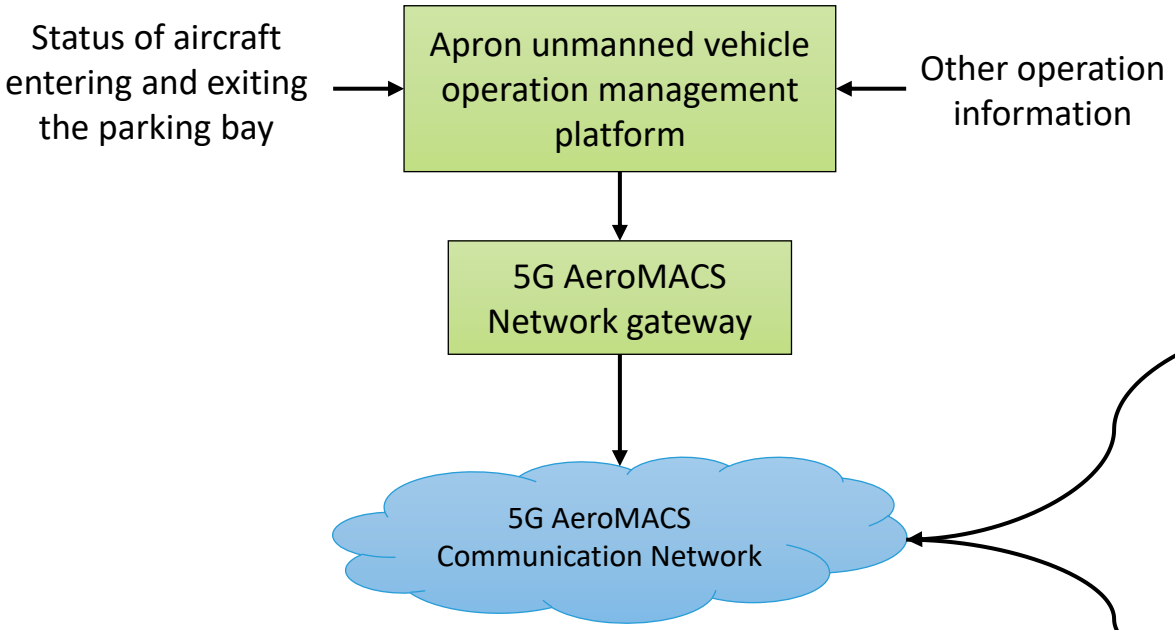
- Based on the 5G AeroMACS network, by means of "verifying license plates, detecting driver's faces, and automatically opening the gate", authorized vehicles are controlled to enter the run-off area
- intelligent control of vehicle access in the run-off areas is achieved, preventing unauthorized vehicle intrusion from the source and enhancing the safety of field operations





Application scenario:

6. Autonomous & Unmanned Apron Vehicle Operations



↑ Uplink: location information
video data both inside and outside the vehicle

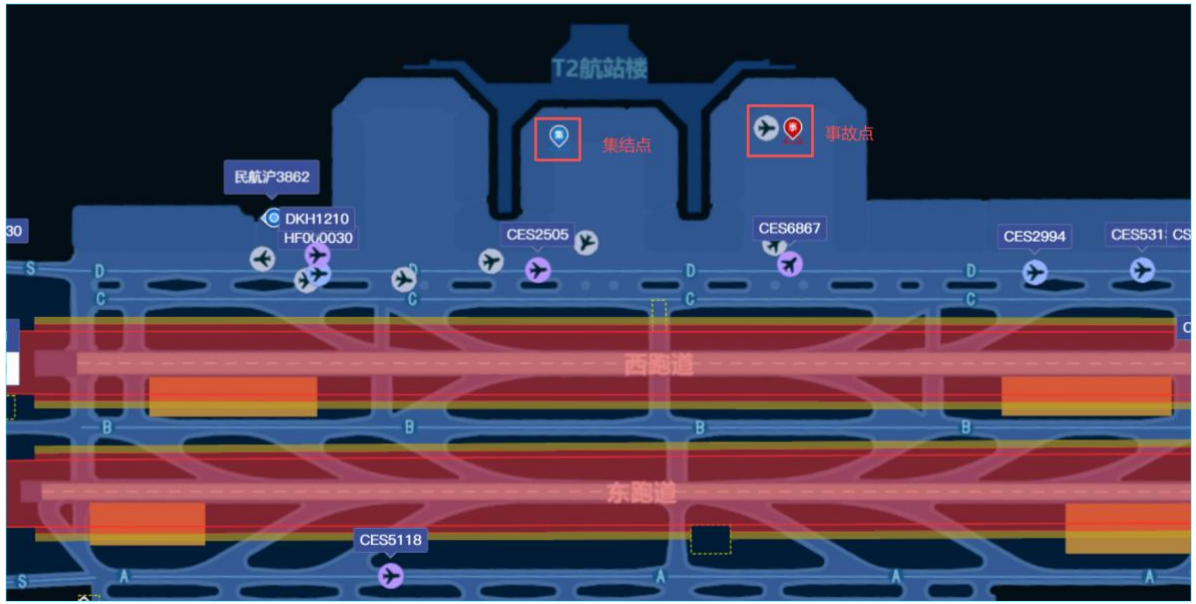
↓ Downlink: Vehicle start and stop information



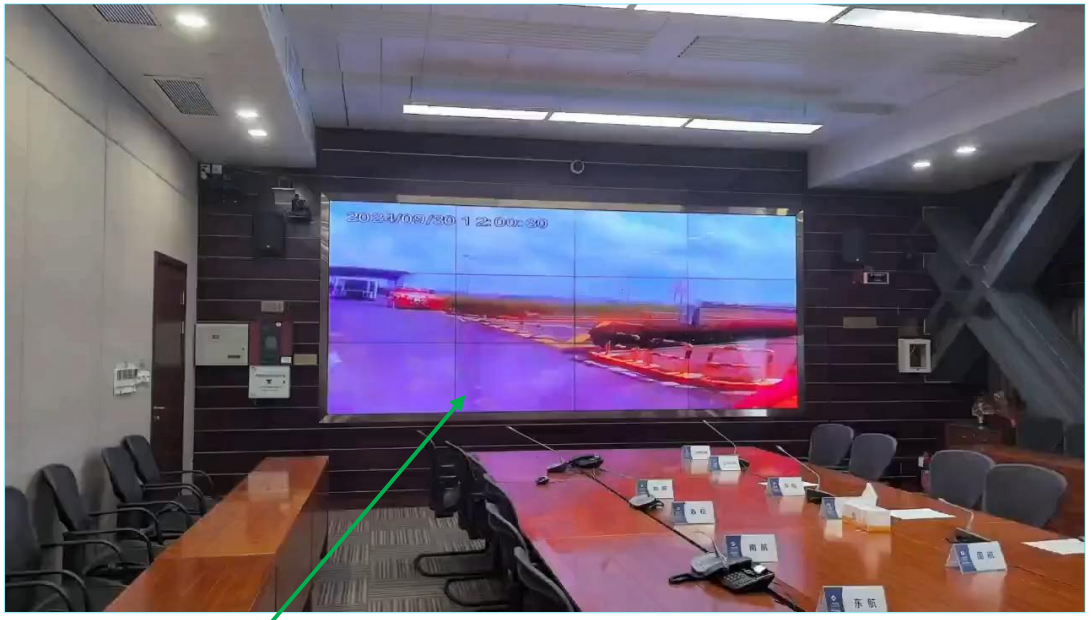


Application scenario:

