



# Aircraft Interface Device

## Connecting Assets to Operations

# SmartDMS (Data Management System) with aircraft interface device (AID) ... unlocking your data, connectivity



## SmartDMS (data management system)



Aircraft health



Full flight data



Environment data



Route data



Maintenance logs

## AID (Aircraft interface device)



Connected flight management system



Electronic flight bag



Electronic logs



Internal apps



3rd party apps

## Improving operations

Reducing pilot, maintenance workload

Reduces operational cost and streamlines operations

Improved safety and operations

Predictive maintenance

Improved asset management, availability

Increased operational insights



# Aircraft health management system ... providing aircraft interface device enablement



## SmartDMS ... reducing workload

### The Problem

Increasing operational complexities that rely upon federated aircraft systems are increasing pilot and maintenance workload

### The Digital Solution

Streamlining access to real-time aircraft data for crew and maintenance personnel. Maximizing the full potential of Electronic Flight Bags (EFB) enabling them to provide actionable insights, increasing operational efficiency, and assist in reducing unscheduled maintenance and disruption.

### The User Experience

- Integrate with EFB's & other aircraft functions to gain access to necessary applications to enable crew to realize operational benefits
- Seamless integration with aircraft data busses
- Supports rapid development and deployment of EFB applications built to industry standards
- Worldwide 4G and WiFi wireless communication interfaces
- Secure communications to ground solution for multiple aircraft platforms

### SmartDMS (data management system)



### AID (Aircraft interface device)



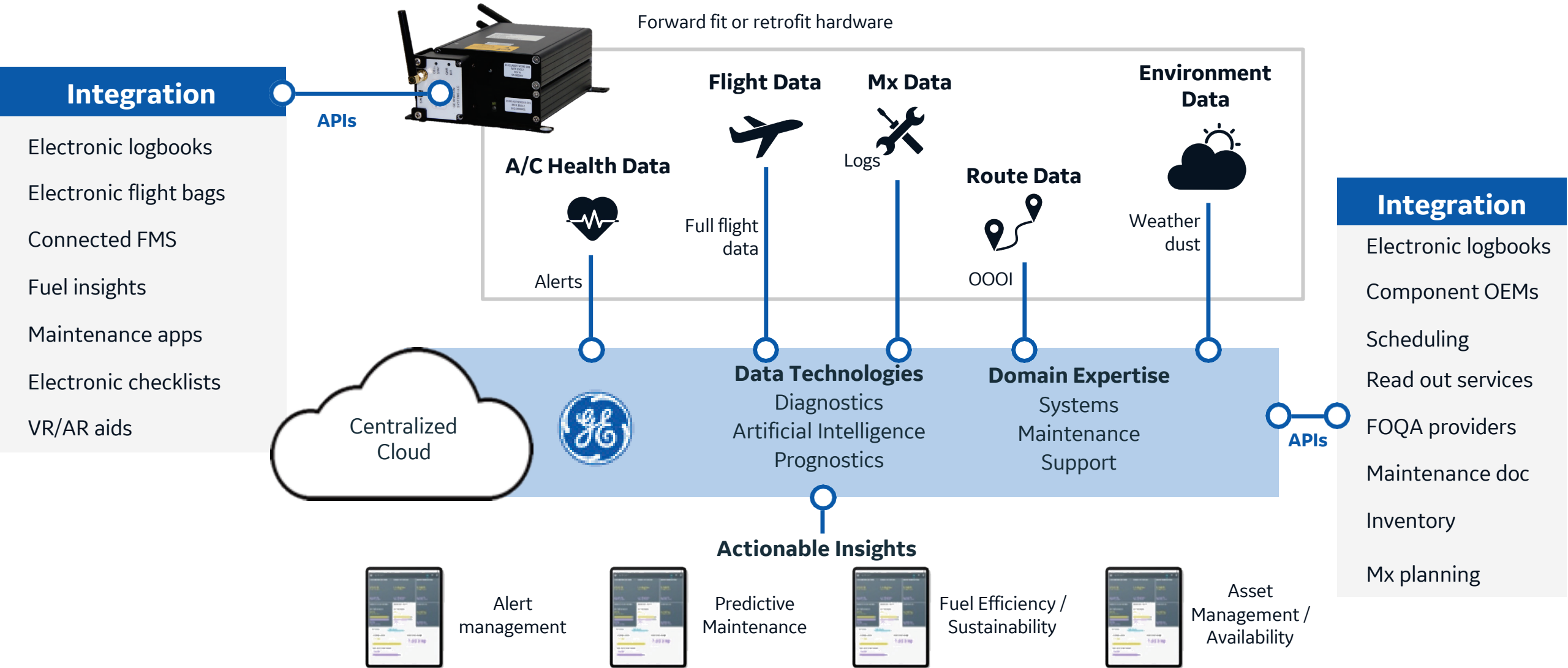
## Capabilities

- Wireless QAR (quick access recorder)
- Aircraft interface device (AID)
- Secure communications
- Aircraft health
- MOQUA

