

The background of the image is a blurred, high-angle view of an aircraft cockpit, showing various instruments, screens, and control panels. The text is overlaid on this background. The word 'Avionics' is in a large, blue, italicized sans-serif font. Below it, the word 'FOR' is in a smaller, blue, all-caps sans-serif font, flanked by two horizontal lines. Below that, the words 'NEXT GEN' are in a large, blue, all-caps sans-serif font.

Avionics

— FOR —

NEXT GEN

www.AvionicsForNextGen.com

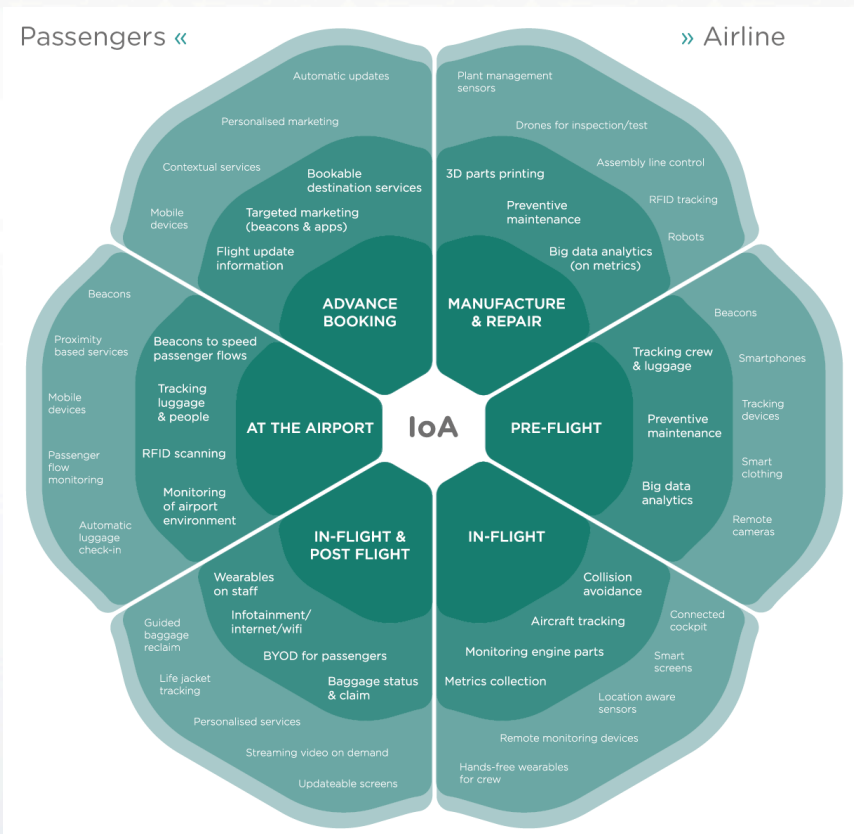
Internet of Things in Air Traffic Management

