

Key considerations for Future AOC/ATC Communications: IATA Perspective

April 2021



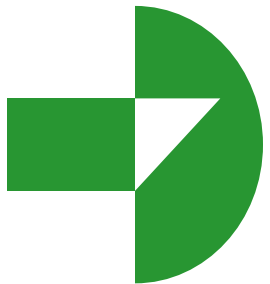
Airline Operational Communications (AOC)



AOC required for the initiation, continuation, diversion or termination of flight for safety, regularity and efficiency reasons (*ref. ICAO, ITU*)



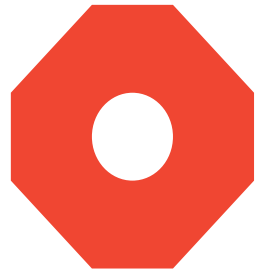
AOC comprises voice and data communication **between aircraft and their operating agencies.**



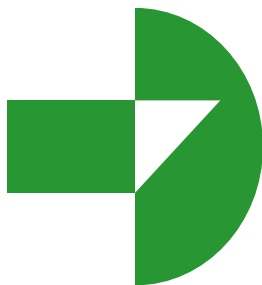
AOC in Actual Operations



Airline's Operational Control Centre with pilots and ground crew

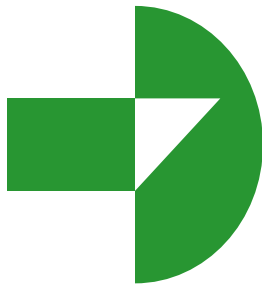
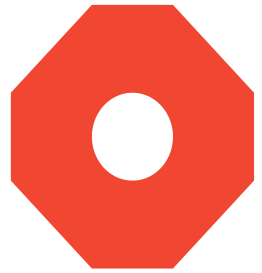


Ground services organizations including ground handling, fueling and aircraft maintenance



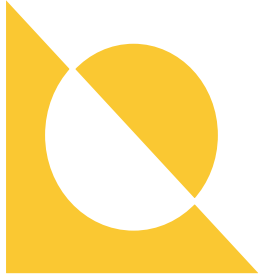
Engine manufacturers who may request engine performance data to be transmitted

Typical AOC data

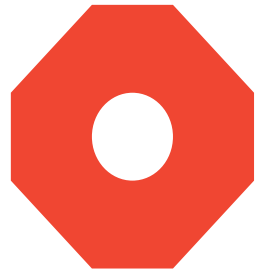


Uplink messages	Downlink messages
<ul style="list-style-type: none">• Flight Plans• Route / Wind / Weather information• Notification to Captain (e.g., dangerous goods, cargo, passenger)• Weight and Balance data• Fuel data• Pilot/Dispatcher communication• Security information• Connecting Passenger information	<ul style="list-style-type: none">• Pilot reports• Real time Failure & Warning messages• Flight Status (Door Status, Boarding, etc)• Position reports & OOOI Messages (Out, Off, On, In)• Engine monitoring data

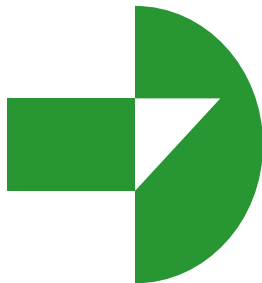
Growth of AOC Traffic and Uses



Prior to Covid-19, AOC traffic has grown over the past years due to **fleet growth and fleet change**.



Newer aircraft send a lot more data. AOC (engine and maintenance data) has dramatically increased recently.



Some airlines are **using AOC more** with flight crew and to report specific operational information.

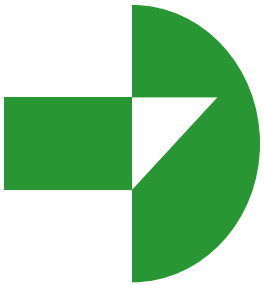
Continuing Needs for AOC Quality of Service



AOC required Quality of Services (QoS).



Currently under pressure from VDL frequency overload, message collisions etc.



ATS Communications



Safety and time critical

- Reliable Quality of Service (QoS) is mandatory.
- Support ATC aircraft separation and ATM applications



Examples of ATS Communications

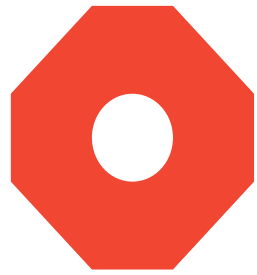
- Provision of aircraft separation (e.g. ADS-C)
- CPDLC clearance, e.g. DL departure clearance, Oceanic Clearance
- Frequency change
- Flight Information Services (e.g. ATIS, D-ATIS)
- Future ATS communication for exchanges of trajectory data

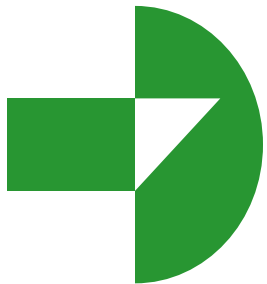
AOC and ATS Communications



ATS messages are **safety and time critical**.

Time and safety criticality of different AOC messages

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- **Up-linked AOC** messages are often **essential for the safety and regularity** of the flight
 - Some **Down-linked AOC** messages are **less time-critical**.



