

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

Teledyne Technological Concepts & Views

“Connecting the Dots”

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Connecting the Dots - for a Safer Tomorrow

Agenda

- Teledyne Controls introduction
- Existing Aircraft Flight Data Architectures
- New Broadband Internet systems
- New Flight 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 Wi-Fi while on the ground
 - ~62% market uptake across nearly all large transport aircraft
- End to End Data Automation solution - 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



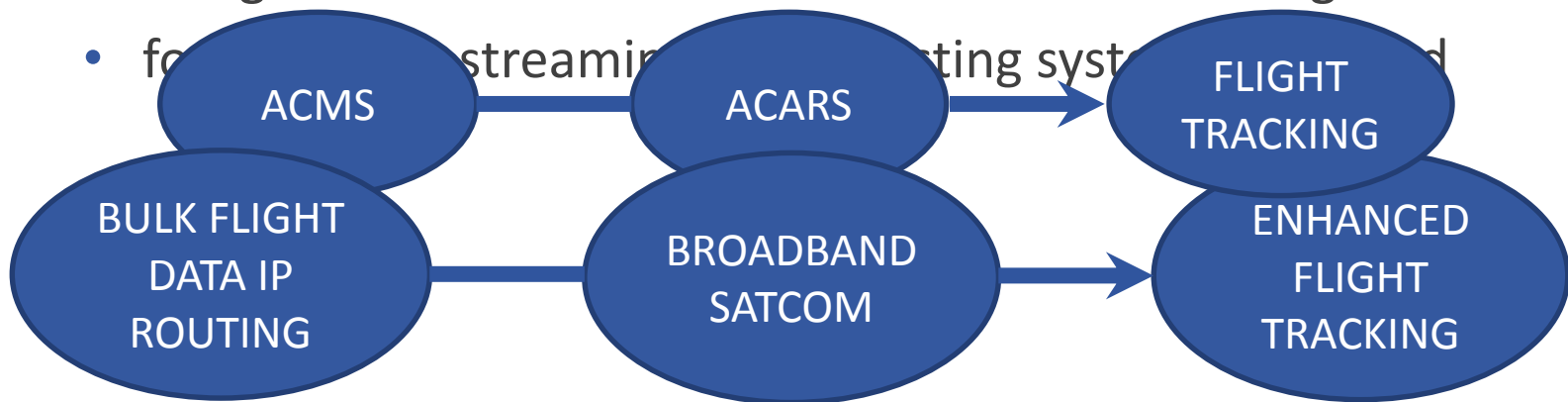
- Bulk “Black Box” Data Routing
 - There are new systems capable of IP data routing and intelligent data transmission of Flight Data on the ground at the airport
 - The most Common Flight Data IP routing system is Teledyne’s Wireless GroundLink Comm+ (WGL Comm+) which has integral cellular radios and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



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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