November 16, 2017



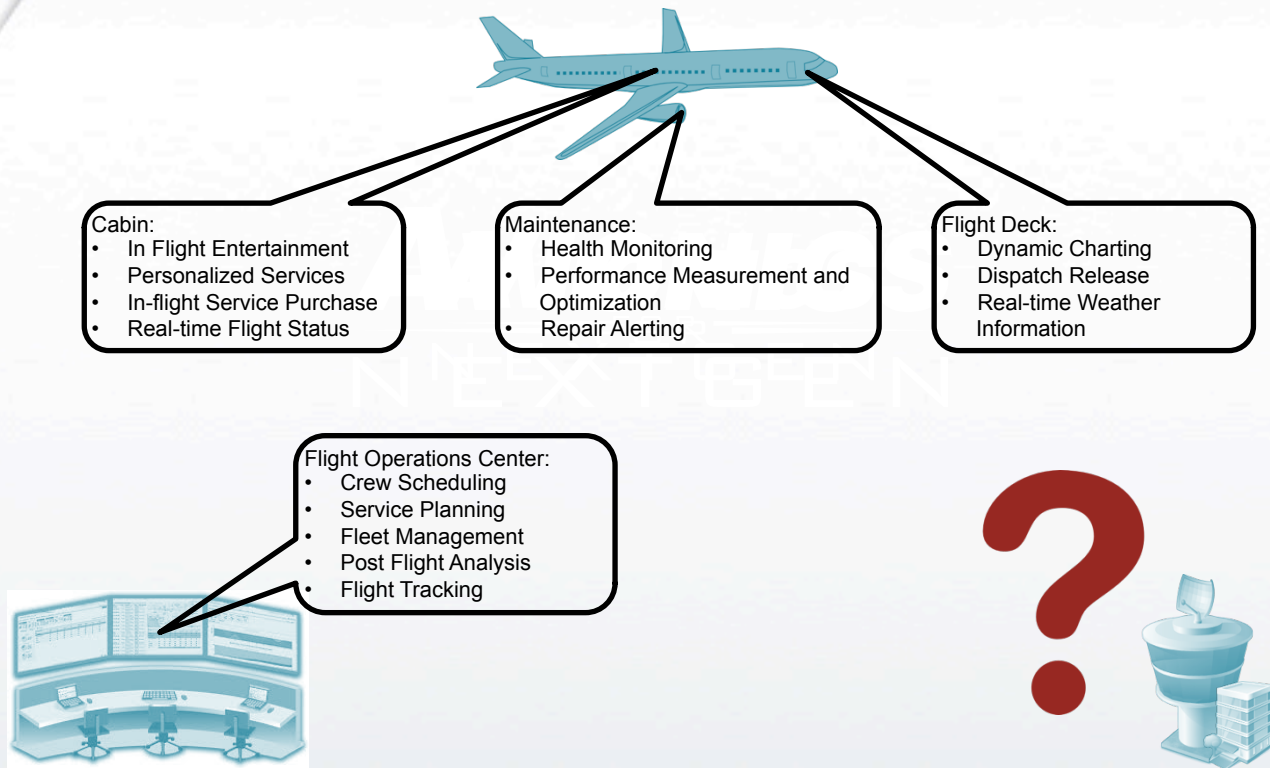
Biruk Abraham
Operations Research Analyst
FAA