7. Airside Emergency Management & Rapid Dispatch



Web-based terminal of emergency management system



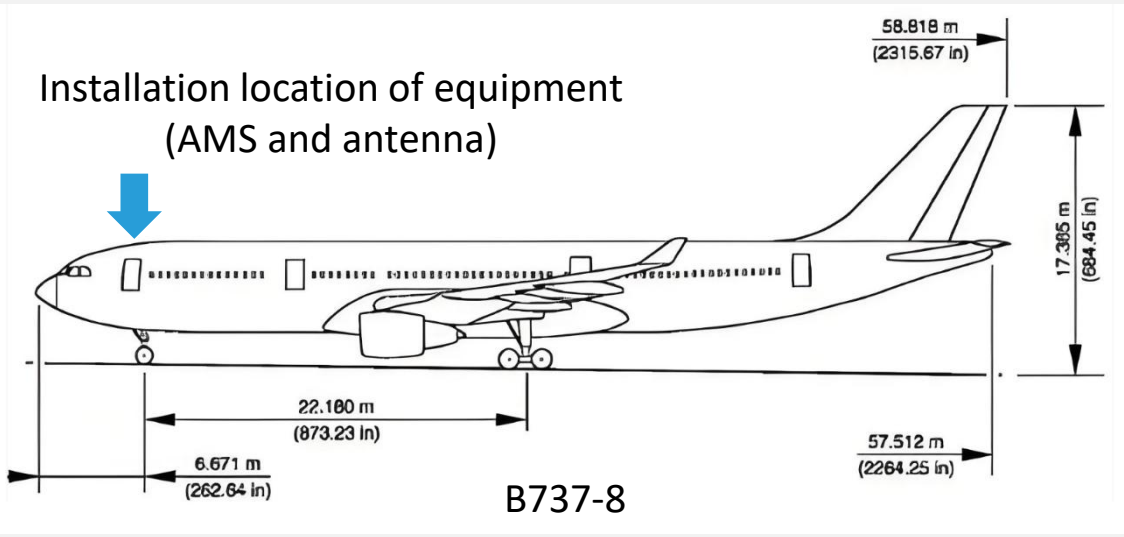


Camera connected to the 5G AeroMACS network

Application scenario:

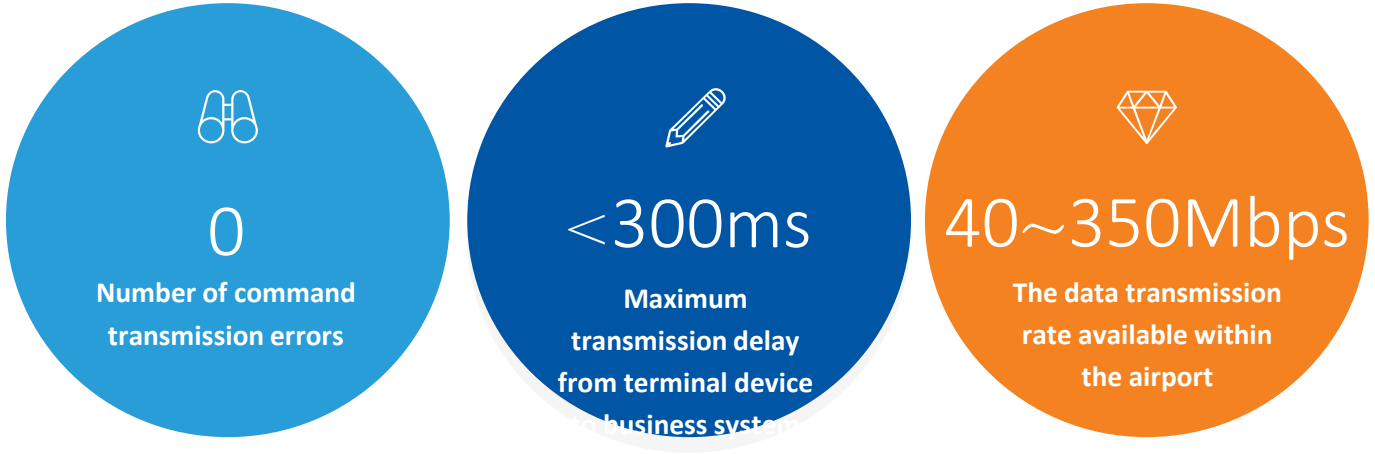
8. Aircraft Datalink: EFB Uplink & Flight Data Offload

- Downloading of cockpit voice recorder data
- Download QAR data from aircraft
- Uplink and downlink D-ATIS information
- Uplink data to EFB



B737-8

03. Key Performance Results



Runway Incursion Prevention for Ground Vehicles (data from Shanghai Hongqiao Airport)

任务类型 Task type	任务申请次数 Number of task request	任务完成次数 Number of task completions	任务撤销次数 Number of task cancellations
跑道巡检 runway inspection	3701	3422	279
航前清场检查 Pre-flight clearance inspection	109	93	16
应急巡检 Emergency runway inspection	788	787	1
合计 Total	4598	4302	296
2024/07/06 00:00:00 - 2026/09/29 23:59:59			

Q & A

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Thank You


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Session 6

Evolution of Network Architectures

Session 6 – Evolution of Network Architectures

Overview

With the Aeronautical Telecommunication Network using the Internet Protocol Suite (ATN/IPS) standards now adopted, this session provides guidance for ANSPs and airlines transitioning to modern IP-based network architectures. The discussion will highlight what implementation will look like from their perspective. Where do they start from and any practical guidance. A major highlight is the transition to VoIP (Voice over IP), a transformative application that unlocks significant operational efficiencies.

