4DT and the Connected Aircraft

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Building trust every day

Summary

In-flight rerouting requires fundamental technologies - efficient air-ground communications, reliable threat data feeding robust display/processing tools, and a collaborative relationship with the controlling airspace authority.

Widespread adoption of rerouting may require additional features - seamless secure air-ground communications, secure two-way avionics interfaces, and a compelling business case.

Rockwell Collins describes each unique feature required to facilitate collaboration between the airline users of the National Airspace (NAS) in prototyping trusted 4DT ecosystems that are reliable, robust, and secure.

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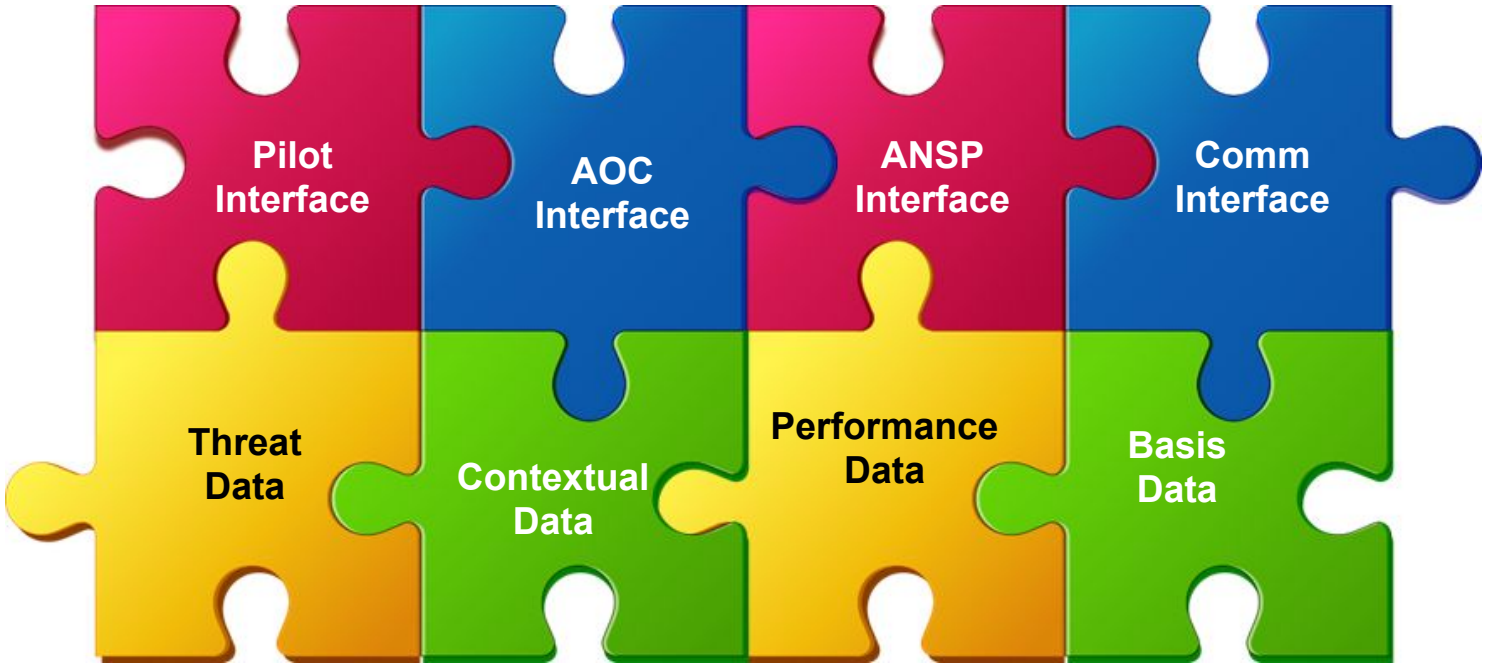
Outline

- Statement of the Problem
- Systems of Interest
- Operator Adoption Business Case
- Partners for Success