Internet of Aviation



Source: <https://internetofbusiness.com/events/internet-of-aviation-emea/>

Connected Aircraft – Current Applications

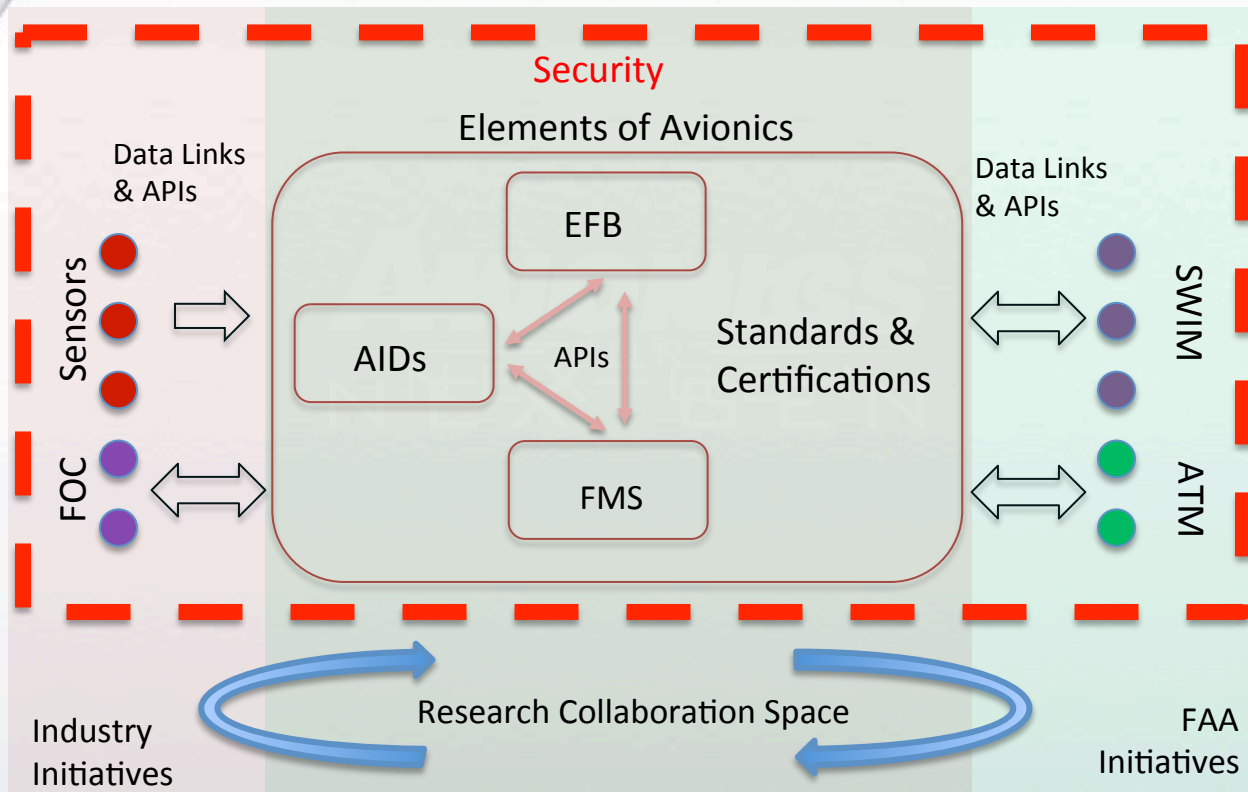


