

Internet Protocol Suite for Safety Services

Honeywell Perspective

**AEEC IPS Subcommittee Meeting 01
Washington, DC
23-25 Feb 2016**

What is IPS?

- Internet Protocol Suite for aviation
 - Commercial Internet is already on the aircraft!! Is that good enough?
 - Perception: Internet is not secure. Why?
 - Is the protocol deficient?
 - Are applications running over IP not designed adequately, leaving open exposures?
 - Is commercial software not adequate permitting exploitation?
 - Open Internet: Anyone can reach anything on aircraft – addressing, web-crawler!!
 - Other reasons??
 - Is IPS so unique (like OSI) that OEMs and vendors have to build it from scratch
 - Complexity, cost, obsolescence, maintainability....
 - Ideal IPS characteristics:
 - Architected correctly to protect flight-safety equipment, applications and services from intentional AND unintentional unauthorized access
 - Domain isolation, interface control, firewall, port filtering, authentication....
 - Meets requirements for safety services and accommodates use of commercial data links
 - Meets operator goals for flexibility, growth, agility, maintainability
 - Leverages commercial IP protocol but profiled to restrict protocol elements that introduces vulnerabilities – lower cost, upgrade flexibility, compatibility...
 - Implemented correctly to prevent exploitation and unwanted failures

IPS-Related Work Elements

Performance Requirements

Safety Services

Airline /
Operator
Requirements

Architecture and Interfaces

Applications &
Upper Layers

System &
Security Mgmt.

Datalink
Layers

Domain
Isolation / FW

SATCOM

LDACS

Aero
MACS

VDLm2 ?

Other ?

Protocol
Boundaries

Technical Requirements

Protocol
Profiles

Mobility
Management

QoS / CoS

Multilink

Security

Naming &
Addressing

Protocols

Policy

PKI /
Profiles

Key Mgmt

DNS

Transition Considerations

OSI and IPS

IPv4 and IPv6

FANS and
AOC

Integration w/
other sys

Implementation
Guidance

SWIM

Avionics

Standardization Perspective



- Completion and evolution of IPS technical provisions and guidance material
- Proposed working structure:
 - WG-I
 - IPS Mobility Sub-WG
 - IPS Security Sub-WG
 - See next chart for current work plan
- Deliverable
 - Doc. 9896

Ref: ICAO CP WG-I 19, WP03



- Terms of Reference covers:
- IPS Protocol Profiles:
 - Current RFCs in Doc 9896
 - Add RFCs from WG-I that addresses mobility, multilink, security, ...
- MOPS:
 - Allocate performance / QoS requirements from SC-214 / SC-206; RCP
 - Expand WG-I Technical Requirements (if needed)
 - Define test scenarios & use cases



- Phase 1: Aircraft architecture & roadmap. Should include:
 - Protocol boundary
 - Interfaces
 - Transition Aspects
- Phase 2: Specifications
 - Airline/Operator requirements
 - System & Security Mgmt.
 - Domain isolation, port filtering, firewall
 - Management protocol & MIBs

ICAO – Current IPS Work Scope

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RTCA – Expected IPS Work Scope

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AEEC – Expected IPS Work Scope

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Safety Services

**Airline /
Operator
Requirements**

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**Applications
& Upper Layers**

**System &
Security Mgmt.**

**Datalink
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PP658 Document Outline Proposal

1.0 Introduction

- 1.1 Purpose
- 1.2 Scope
- 1.3 Desired Benefits of IPS
- 1.4 Document Organization
- 1.5 Related Documents

2.0 IPS Overview

- 2.1 Context
- 2.2 IPS Applications
- 2.3 Candidate Communication Links
 - 2.3.1 Air-Ground → LDACS, VDLm2
 - 2.3.2 SATCOM
 - 2.3.3 Airport Surface → AeroMACS
 - 2.3.4 Air-Air (?)

3.0 IPS Architecture Considerations

- 3.1 End-to-End
- 3.2 Avionics
- 3.3 Transition Concepts

4.0 IPS Work Scope Considerations

- 4.1 Functional
 - 4.1.1 Naming and Addressing
 - 4.1.2 IP Version and Translation (IPv4/IPv6)
 - 4.1.3 etc.
- 4.2 Safety
- 4.3 Security
- 4.4 Performance
 - 4.4.1 RCP
- 4.5 Non-functional
 - 4.5.1 (current PP658 Section 1.3.x ?)

5.0 Environment Roadmaps

- 5.1 ICAO GANP
- 5.2 NextGen / SESAR
- 5.3 Airbus / Boeing

6.0 Standardization Roadmaps

- 6.1 Gap Analysis (*i.e., what*)
 - 6.1.1 Existing / In-progress Standards
 - 6.1.2 What's missing (*wrt Sections 2, 3, 4*)
- 6.2 Standardization Recommendations (*i.e., who*)
 - 6.2.1 ARINC
 - 6.2.2 RTCA / EUROCAE
 - 6.2.3 ICAO
- 6.3 Timing & Coordination Recommendations (*i.e., when and how*)

7.0 Summary and Recommended Next Steps

Appendices

- A Acronyms
- B Glossary
- C A-G Communication Overview → Section 2 from current PP658 Strawman

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