Statement of the Problem



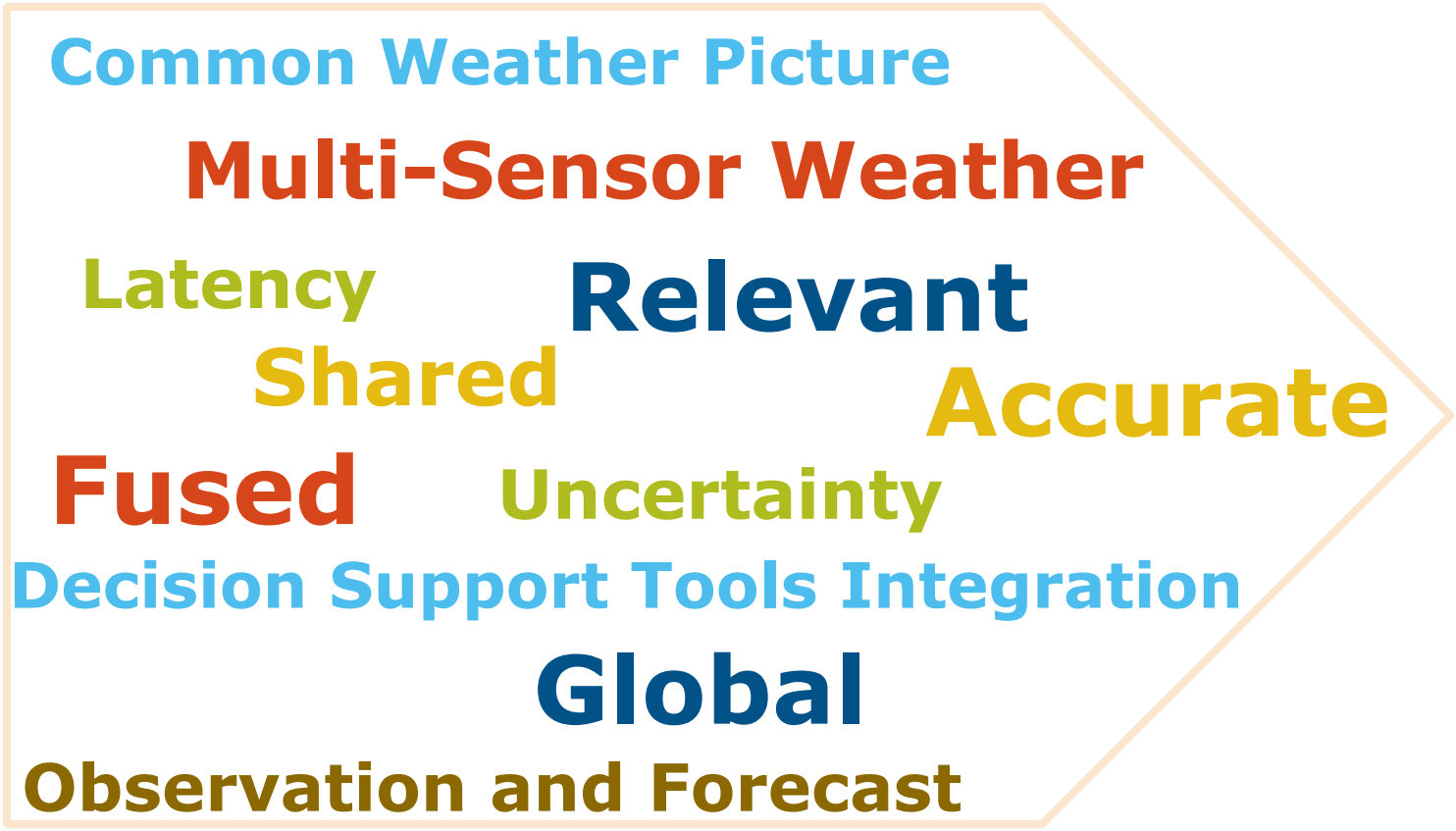
Widespread adoption of 4DT requires mature complementary systems driving shared efficiencies to a compelling return on investment.

Systems of Interest

- Flight Optimization
- Weather / Hazard Avoidance
- Human Machine Interface
- Air-Ground Communications
- Two-way Avionics Interfaces
- Collaborative Data Sharing