Connected Aircraft Research Scope

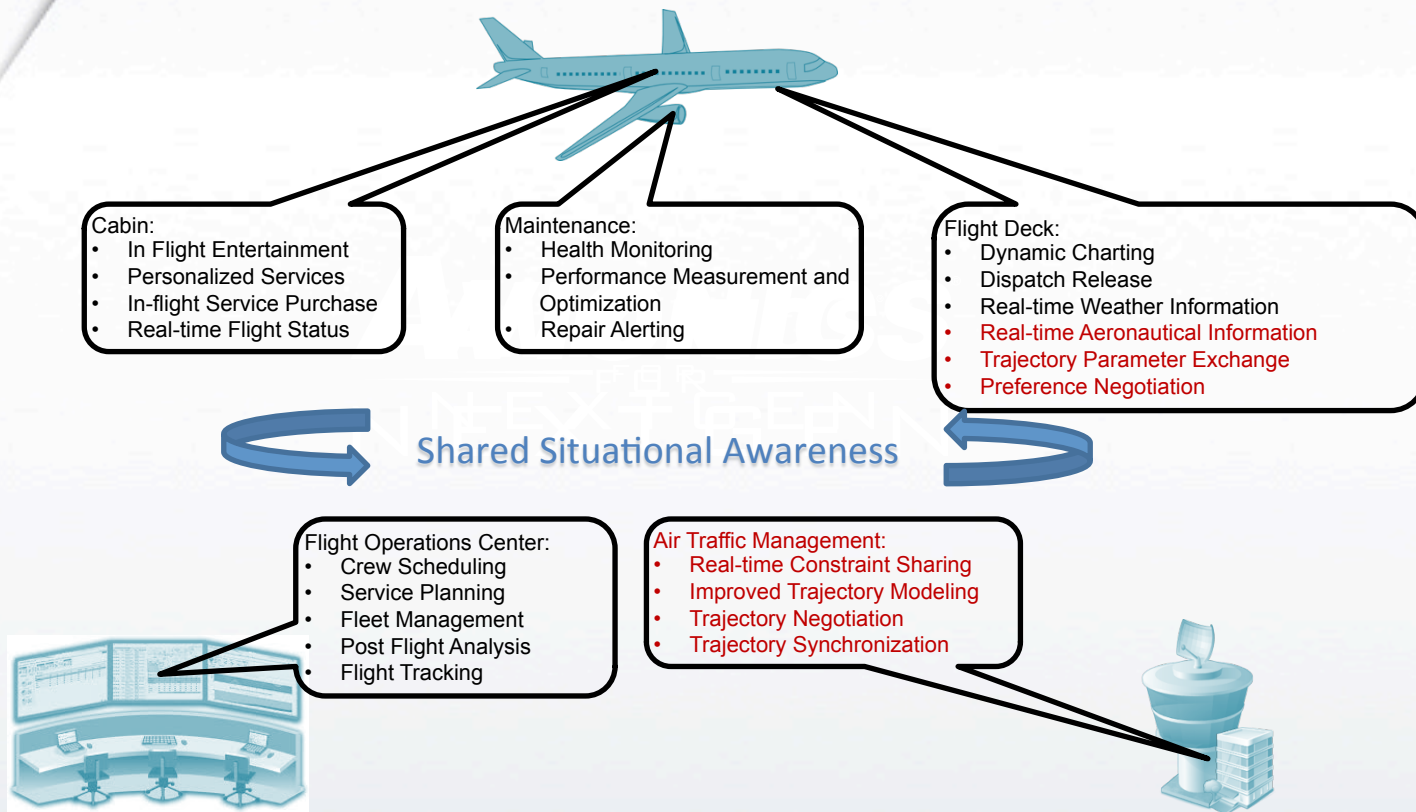
- Internet Protocol (IP) Data Link Connectivity
- Electronic Flight Bag (EFB)
- Aircraft Interface Device (AID)