AOC and ATS: Need for shared service and equipment



Currently, both AOC and ATS transmitted through the **same channel (frequency) using same aircraft equipment.**



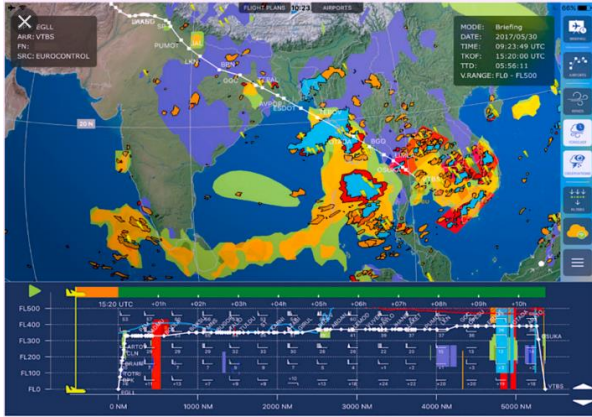
Shared AOC and ATS services for both AOC and ATS traffic are necessary, due to

- Cockpit architecture
- Limited space on-board for additional antenna and avionics
- Prohibitive costs to change



Effective capability for **message priority management** will be highly desirable.

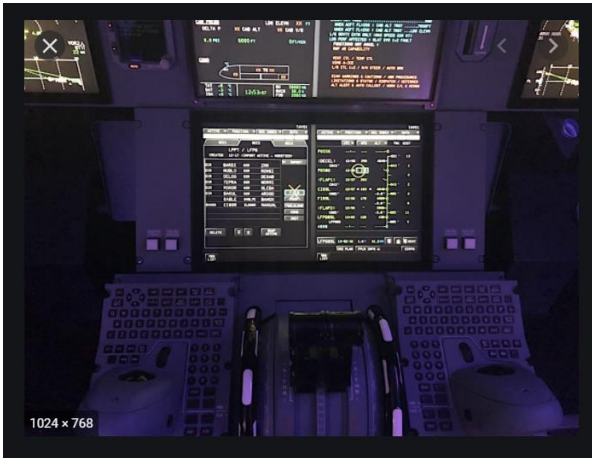
Future proofing upcoming applications: Electronic Flight Bag (EFB)



The EFB is no longer a passive device used as an upgrade from paper documentation.

Playing more importance roles for flight operations

- **reliable communication QoS** will be highly desirable.



Advanced EFB applications, for example graphical weather, require **higher communication throughput to the cockpit.**

Image source: Aviation Today

Future proofing upcoming applications: Electronic Flight Bag (EFB)

Interface with safety-critical equipment, e.g., Flight Management System and CDPLC

- **Cybersecurity** issues need to be addressed, including the security of communication links and interface to EFB

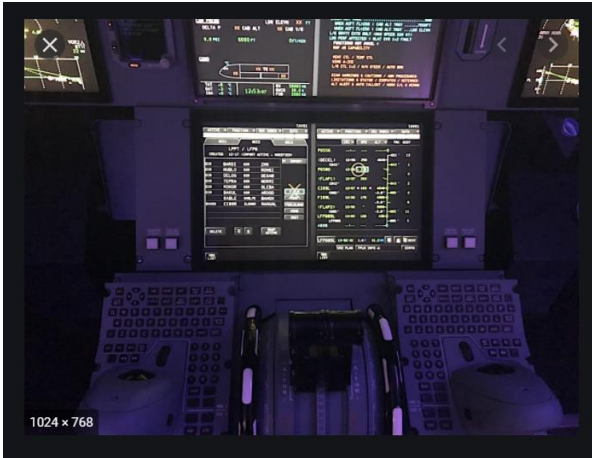
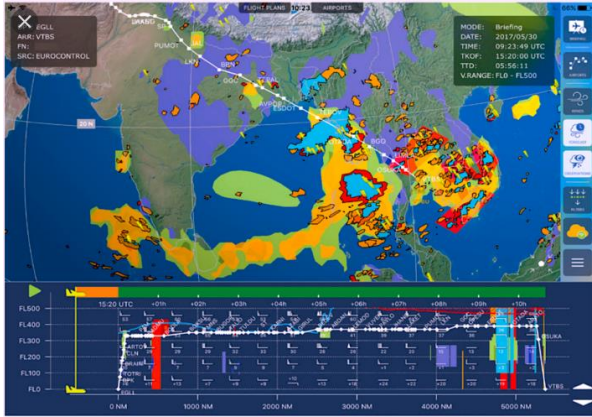


Image source: Aviation Today

Key considerations for Future AOC/ATC Communications



- ❑ Capable to support both ATC and AOC requirements

 - ❑ Common service, infrastructure and avionics

- ❑ High bandwidth and throughputs

- ❑ Global standardized

 - ❑ Reliable and enforceable Quality of Services (QoS)

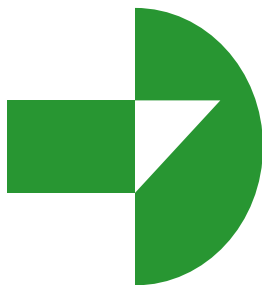
 - ❑ Secured and support prioritizations

 - ❑ Support multilink

- ❑ Spectrum efficient and robust against interference, technically and legally

 - ❑ Preferably protected by global radio/aviation regulations

- ❑ Cost-effective and time-appropriate



Key considerations for Future AOC/ATC Communications

- ❑ Seamless transition from current capabilities, avionics and infrastructures
 - ❑ Clear, well-coordinated migration path
- ❑ Forward-fit approach
- ❑ Synchronized deployment: Airlines, Regulators, CSPs, ANSPs, Equipment and Aircraft manufacturers
 - ❑ Aligned agreement by all aviation stakeholders
- ❑ Scalable
 - ❑ Support well-managed global implementation
 - ❑ Readiness for deployment where/when needed
- ❑ When feasible, support multiple CNS functions
 - ❑ Well-defined primary and secondary roles within CNS
 - ❑ Not lead to a single point of failure