Flight Optimization

Weather / Hazard Avoidance



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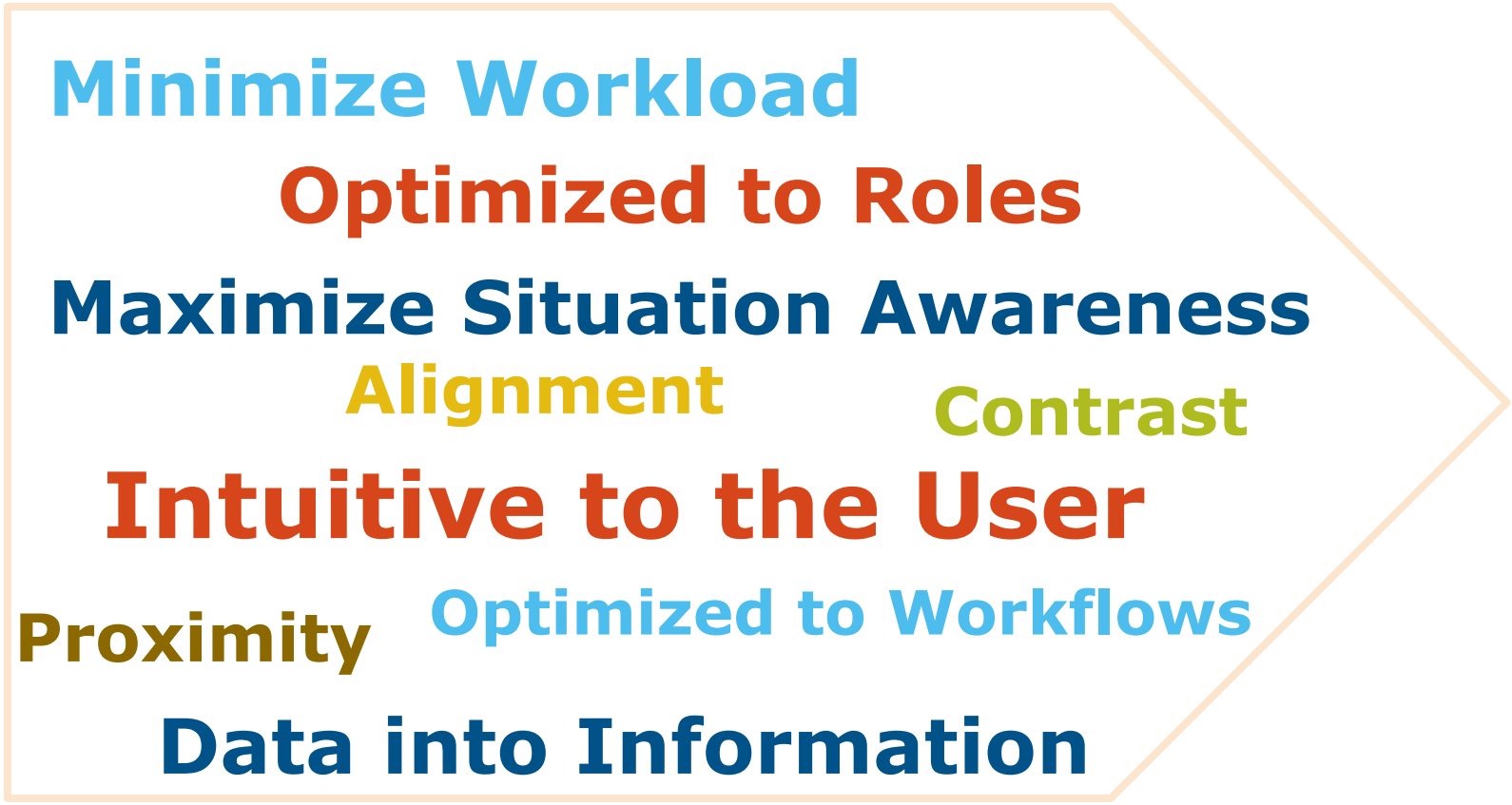
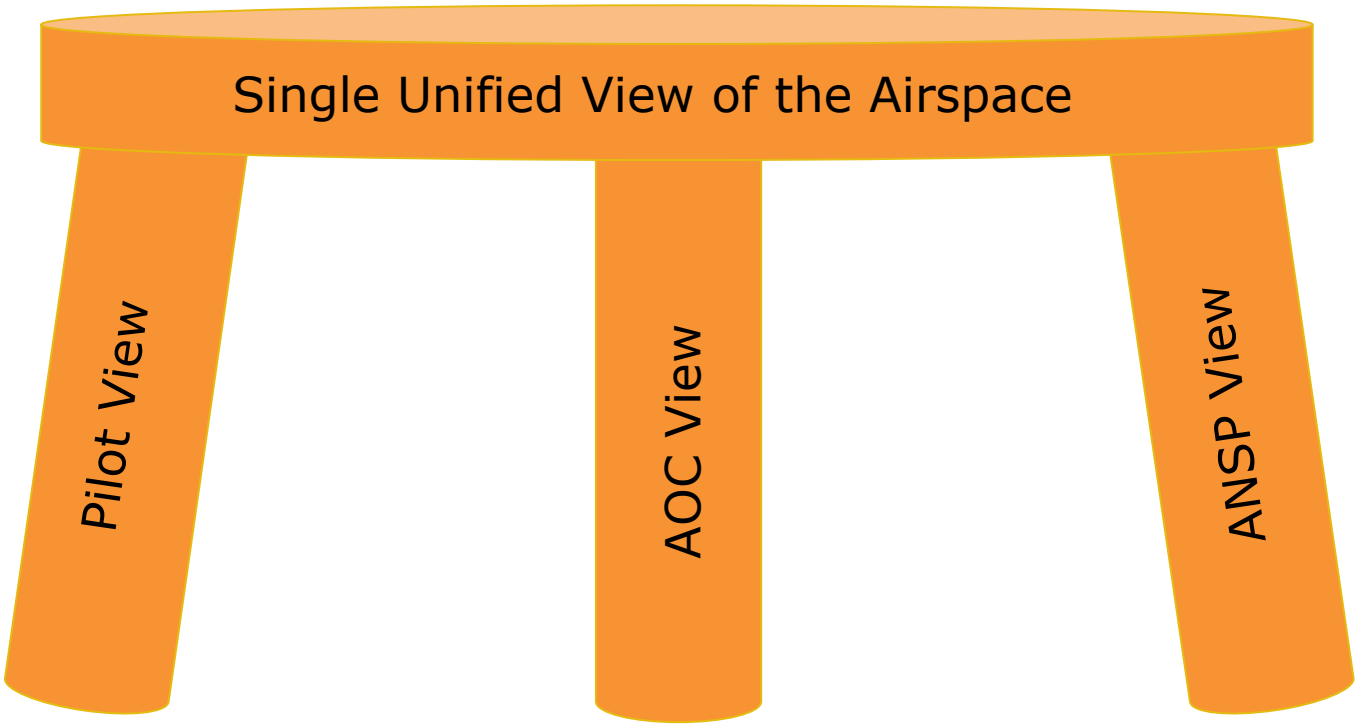
Human Machine Interface