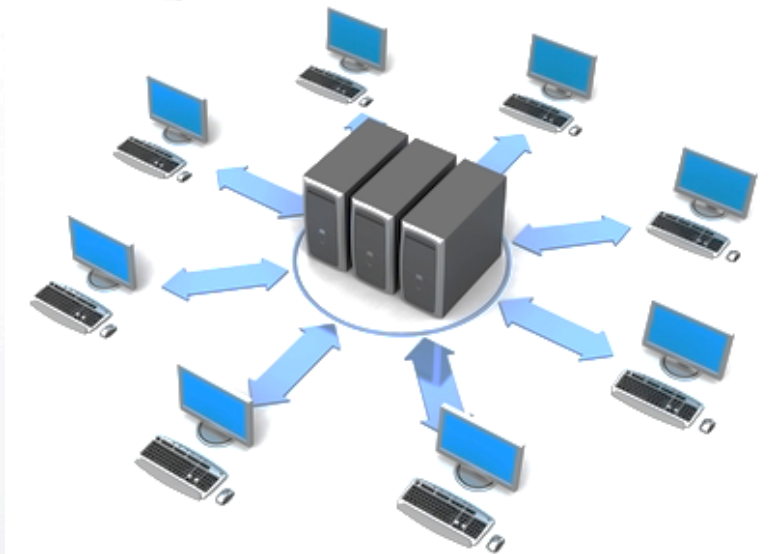


IoT for Avionics - Notional



Connected Aircraft – FAA Research Areas





Data Products Available via SWIM

System Wide Information Management
Information Access to Transform the Aviation Community



Provided below is a list of SWIM Producers and the SOA Services and data products that are made available via the NAS Enterprise Messaging System (NEMS). Send an email request to Data-To-Industry@faa.gov to get started with the process of getting access to SWIM Data.

