Enabling Real-Time Monitoring of Flight Data with Minimum Economic Burden

Teledyne Technological Concepts & Views

“Connecting the Dots”

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May 26th, 2014
Connecting the Dots - for a Safer Tomorrow

Agenda

- Teledyne Controls introduction
- Existing Aircraft Flight Data Architectures
- New Broadband Internet systems
- New Fight Data Routing concepts
- Putting it all together – “Connecting the Dots”
Who is Teledyne Controls?

- Flight Data “Black Boxes” ~75% market share on most large transport types
- Real-Time Flight Data Analysis - Aircraft Condition Monitoring System (ACMS)
- Post-Flight Data Analysis – Safety & Maintenance Applications (FDM / FOQA)
- Flight Data Transmission Solutions
  - ACMS data routed over ACARS system while airborne
  - Black Box “QAR” data IP routing over Cellular while on the ground
    - ~62% market uptake across nearly all large transport aircraft
  - End to End Data Automation solutions that Connect multiple systems

Teledyne provides Innovative Modular Solutions that:

a) improve airline SAFETY and EFFICIENCY
b) play WELL with OTHERS
Existing Aircraft Flight Data Architectures

• Airborne Analysis and Message Routers are prevalent on ALL commercial transport aircraft
  • ACMS provides Airborne Analysis
  • ACARS provides “Text” Message Routing

ACMS & ACARS already support Real-Time Flight Data Monitoring

ACMS and ACARS together support Limited Real-Time Flight Data Monitoring Today
Airborne Flight Data Systems of Today

- How much Real-Time Flight Data is generated in the air?
  - ACMS and FANS messages are measured in Bytes per message
  - Black Box data is measured in Mega Bytes per flight hour
- What Bandwidth do we have available onboard?
  - Oceanic ACARS data links in use today are < 5 Kbps
    - OK for ACMS and FANS, Not OK for Black Box streaming

For Enhanced Real-Time Flight Data Monitoring and Black Box Streaming, higher bandwidth data links are needed
New Broadband Internet Systems

• What about new Broadband Systems for aircraft?
  • Very Fast - providing Mbps data rates
  • Designed to support Passengers not Aircraft Operations
  • Rapid deployment in progress among airlines – especially on long haul aircraft
  • Isolated from Flight Data such as Black Box and ACMS data

What if onboard Flight Data Systems could utilize the New Broadband Links in flight?
New Flight Data Routing Concepts

• Bulk “Black Box” Data Routing
  • There are new systems capable of IP data routing and intelligent data transmission of Flight Data on the ground at the airport
  • The most Common Flight Data IP routing system is Teledyne’s Wireless GroundLink Comm+ (WGL Comm+) which has integral cellular radios and antennas
    • The WGL Comm+ system is already justified and installed by airlines to automate the supply of Flight Data for Safety & Risk Management

The Teledyne Controls proposition is to Connect such IP Flight Data Routing Systems with Broadband Systems to realize a Secured End-to-End Intelligent Real-Time Flight Data Monitoring Solution
Conclusion

- Great potential exists to enable Real-Time Flight Data without a huge economic burden on the airlines
- Teledyne advocates Industry Standards for Real-Time Flight Data:
  - using ACMS and ACARS to enable Basic Monitoring
  - for Black Box streaming using existing systems on board

**BONUS:**
Real-Time Flight Data Monitoring can also provide many Benefits to Maintenance and Operations
let’s Connect the Dots that are already there to enable Universal Solutions for Unlimited Real-Time Flight Data Monitoring

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