Two-way Avionics Interfaces

Air-Ground Communications

Collaborative Data Sharing Systems

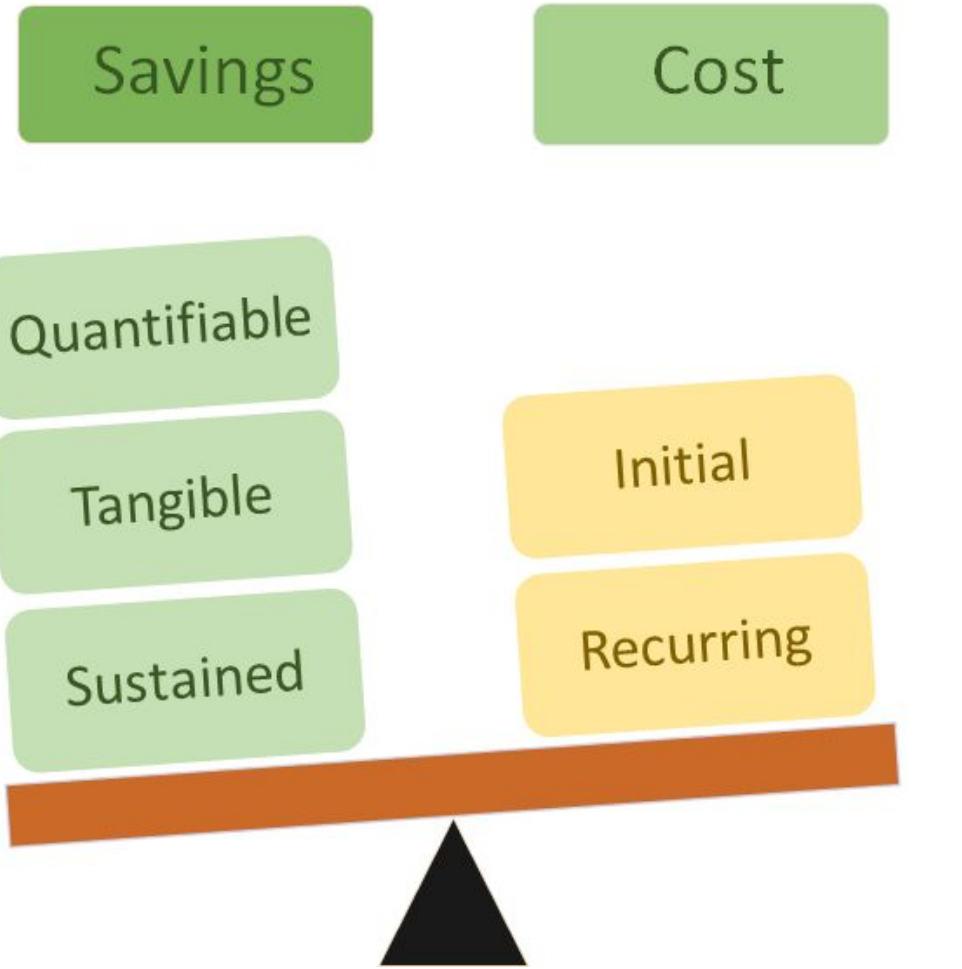


A shared single unified view of the airspace; proliferating advances in the flight deck and ground operations into the ANSP; dissemination of air space constraints and preferred (likely to be approved) routes back to the operators