Product Availability

Learn more about how to Get Connected to SWIM Data or view the External Consumer Brief

Producer	Description	NSRR Business Service Name	Availability
AIM FNS	Provides Notice to Airmen (NOTAMs)	<ul style="list-style-type: none"> FNS NOTAM Distribution 	<div>via NESG: Now Available</div> <div>R&D: Now Available</div> <div>FNTB: Now Available</div>
AIM SAA	Provides Airport reference and configuration data, including: definitions and schedule information for Special Activity Airspace (SAA), Temporary Flight Restriction (TFR), procedure (RNAV/RNP) data, and obstacles.	<ul style="list-style-type: none"> Get Static SAA Put Static SAA SAA Operational Schedule SAA Schedule Notification Static SAA Update Notification 	<div>via NESG: Summer 2014</div> <div>R&D: Summer 2014</div> <div>FNTB: Now Available</div>

AIMM Segment 2 (S2) will
during the process

<https://www.faa.gov/nextgen/programs/swim/products/>

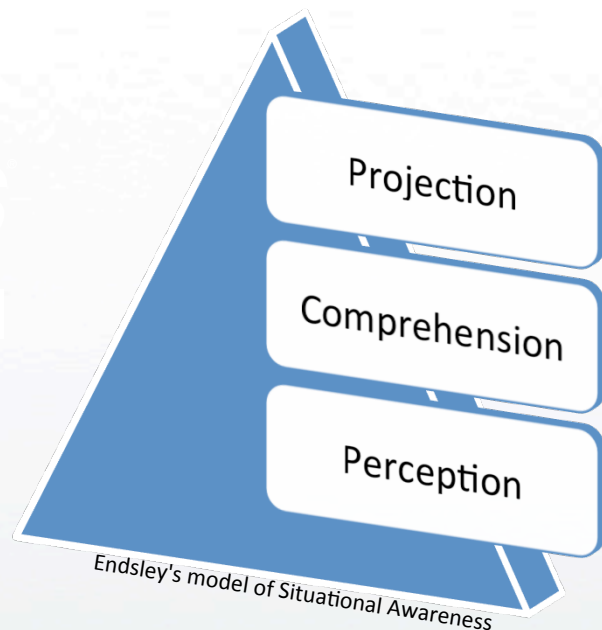
Considerations Based on Intended Use

- Quality of Service
- Information Security
- Human Factors

Information

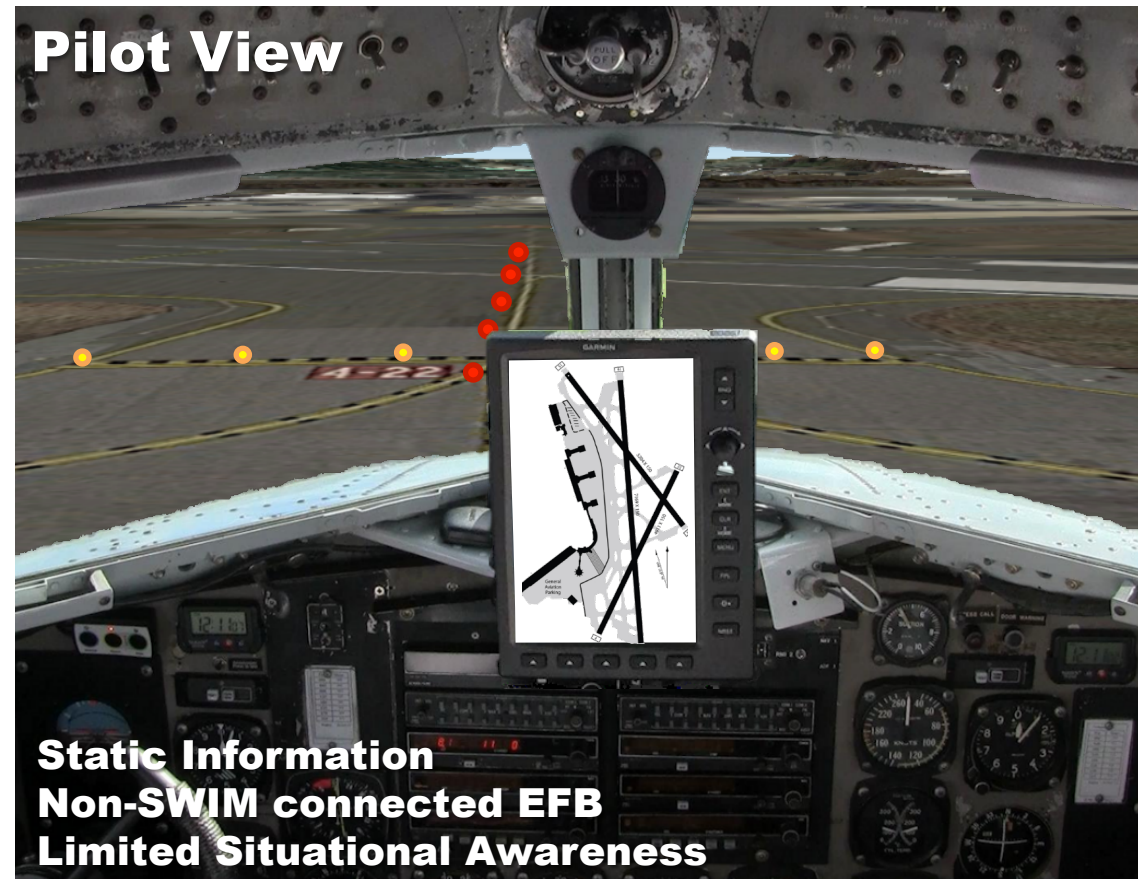
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Situational Awareness



