TERMS OF REFERENCE

Special Committee (SC) 223

Internet Protocol Suite (IPS) and Aeronautical Mobile Airport Communication System (AeroMACS) (Version 11)

REQUESTOR:

Organization	Person
FAA ANG-B	**ANG-B/Michelle Merkle**

SC LEADERSHIP:

Position	Name	Affiliation	Telephone	email	Change
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Secretary	**TBD**				

BACKGROUND:

As Internet Protocol (IP) standards mature and current communication technologies are upgraded or new systems are developed, a move to IP-based communication becomes a more viable and attractive alternative to existing technologies. Enterprises can begin to leverage the benefits stemming from a unified IP based communications strategy including greater network flexibility due to better scalability and ultimately better performance.

The Aviation Industry's planned end-state has recently been identified as one based on Aeronautical Telecommunications Network – Internet Protocol (ATN/IPS) standards. ICAO has planned to adopt the IPS standards for future aeronautical datalink communications to enable seamless, broadband, end-to-end communications.

A variety of safety-critical services and applications will be supported by the proposed IPS network. These include, for example, Controller-Pilot Datalink communications (CPDLC), Network-centric Mission

Services, Support Services, and SWIM-Oriented Architecture (SOA) Core Services envisioned in the NAS Enterprise Architecture SV-4 Framework. Services will enable full 4D Trajectory-based Operations (TBOs) through all phases of flight including the airport surface. Additionally, various Aeronautical Information (AIM) and metrological (MET) data products can be provisioned via the IPS network.

FAA Management has directed that the existing ICAO Doc 9896 be updated to complete the air-ground IPS requirements and to develop the corresponding A-G IPS MOPS document in RTCA. All future FAA Aviation systems can then be designed and developed leveraging these new communication standards to enable more effective and efficient sharing of data.

Since the future A-G IPS Systems will be operating in Commercial Aircraft, it will be necessary to develop form and fit standards to support their development and implementation. Based on Boeing's request, AEEC SAI Committee initiated the development of ARINC Standards for ATN/IPS. This activity is expected to leverage documentation developed from the ICAO ATN/IPS SARPS and RTCA MOPS activities.

The Special Committee 223 was also responsible for developing the AeroMACS MOPS (RTCA DO-346A) and the Profiles (RTCA DO-345) and the MASPS for IPS (DO-404), which have been published already.

DELIVERABLES:

Product	Description	FRAC Completion Due Date*	Change
Technical Standard of Aviation Profiles for Internet Protocol Suite (DO-379 Rev A)	Certification profiles for TCP / UDP / IP / DHCP / Routing / Mobility / Multilink protocols based on IETF RFCs	June 2024	

*Note: Final Review and Comment (FRAC) Completion Due Date refers to the date that the committee plenary approves the document after completing the FRAC Process. SCs should submit the final document at least 45 days before the PMC meeting where it will be considered for approval.

SCOPE:

The proposed standards would be used to support future mobile and fixed data communication applications and services for both air/ground and ground/ground communications services supporting the aviation industry. Examples include information exchanges to support CPDLC, Collaborative Decision Making (CDM); Surveillance Broadcast System (SBS) applications, and System Wide Information Management (SWIM) data exchanges, and its extension to aircraft ("Aircraft Access to SWIM"), such as aeronautical and metrological data link services. Development of technical standards for products that support both the airborne and ground segments will make extensive use of the existing IETF RFC standards (and its updates).

AeroMACS is expected to be the first aeronautical broadband datalink to operate under the native IPS. However, the IPS networking, routing, mobility and multilink management, transport, and security

functions will be equally applicable for future air/ground datalinks including INMARSAT and IRIDIUM broadband SATCOM, and L-DACS. The IPS standard will also integrate the air/ground communications with the planned migration of ground/ground infrastructure to IP networks. It should be noted that major telecommunication network providers have established a sunset date for circuit-switched TDMA services. As such, FAA ground network infrastructure will migrate to IP networks in the 2020 timeframe.