The panel discussion will focus on the shift from legacy protocols to a modern IP-based global network architecture, essential for high-integrity data exchange. Attendees will gain insights into the new SARPs and guidance material developed for global interoperability and the integration of cyber resilience to protect communication infrastructure. By standardizing these IP-enabled pathways, a secure, scalable foundation is now in place for further enhancements. Furthermore, some of the implementation challenges will be discussed.

Moderator

Mr. Liviu POPESCU - EUROCONTROL
Senior Team Leader

Panelists

Ms. Kathy TORRENCE - FAA
Director (A), NAS Systems Engineering & Integration Office

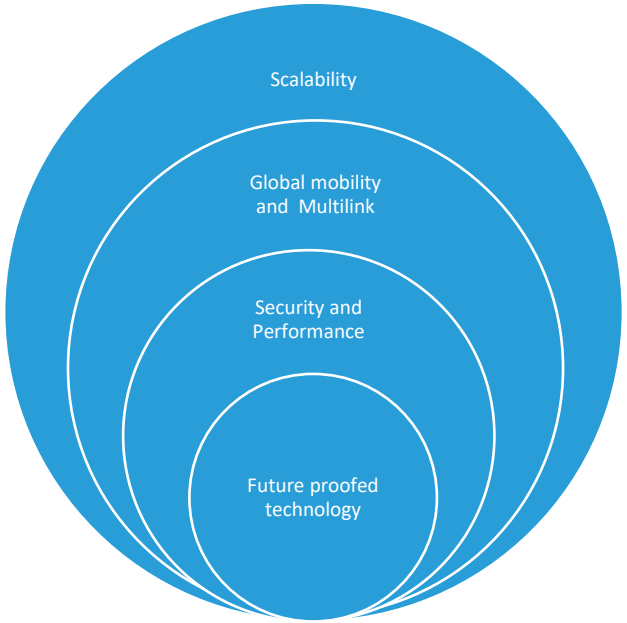
Mr. Stephane PELLESCHI - COLLINS AEROSPACE
Technical Fellow

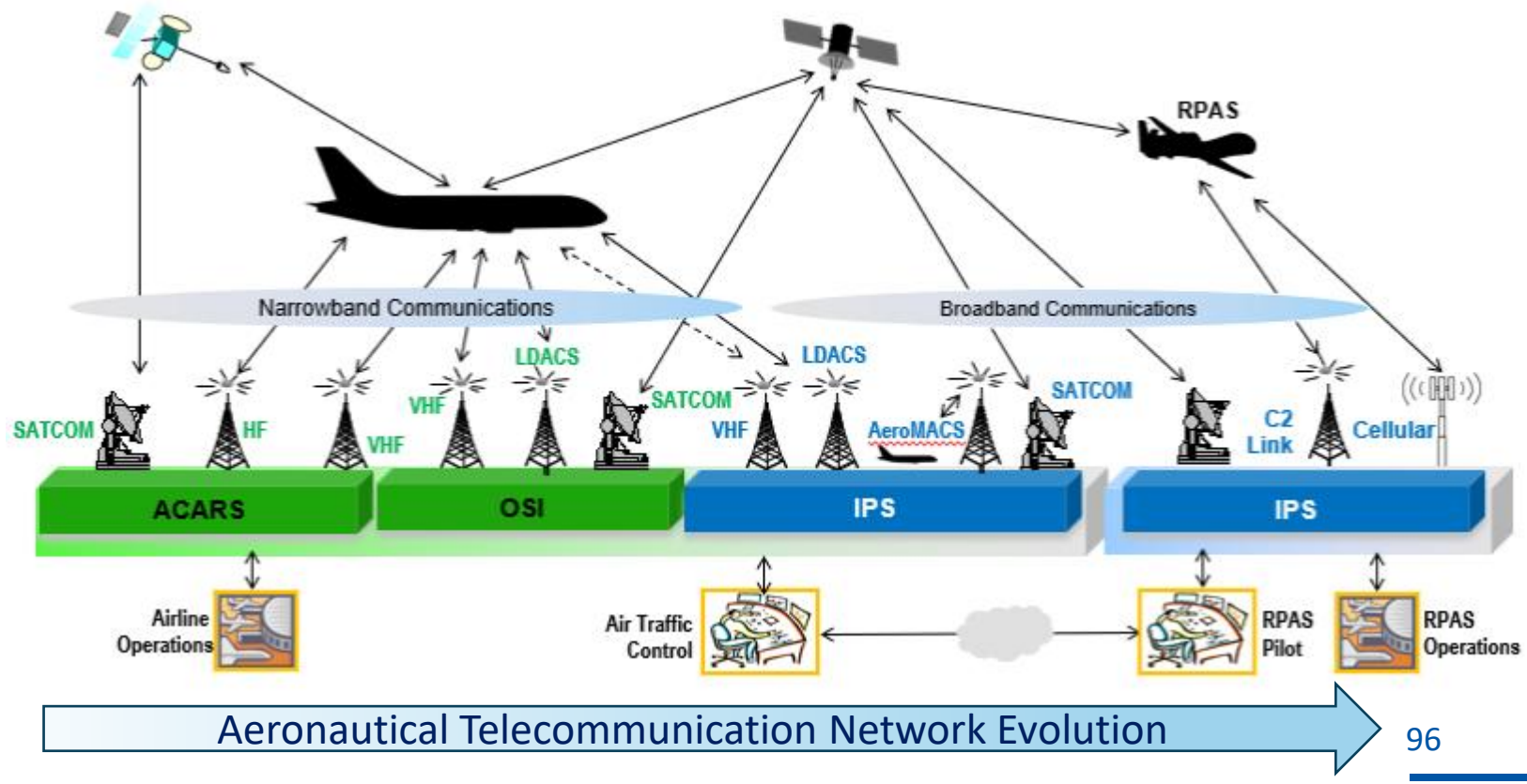
Mr. Bernhard HAINDL - FREQUENTIS
Principal scientist