Surface Movement Today

Pilot View

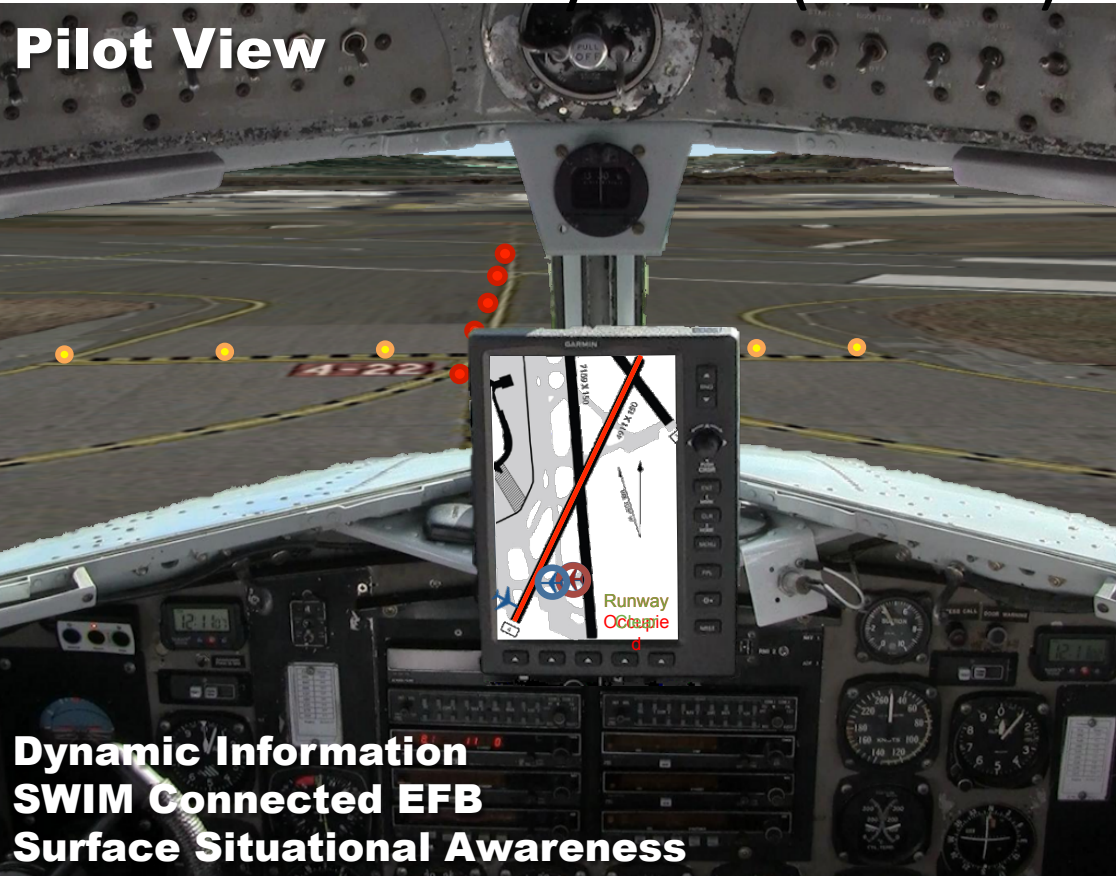


Overhead View



Surface Movement with SWIM Terminal Data Distribution System (STDDS)

Pilot View



Dynamic Information
SWIM Connected EFB
Surface Situational Awareness

Overhead View



Pilot Perspective



FAA Air/Ground System Wide Information Management (SWIM) Demonstration Prototype



NASA Traffic Aware Strategic Aircrew Requests (TASAR)

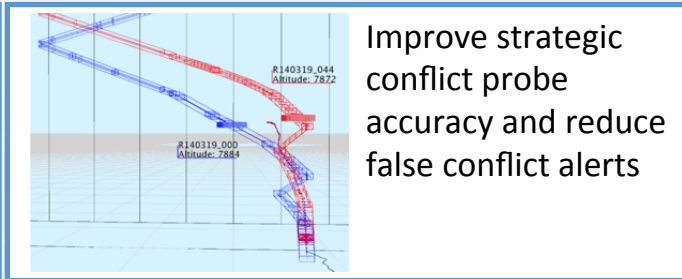
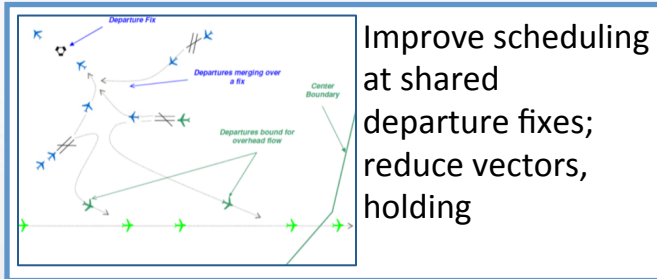
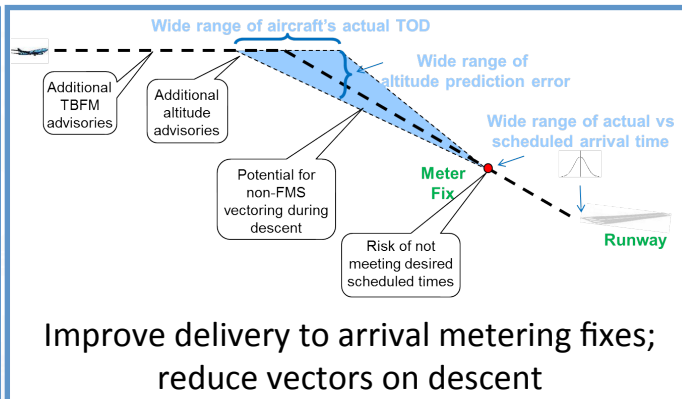
<https://technology.nasa.gov/patent/LAR-TOPS-148>