creates an ecosystem facilitating the capture of ROI indices that may lead to widespread adoption by operators.

Operator Adoption Business Case

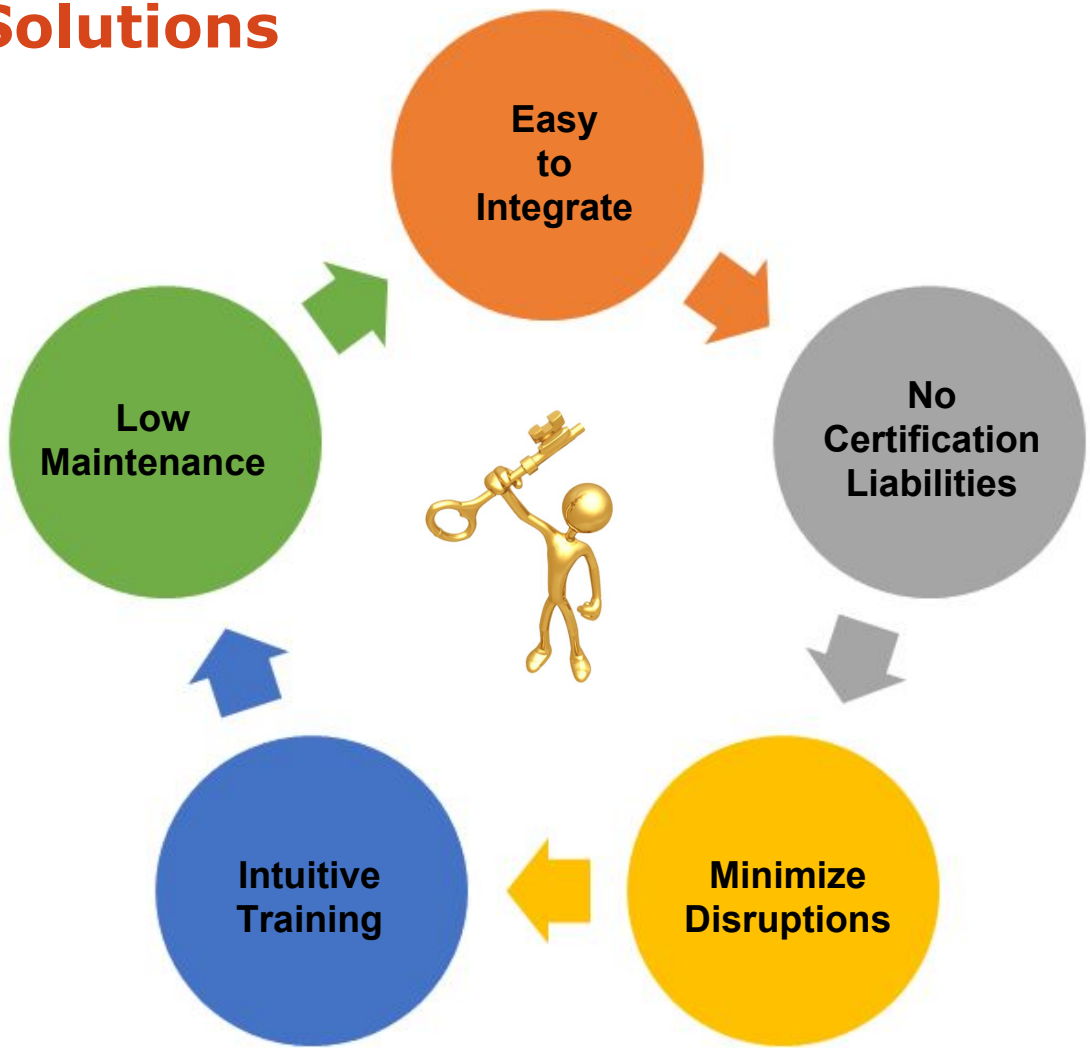
- Substantive Cost Savings Model
- Complete Solutions
- Shared Efficiencies

Substantive Cost Savings Model



Operators must satisfy an internal cost justification process.