Mr. Michal SKOREPA - HONEYWELL AEROSPACE
Sr. Scientist and Technical Supervisor

Evolution of Networks Architectures

Internet Protocol Suite - IPS

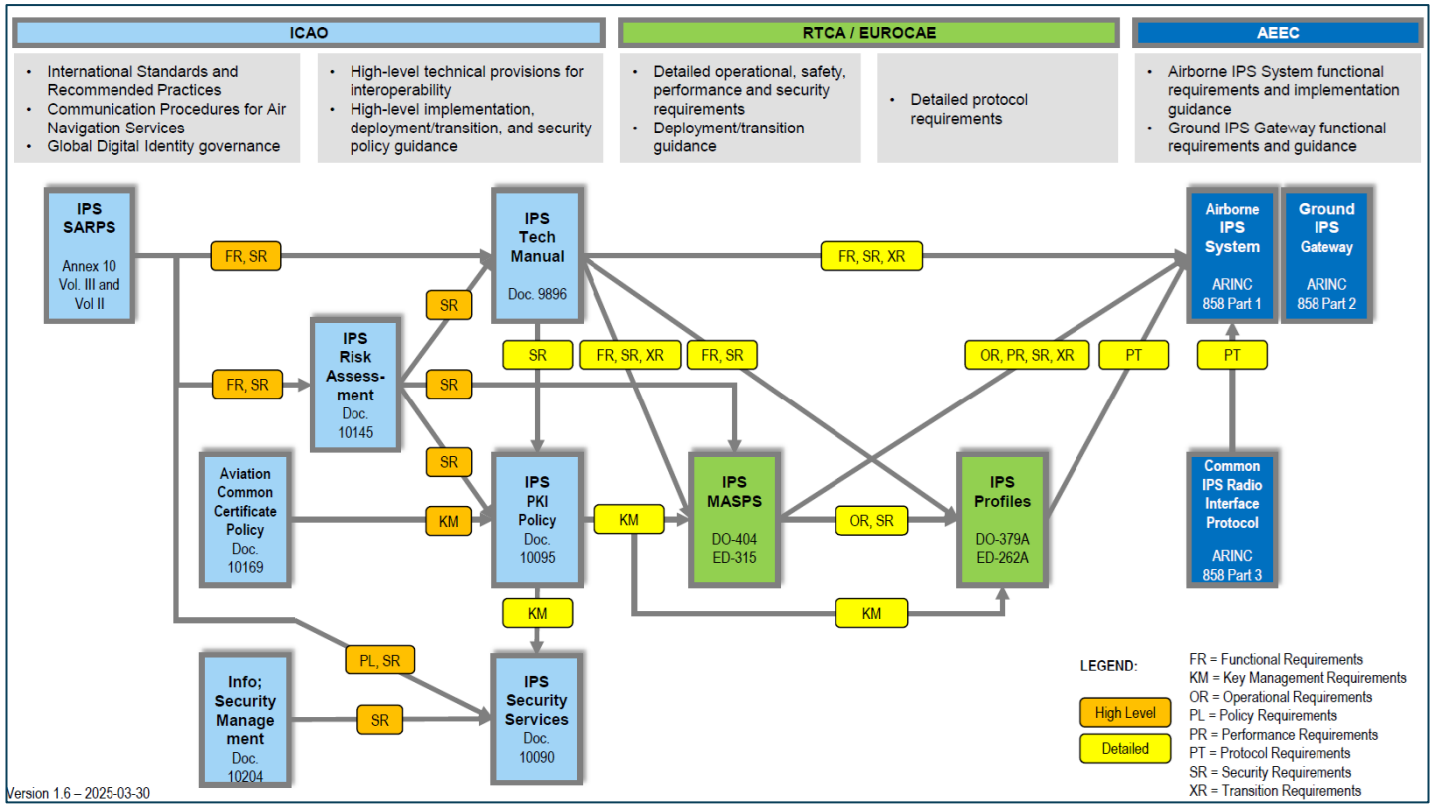




Aeronautical Telecommunication Network Evolution

Evolution of Networks Architectures

Internet Protocol Suite - IPS



ICAO GANP Portal

COMI-B4/3 PERFORMANCE BASED MULTILINK
COMI-B4/1 AIR-GROUND ATN/IPS
COMI-B1/1 GROUND – GROUND ATN/IPS

Standards ready (2026)

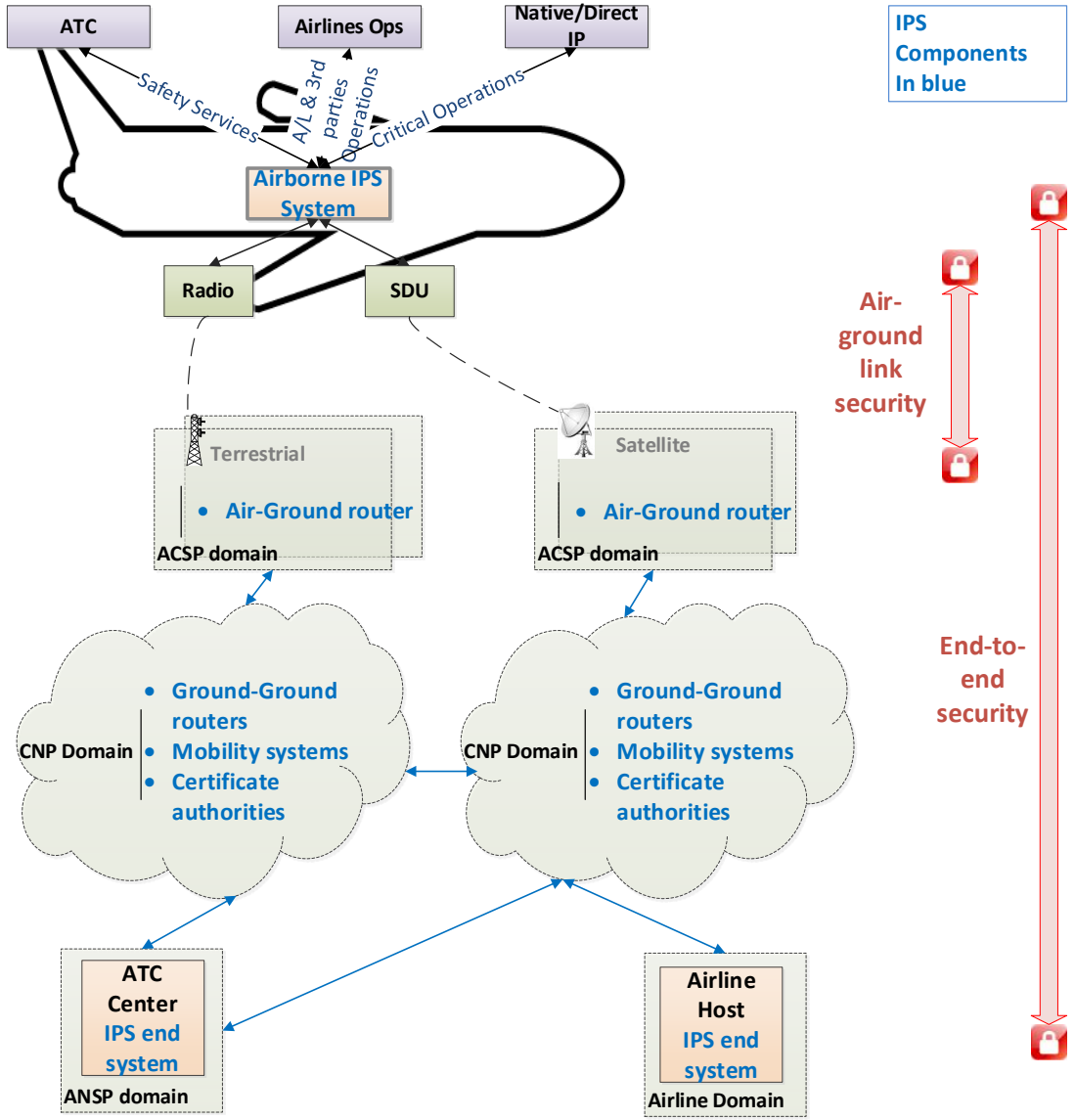
Evolution of Networks Architectures in FAA