The RTCA Standards development activities identified represent a major step necessary to support the FAA's plan to transition to end-to-end IP infrastructure. The standards, when complete will provide the requirements and guidance material necessary for the manufacturers to support the FAA's needs and to help achieve system interoperability.

ENVISIONED USE OF DELIVERABLE(S)

1. The IPS Profile developed in SC-223 will be used to provide useful guidance to the designers, manufacturers, installers and users of the ground network infrastructures using IP communications.
2. The IPS Profiles and MASPS will be used to develop the ICAO IPS Guidance and Technical Manual documents. Also, the IPS MASPS will be used to define the airborne equipment interface specifications by AEEC.

SPECIFIC GUIDANCE:

The IPS Profiles derived from IETF RFCs and related standards needed to provide the desired safety and regularity of flight functions. These profiles are consistent with the broader IETF and NIST standards. In particular, the special committee should:

1. Refine DO-379/ED-262, the IPS Profiles, during the development of MASPS in conformance with IETF RFCs to support networking, routing, mobility and multilink management, transport, and security functions enabling end-to-end aeronautical safety services over data networks;

- **EUROCAE Coordination** –
  - o SC-223 works jointly with EUROCAE WG-108 and intends to produce joint documents for all deliverables
  - o Deliverable schedule for SC-223 and WG-108 have been aligned for both the profiles document and the MASPS to enable joint publication of technically equivalent documents.

- **Additional Coordination** –

  - o The Special Committee will coordinate with other organizations as necessary, such as:

    FAA   Federal Aviation Administration

    ICAO   International Civil Aviation Organization

    EUROCONTROL   European Organization for the Safety of Air Navigation

    - ➢ The FAA and EUROCONTROL developed a Future Communication Strategy and Roadmap for future work and harmonization of activities. As a part of the proposed Agreement, both organizations would provide periodic updates to the international community through the ICAO Aeronautical Communications Panel on the status of this technology and standards development work. The completed standards would be brought to ICAO for technical review and possible adoption. Additional coordination will be conducted with the Internet Engineering Task Force (IETF) which is responsible for updates to the Internet Protocol RFC documents.

IEEE	Institute of Electrical and Electronics Engineers
EUROCAE	European Organization for Civil Aviation Equipment
ISO	International Organization for Standard
IETF	Internet Engineering Task Force
AEEC	Airlines Electronic Engineering Committee

- **Initial Documentation** -

Documents	Intended Use
ITU Directive	Support Recommendation for SC
ICAO Commission Approval of FCS Recommendations	Support Recommendation for SC
ARINC 821 and 822	Background Guidance
DO-272	Background guidance on D-Taxi and D-Traffic applications
DO-308	Background guidance on AIS and MET Data Link Services
Various SC-186, SC-206, SC-214 and SC-217 working documents.	To provide background guidance for the DRNP, A-IM, 4DTRAD, D-Taxi, and other relevant services.
ICAO Document 9896	Background ICAO Technical Manual and Guidance document for IPS. This document is currently being updated by ICAO WG-I.
ARINC Standard 658	Background on aircraft architecture, roadmap and gap analysis
DO-350B/ED-228B	Safety and Performance Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 SPR Standard)
DO-351A/ED-229B	Interoperability Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard)
ICAO Doc 9869	Performance Based Communication and Surveillance (PBCS) Manual
DO-379/ED-262	Internet Protocol Suite Profiles
Various Request for Comment (RFCs)	The group uses the published IETF RFCs as the basis of DO-379 and in support of the MASPS development
DO-362A	The Committee will use the CNPC waveform specification to determine impact of spectrum mask & spurious emissions.
ICAO Doc 10044	The AeroMACS Technical Manual
DO-346A/ED-223A	The AeroMACS MOPS
DO-404/ED-315	Minimum Aviation System Performance Standard on ATN-IPS End-To-End Interoperability and Certification

TERMINATION*:*

When the scope of this Terms of Reference is complete, the committee will recommend to the PMC that the committee Sunset, go into Active Monitoring Mode, or spend a period of time in Hiatus. Any change/extension of the committee's work program requires prior PMC approval.