Complete Solutions



Complete solutions that are mature, low-risk, and high-quality will drive operator acceptance.

Shared Efficiencies

Efficiences in the airspace must realized by both the ANSP and the operator. Programmatic inclusion of operator's route preferences in ANSP decision making engines facilitates a win-win.

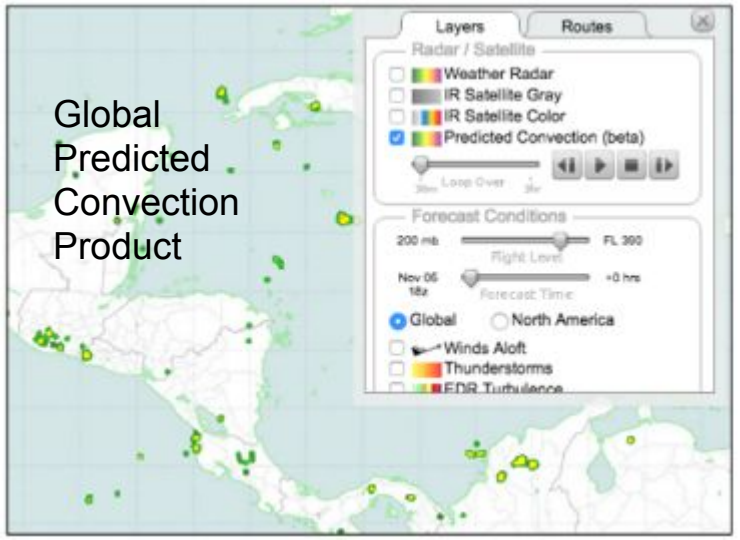
Partners for Success

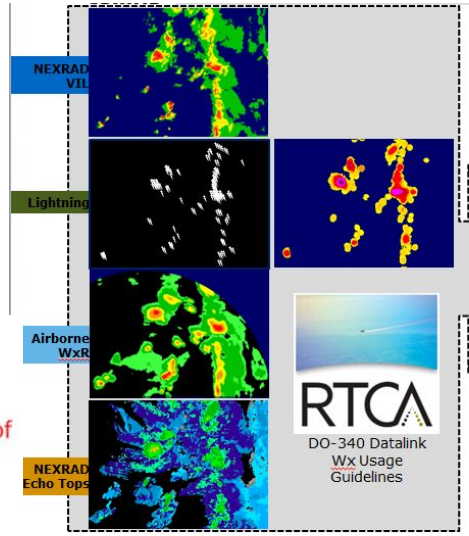
The success of the ANSPs extends to many partners; spanning academic and government sponsored research, data and data-link services providers, value added service providers, airframe and avionics manufactures, and the operator - as driven by its operational goals.

Rockwell Collins Initiatives

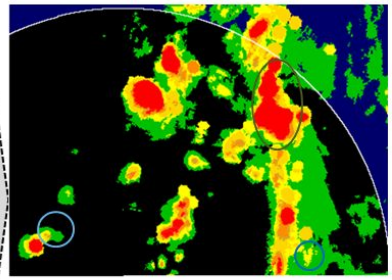
- Weather Research
- HMI Research
- Connected Aircraft Research

