The Connected Airplane

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June 2014
Connectivity: meeting passenger expectations

• Keep pace with the consumer market
  – Ease of upgrade
  – Software driven functionality

• Different levels of functionality
  – Simple wireless to large embedded system
  – Consumer device integration

- **Basic Airplane**
  - **Wireless Connectivity**
  - **In-seat power**
  - **Installed wireless display**
  - **Handout/rental tablets**
  - **Streaming media**
  - **Embedded IFE**
What is connectivity?

• Connectivity is much more than entertainment

**Airborne elements**
• Onboard Network
• Operational Connectivity
• Passenger Connectivity

**End user client**
• Airline
• Passenger
• Boeing
• End Application Supplier

**Service providers**

**Connectivity**
• Terminal Wireless
• Satellite
• Air to Ground - Cellular
Airborne Connectivity Demand is Increasing

- Demand for connectivity increasing
- New entrants into market
Connectivity Domains

Passenger Domain
Untrusted

- Entertainment
- Revenue
- Connectivity
- Cellular

Crew Domain

- Crew Applications
- Maintenance
- Operational

Aircraft Domain
Trusted

- Maintenance
- Operations
- Safety of flight

We must protect the “Trusted” from the “Untrusted” domains
The E-enabled environment

- Ethernet networks changed everything

- SatCom, ACARS
- IP broadband
- SatCom, ACARS
- IP broadband
- Jepp Charts
- ACARS
- MRO
- Software
- Hardware
- Software
- Hardware
- SW Supplier
- Elec Parts
- IC’s
- BOEING
- Supplier
- Airline, ATM
- WWW
- BOEING
Cyber security

• Connectivity will drive cyber protections

  ▪ Cyber security is a new paradigm in commercial aviation
  ▪ Protection will require airborne and ground based solutions & processes
  ▪ Information Sharing will become critical
  ▪ Active management of the networks will become the norm

Safety culture

Security reality

![Graph 1993 Through 2012](image1.png)

![Bar Chart Reporting by Federal Agencies](image2.png)

Managing Cyber Security

• What is the reference?

National Institute of Standards & Technology
Cyber Security Framework

American Institute of Aeronautics & Astronautics
Cyber Security Framework
Creating an ISAC for Aviation

• Shared Situational Awareness

• Information Sharing & Analysis Centers (ISACs)
  ▪ Operational concept for sharing information within private sector
  ▪ Part of DHS National Infrastructure Protection Plan (NIPP)

• Protection of Critical Infrastructure / Key Resources
  ▪ Physical and cyber security focus
  ▪ ISACs currently exist in many sectors already

• Establishing aviation-centric ISAC
  ▪ Non-profit, third party entity
  ▪ Target incorporation in 2014

ISACs sit at the nexus of public-private information sharing
Why are we doing this?

- Airline industry **profitability** has declined over past 4 decades
- Average **fuel cost** has increased 350% over the last ten years
- Exponential growth in **data**
- New insights created by **human and machine integration**
- Analytics and **optimization** are becoming business imperatives
- **Mobile** access to **real-time** information is proliferating in all industries

*Note: The diagrams show Airline Yields and Airline Expenses with various costs contributing to the total expenses.*

_Airlines seeking new levels of operational efficiency_
Value Proposition for Connectivity

- Reduce **fuel** costs
- Optimize **crew** utilization
- Increase **airplane** operational availability
- Improve **operator** efficiency
- Enhance **on-time** performance
- Improve decision making with **real-time** information

*Optimize resources, manage complexity, drive efficiency*
Enabling The Connected Airplane

- **Passenger expectations**
  - Different levels of functionality available
  - Equivalence to the consumer market

- **Operational efficiency**
  - Operational data to the airplane
  - Maintenance data from the airplane

- **Crew awareness**
  - Flight crew
  - Cabin crew