- The Federal Aviation Administration (FAA) is transitioning its communication architecture toward IPS to modernize both ground-to-ground and air-to-ground safety-critical communications.
- Legacy, character-based protocols such as ACARS were designed prior to modern cyber-threat landscapes and were custom-built for low-bandwidth, text-only messaging such as basic Controller-Pilot Data Link Communications (CPDLC).
- Legacy protocols lack the speed, capacity, and flexibility required for modern air traffic management.
- IPS enables modern security upgrades and also provides a migration path towards future native-IP safety applications.

IPS is the digital backbone that enables the FAA to evolve from legacy, voice-and-text traffic control to a data-centric, automated, and secure Air Traffic Management network capable of handling future growth in commercial, uncrewed, and advanced air mobility traffic.

The adoption of IPS addresses several critical structural and operational needs:

1. **Enabling Trajectory-Based Operations (TBO) & High Data Volume**
   - IPS enables the high throughput and low latency required for TBO
2. **True Multi-Link Mobility and Redundancy**
   - IPS supports modern multi-link routing
3. **Commercial Off-The-Shelf (COTS) Efficiency & Interoperability**
   - IP standards allows the FAA and avionics manufacturers to leverage mature, mainstream commercial hardware, testing suites, and network infrastructure
4. **Extending System Wide Information Management (SWIM) to the Cockpit**
   - Extends IP infrastructure directly into the aircraft
5. **Standardized, Industry-Grade Cybersecurity**
   - Heavily vetted IP commercial security protocols protect safety-critical air traffic management messages against spoofing, jamming, or interception
6. **Global Harmonization**
   - IPS is the unified global end-state standard for air-ground safety services



AIR NAVIGATION WORLD-CNSS 2026

ATN/IPS: End-to end IPv6-based network

- Aircraft (with ACARS)
- Air-ground network (ACSP): VDL2, IRIS…
- Ground network (CNP)
- ANSP/Airline

Supporting existing and future links

- VDLM2, IRIS
- LDACS, AeroMACS, …
- HYCON

Scalable system

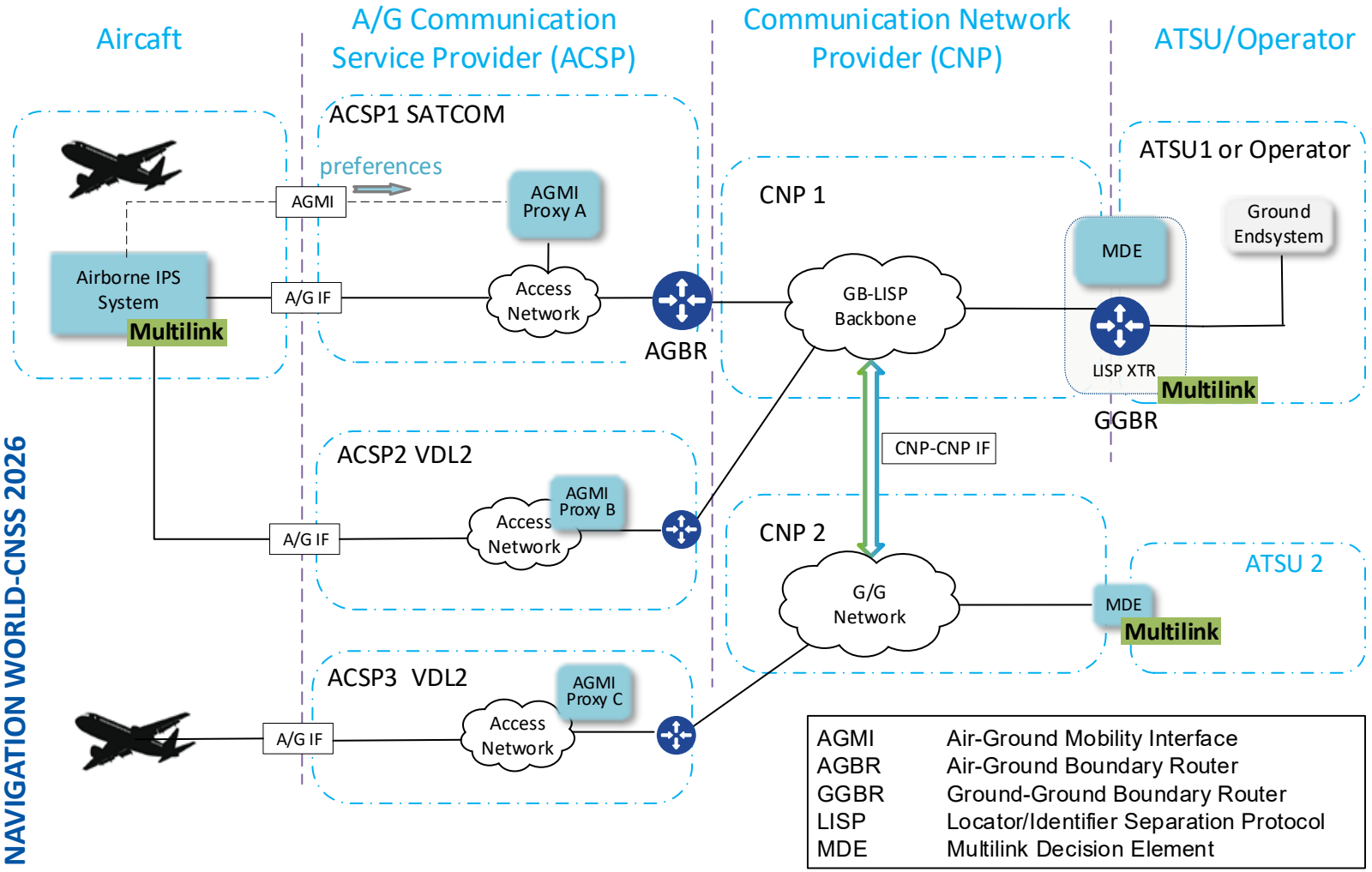
- Supporting addition of air-ground and ground networks