Weather Research





Separate Threat Displays/Layers

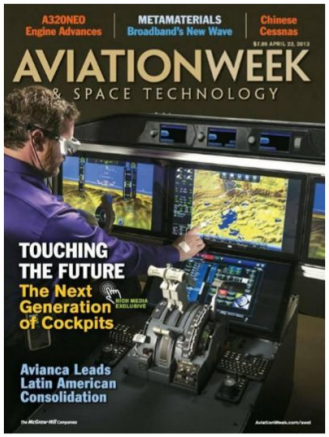


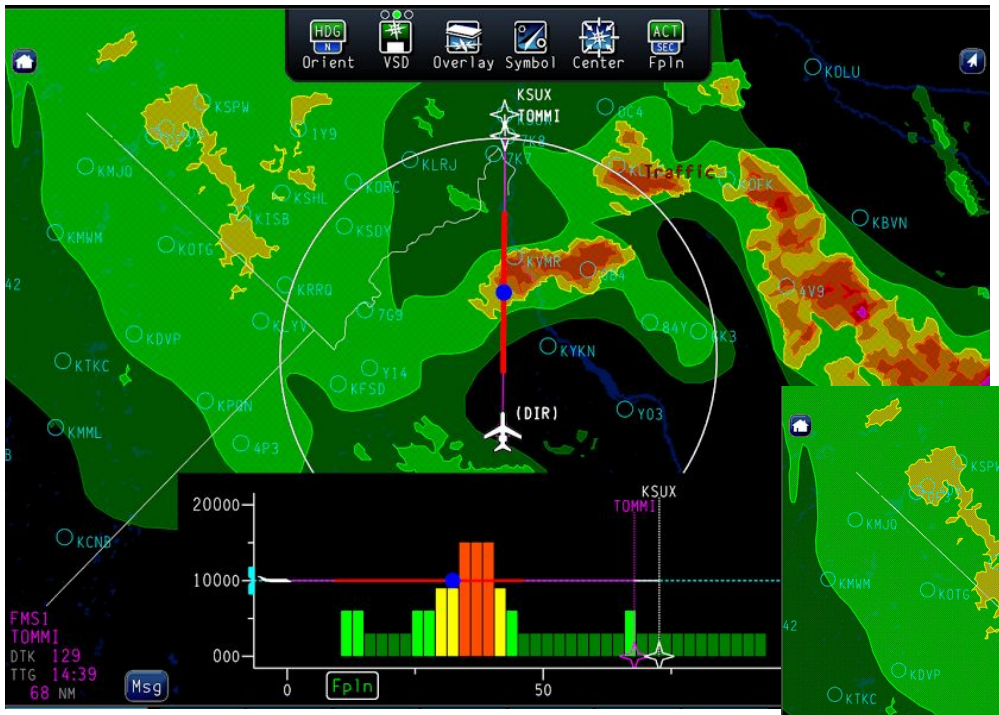
Single Integrated Threat Display

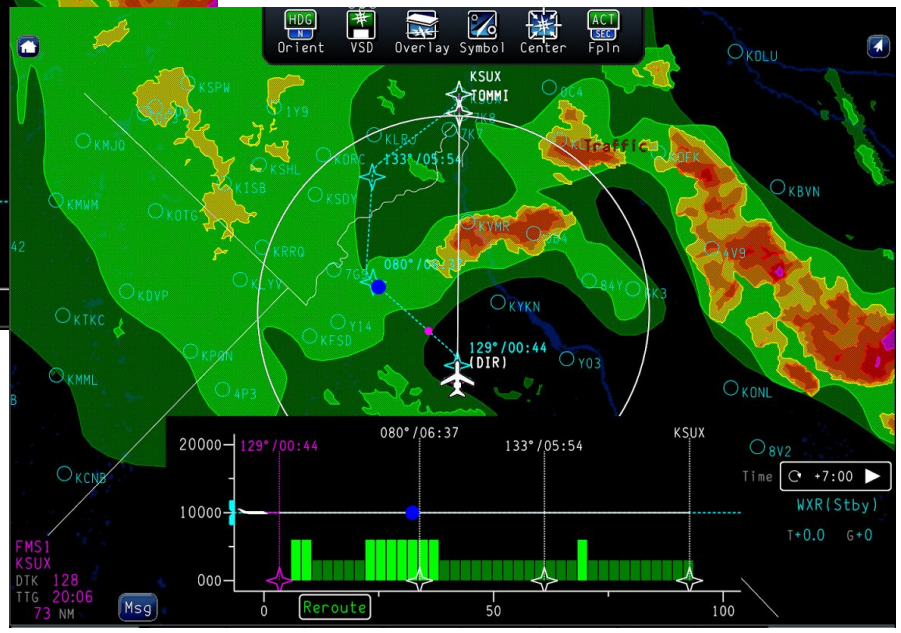
Data Fusion automates complex datalink usage logic and takes advantage of the strengths of each sensor source.

Global weather vendors current convective products may miss or overestimate threat regions and may be as much as an hour or more old. Rockwell Collins is prototyping global consistent (fused best of class; including our on-board sensors/systems) to provide global weather alerting and support route optimization.