MITRE Mobile Departure Clearance Prototype

<https://youtu.be/XdC2lCKtxd0>

Air Traffic Management Applications

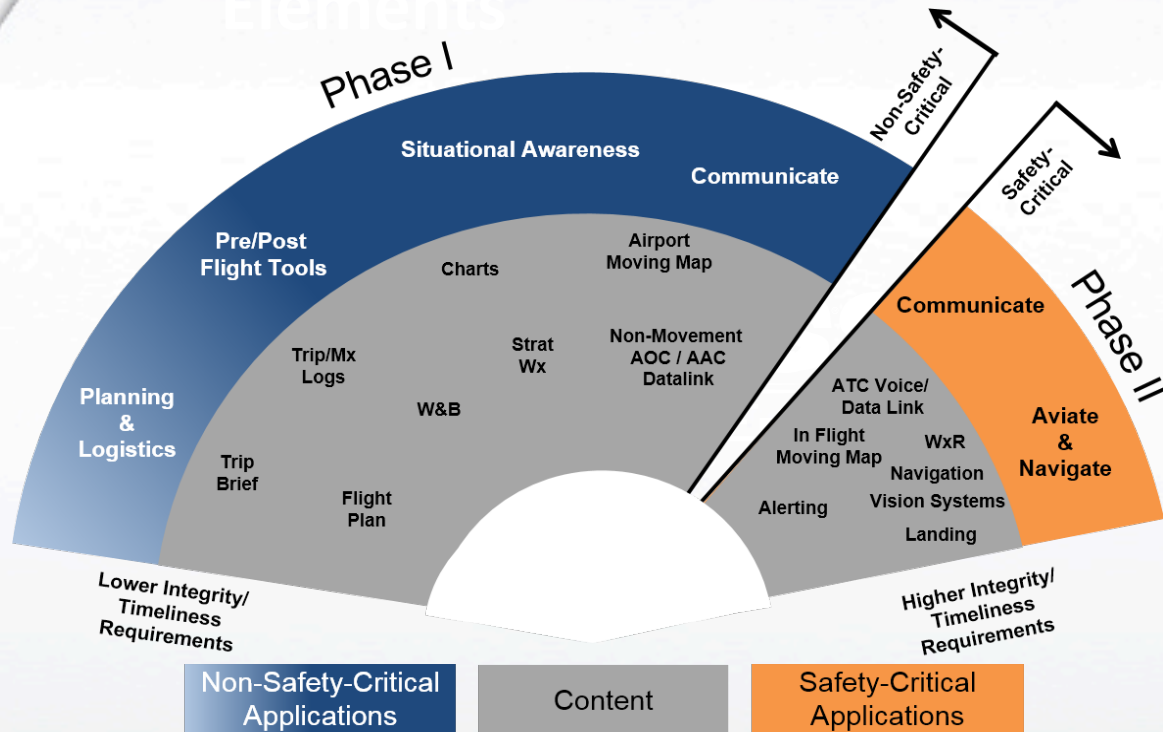


- The Global Air Navigation Plan (Doc 9750) introduces Aviation System Block Upgrade (ASBU) Block 2 (B2)-SWIM “Enabling Airborne Participation in Collaborative Air Traffic Management (ATM) through SWIM”
 - Allow the aircraft to be fully connected as an information node in SWIM, enabling full participation in collaborative ATM processes with exchange of data
- ICAO SWIM Manual (Doc 10039) §5.2 introduces Air-Ground SWIM
 - Focuses on what types of information (services) are needed to improve the exchange and access to information between flight crews and ground operations
 - Future editions will include additional concept and implementation guidance for Air-Ground SWIM
 - Phase I: Non-Safety Critical
 - Phase II: Safety Critical



Air/Ground Data Exchange

Elements



ANSP Improvements:

- SWIM Infrastructure and Services Maturity
- Air Traffic Management Automation Improvements
- Adoption of Cloud implementation concepts

Flight Deck Technologies:

- IP Data Link Advancements
- Increased EFB and Avionics Integration
- Automated Aircraft Sensor Data Downlink
- Much more....
- Substantial research and innovation needed
- Need to embrace Internet of Aviation in Air Traffic Management