Relying on 2 levels of security

- Air-ground link security (including VDL2)
- End-to-end security between Aircraft and ANSP or airline end system (or delegated to the CNP)
- Mutual authentication & Integrity
- PKI management

RTCA EUROCAE AEEC
Standards

ATN/IPS - Mobility and Multilink



Mobilty and Multilink - AGMI

- Domain-specific standard over A/G links
- Aircraft preferences and link status shared with ground for link-loss detection
- Ensured interoperability
- Efficient safety-link utilization - Coordinated link assignment
- Makes multiple concurrent datalinks available

ATN/IPS Ground infrastructure

- Internet-based architecture (IPv6) – COTS based IP infrastructure
- International standards (global interoperability)
- Resilient unified ATS/AOC infrastructure
- Open framework fostering market competition
- Datalink-independent solution with clear local/global mobility separation

ATN/IPS provides a **high available** and **scalable multilink** solution supporting current and future safety A/G datalinks (L-band SATCOM, VDLm2, LDACS)

IPS validation activities

On the way to IPS deployment…

Main goals of IPS validations

- Verify that published IPS standards (ICAO, AEEC, RTCA/EUROCAE) are mature and implementable
- Validate that IPS prototypes from different vendors implemented according to the IPS standards are interoperable

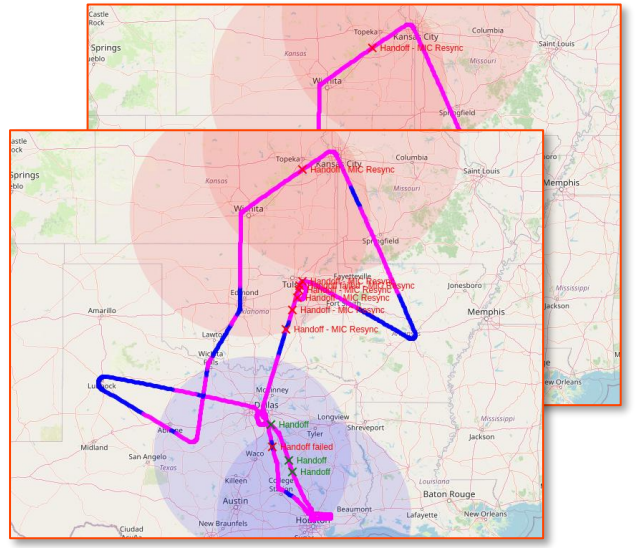
Illustration of recent IPS validations

- SESAR FCDI: Lab-based validations with focus on multilink and global mobility
- ESA Iris: Series of flight tests with focus on Safety SATCOM performance
- SESAR ESMA: Flight tests focusing on VLDm2 and SATCOM multilink and IPS-OSI interoperability
- FAA IPS VLD: Flight test focusing on interoperability at large scale (link level, ground level, end-to-end level), performance, VLDm2 and SATCOM multilink and IPS-ACARS interoperability

Large scale IPS validations in 2025

FAA IPS VLD, SESAR ESMA, ESA Iris





Boeing 737MAX-8 from United Airlines

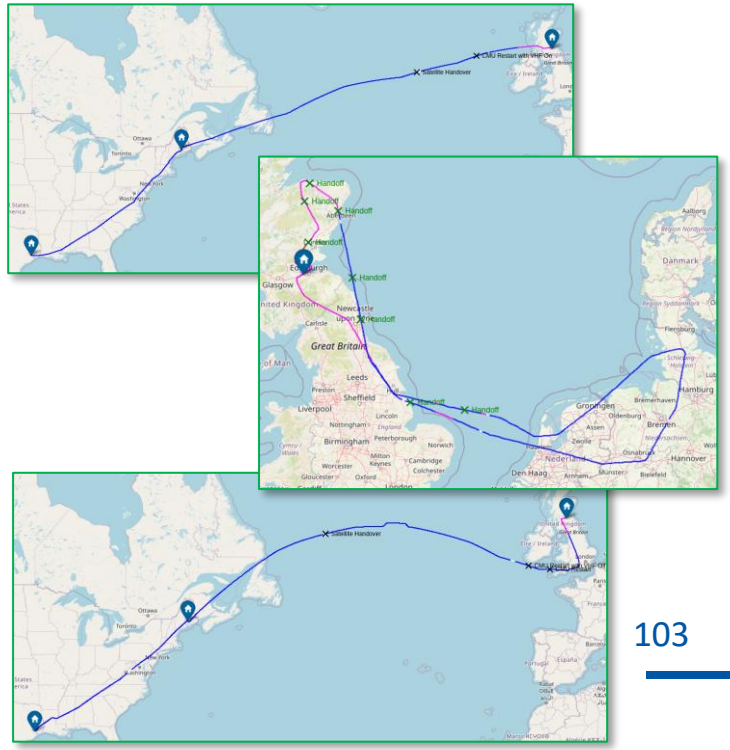
- Honeywell and Collins IPS-enabled CMU prototypes

4x USA domestic flights from Houston (~6 hrs each)

- SATCOM: Thales SDU, VIASAT, SITA (ground routing)
- IPS-enabled VHF (IOA): 2x SITA VGS + 2x Collins VGS on test frequency
- FANS1/A + AOC End Systems: FAA Tech Center (via SITA & COL IPS/ACARS GW), Boeing

2x Trans-Atlantic flight between Houston to Edinburg (~10 hrs each) and 1x Europe overflight from/to Edinburgh (~ 4 hrs)

- SATCOM: Cobham SDU, VIASAT, Frequentis (ground infrastructure)
- IPS-enabled VHF (IOA): 5x SITA VGS in UK on live CSC frequency (!!), Honeywell VDR
- ATS B1: ENAIRE OSI End System (via SITA IPS/OSI GW and SITA Staging Network)
- CPDLC end-to-end performance test applications: Airtel