Human Machine Interface (HMI) Research

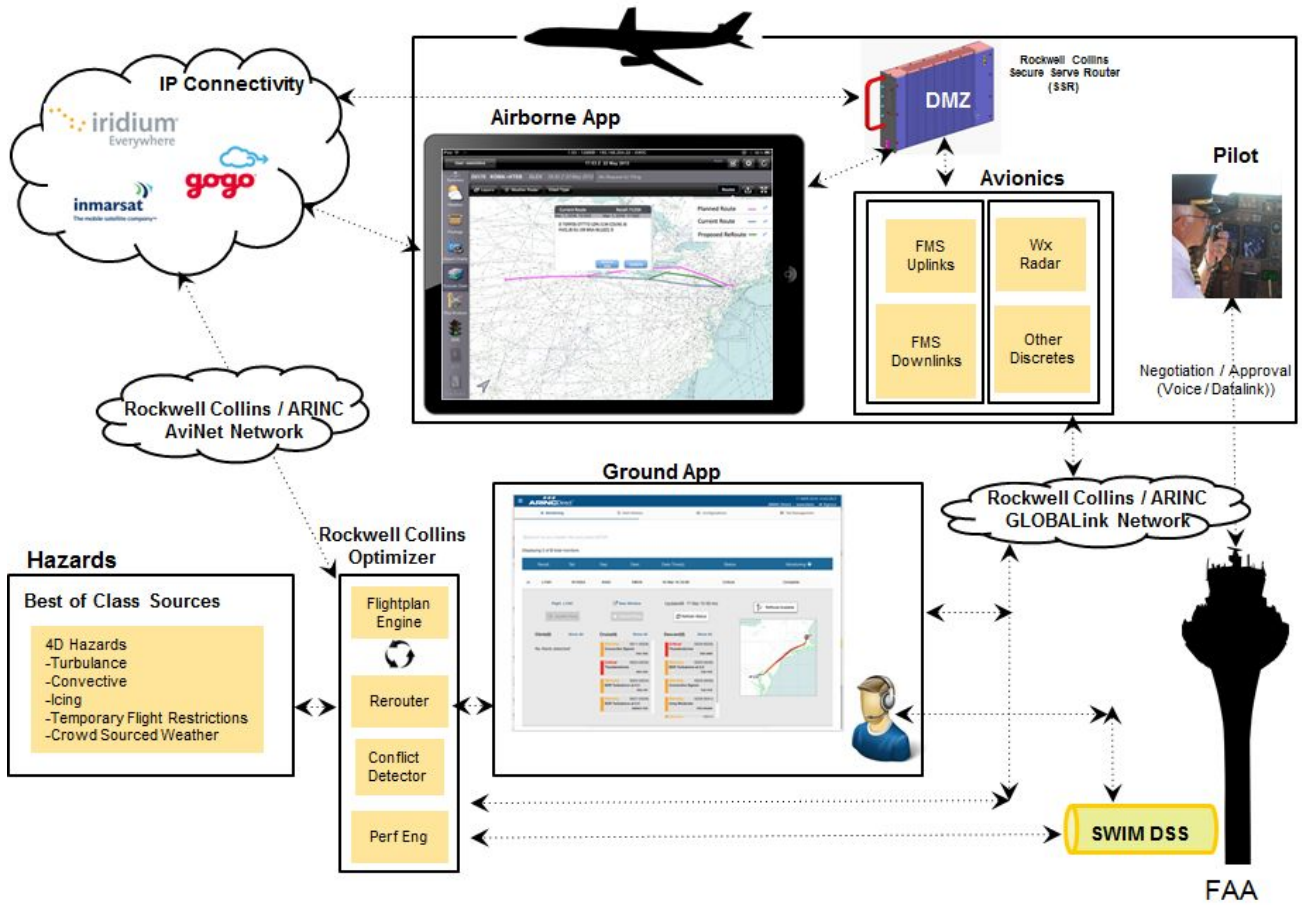






Rockwell Collins is prototyping methods to provide the right information, in the right way, at the right time to both airborne and ground based systems.

Connected Aircraft Research



Rockwell Collins is prototyping the connected aircraft ecosystem: seamless secure air-ground communications; secure two-way avionics interfaces; effective human machine interfaces; and accurate timely weather. The intent of these efforts is to validate and demonstrate components of a complete system and to facilitate the formation of ROI indices.

Where do we go from here?

$$1 + 1 > 2$$

The Advanced Technology Center (ATC) of Rockwell Collins has been exploring technologies fundamental to the 4DT solution space. We have presented research centric to the aircraft and operator (two legs of the three legged stool). We believe this research can be extended to support the third leg; working toward the goal of a single unified view of the airspace.

Thank you.

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