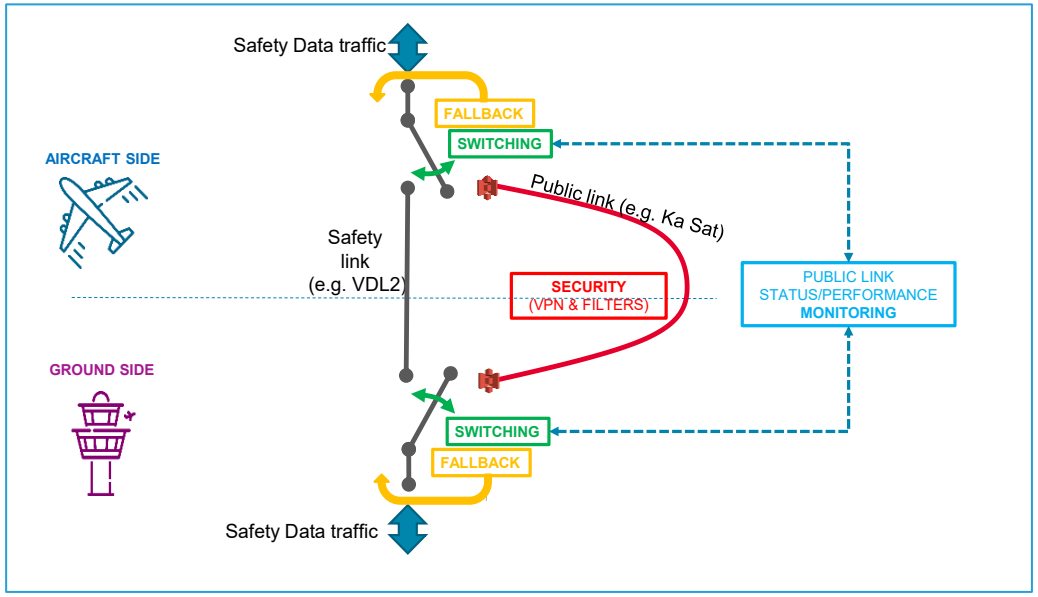




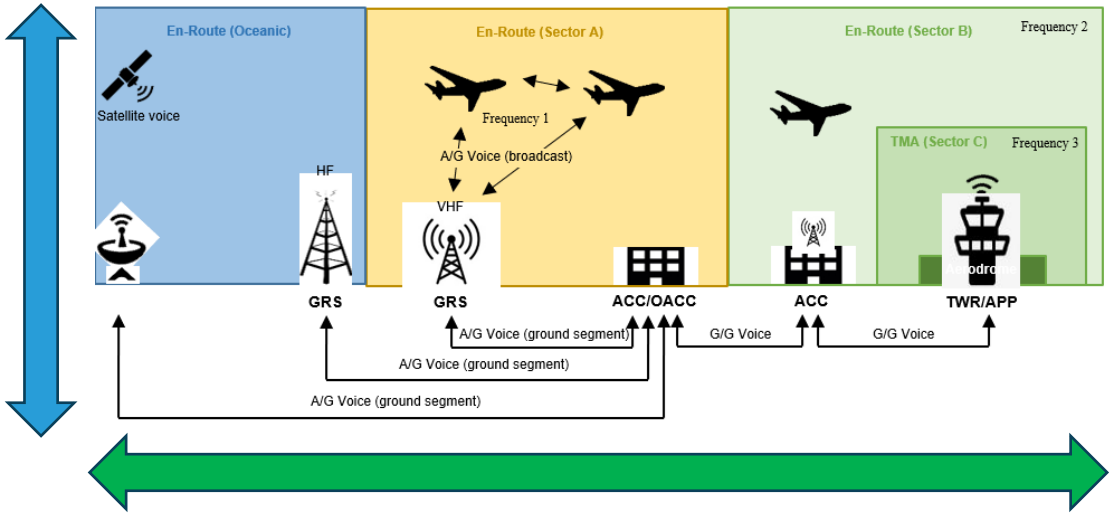


Evolution of Networks Architectures

Hybrid Communication Networks (HYCON)



Secure ATM Voice



ATM VoIP

Session 6 – Evolution of Network Architectures

Conclusions

Internet protocol Suite (IPS)

1. Operational benefits: **Enabling Trajectory-Based Operations (TBO) & High Data Volume**
2. Resilient infrastructure: **True Multi-Link Mobility and Redundancy**
3. Efficiency, Interoperability and Performance: **Commercial Off-The-Shelf (COTS) based deployment**
4. Standardized, Industry-Grade Cybersecurity: **Protect safety-critical air traffic management messages**
5. Global Harmonization: **Ensured scalability and support of new operational concepts**
6. Future proof technology**: Evolutions foreseen for Hybrid Communications Networks and Secured VoIP over Air Ground Networks**

Thank You


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Session 7:
Collaboration Between ICAO and Standards-Making Organisations
ICAO Standards Round Table (SRT)

Moderator:

- Mr. Raza Ali Gulam, Technical Officer CNS, ICAO

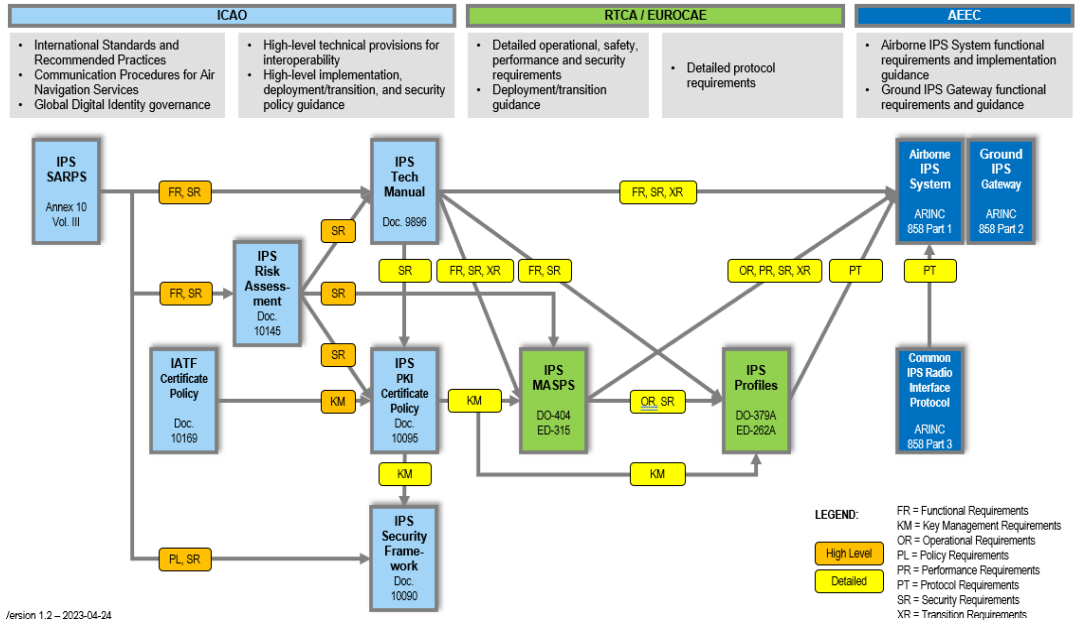
Panelists:

- Mr. Nikos Fistas, EUROCONTROL
- Mr. Andrea Trimarchi, EUROCAE
- Mr. Hette Hoekema, EASA
- Mr. David Alexander, SAE INTERNATIONAL

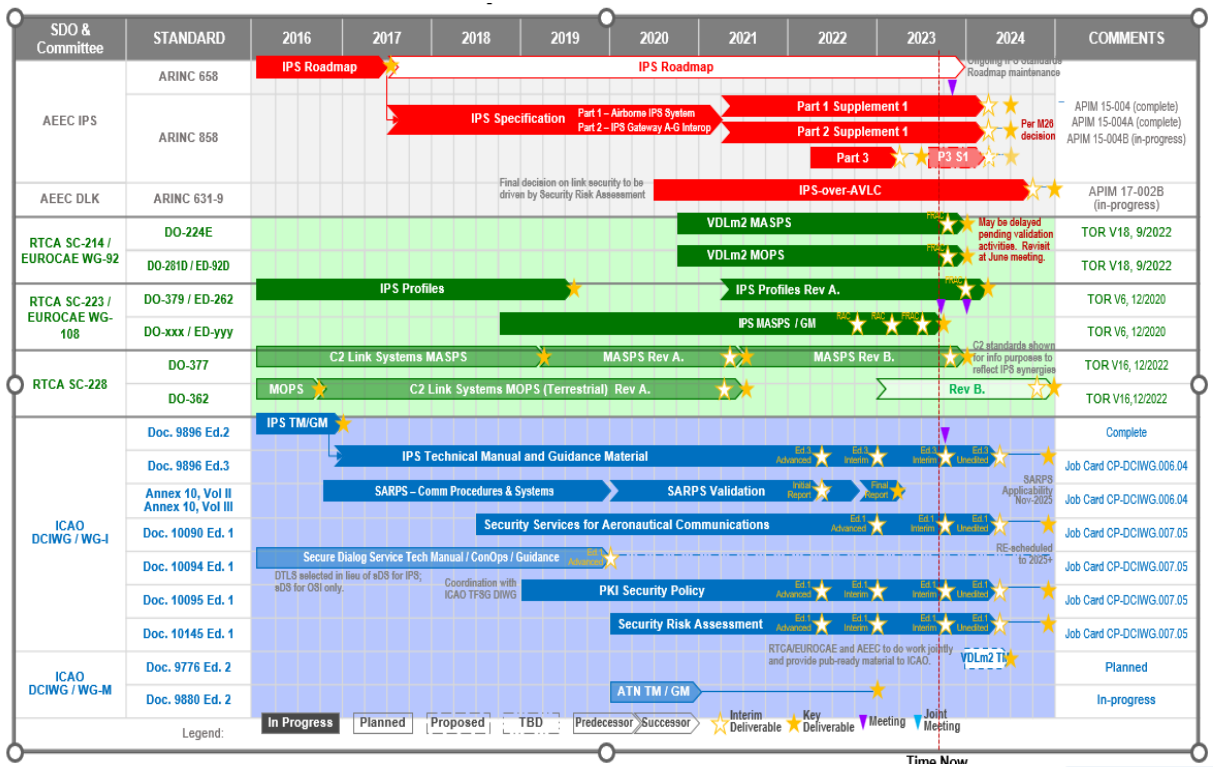
Why Collaboration Matters

Standards relationship, common roadmaps

IPS Standards Inter-relationships



IPS Standards roadmap



Global benefits are achieved through collaboration

ICAO Standards Round Table

Better coordination. Less duplication. Faster development and implementation

Purpose

- Align priorities
- Share roadmaps
- Synchronize activities
- Identify gaps and overlaps
- Reduce duplication
- Optimize expert resources.

Desired Outcomes

✅ Better alignment

✅ Reduced fragmentation

✅ Improved efficiency

✅ Enhanced interoperability

As aviation becomes more connected, standards development must become more connected too.

From Standards to Implementation

Key Challenges

- Translating standards into operational capability
- Aligning implementation timelines
- Maintaining interoperability
- Supporting regional and global deployment.

Key Question

✅How can stronger coordination accelerate implementation?

Answer: Strong coordination will allow more accurate development roadmaps, clarity of roles, involvement of users, thorough validation of standards and better (fit for purpose) standards meeting the stakeholder needs

Due to the increasing complexity of ATM systems, relevant standards development needs to be coordinated across the full cycle: from agreeing the need, to drafting, to consulting and validating, to publishing and to maintaining the standard

Standards Supporting Aviation Innovation

Focus Areas

- From duplication to complementarity
- Early alignment
- Address increasingly cross-domain technologies (CNS, AI, AAM, etc.)
- From information-sharing to strategic coordination
- Ensuring coherence and consistency across the standardization ecosystem

Key Question

✅How can standards organizations best support ICAO Development and implementation objectives?

A coordinated standardisation ecosystem accelerates innovation by creating a coherent path from ICAO objectives to global implementation

Systems Engineering & Emerging Technology Consensus

Focus Areas

- System-Level Safety Assessment: Standardizing architectures and safety frameworks (ARP4754B / ARP4761A) bridging high-level SARPs to aircraft design.
- Emerging Tech Standardization: Leading joint consensus on Artificial Intelligence (G-34 / WG-114), autonomy, and Advanced Air Mobility (AAM).
- Aeronautical Security & Trust: Driving digital engineering, hardware assurance, and aerospace cybersecurity standards.

Key Question

✅How can international engineering consensus keep pace with rapid innovation (AI, autonomy, AAM) while safeguarding rigorous system safety and global interoperability?

As aviation becomes more complex and interconnected, consensus-driven systems engineering turns high-level global requirements into certifiable, operational realities

Regulation and Standardization

Focus Areas

- Early engagement & Prioritisation
- Certification considerations:
  - Standards as Means of Compliance
  - Keeping up with fast pace developments
  - Configuration Management
- Regulatory readiness & Challenges
- Global interoperability

Key Question

✅How can regulators engage earlier and more effectively in standards activities?

Aviation was innovative, then turned conservative. A new approach should foster innovation again.

Audience Interaction and Discussion

Poll Question

What is the greatest challenge facing aviation standardization?

- □ Synchronizing timelines
- □ Limited expert resources
- □ Regional fragmentation
- □ Emerging technologies
- □ Global interoperability
- □ Joint roadmaps

Discussion Questions

What should be the highest priority for the SRT?
What would most improve coordination?
How can we reduce duplication?

Poll and discussion Question

Thank You


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