## Outcomes

- Improved pilot workload
- Reduces operational cost and streamlines operations
- Improved safety and aircraft operation

# Connecting assets to operations ... utilizing aircraft data to deliver seamless user experiences





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# Augmented Checklist

# Augmented electronic checklist ... enhancing safety



~20%  
non-compliance

of business jet flight  
control checks prior  
to take-off 2013-2015

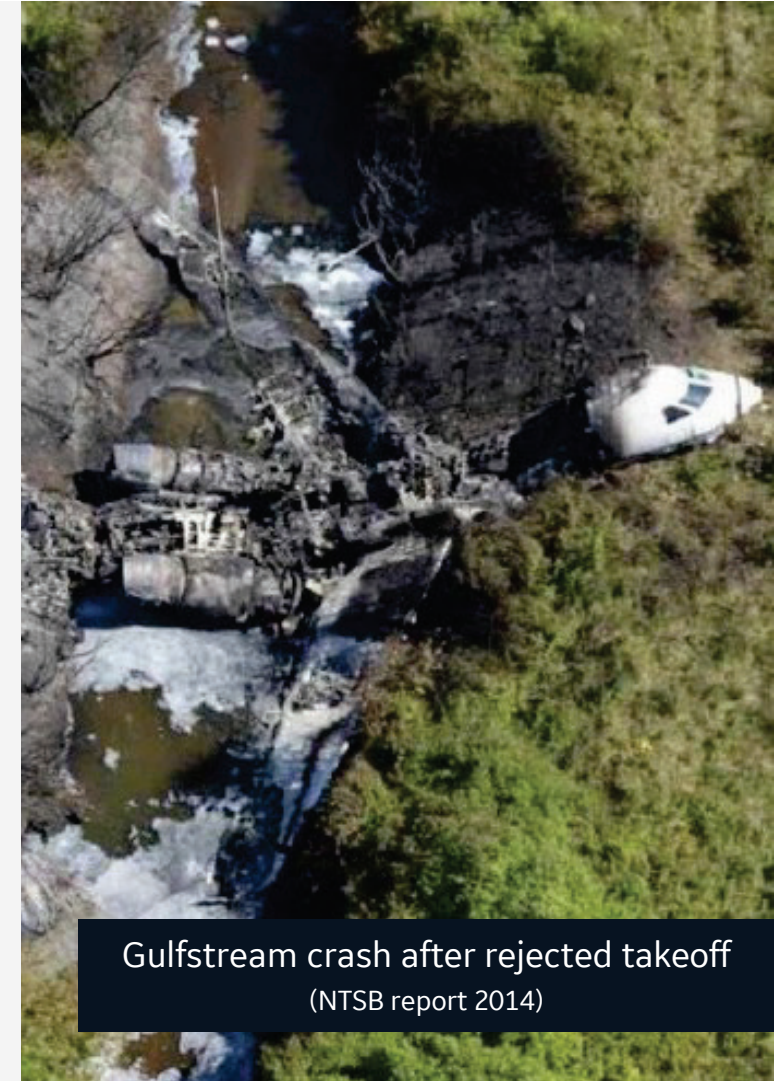
(Source: NBAA)

*“An Analysis of the Effectiveness of Checklists when combined with Other Processes, Methods and Tools to Reduce Risk in High Hazard Activities” – William Y. Higgins, Daniel J. Boorman*

“...4-ways that aircraft flight crews deviate from the proper use of checklists....”

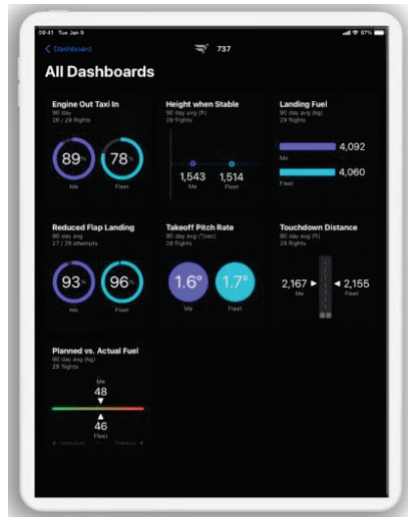
- At times a crew member simply does not do the checklist
- The crewmember may do the checklist but misses an item
- A crewmember responds to the call on the checklist as required but indicates it is checked or set, when in fact it is not checked or set
- The crew may start the checklist, but it is interrupted for some reason and not completed.”

– Boeing Technical Journal – 2016 paper excerpt



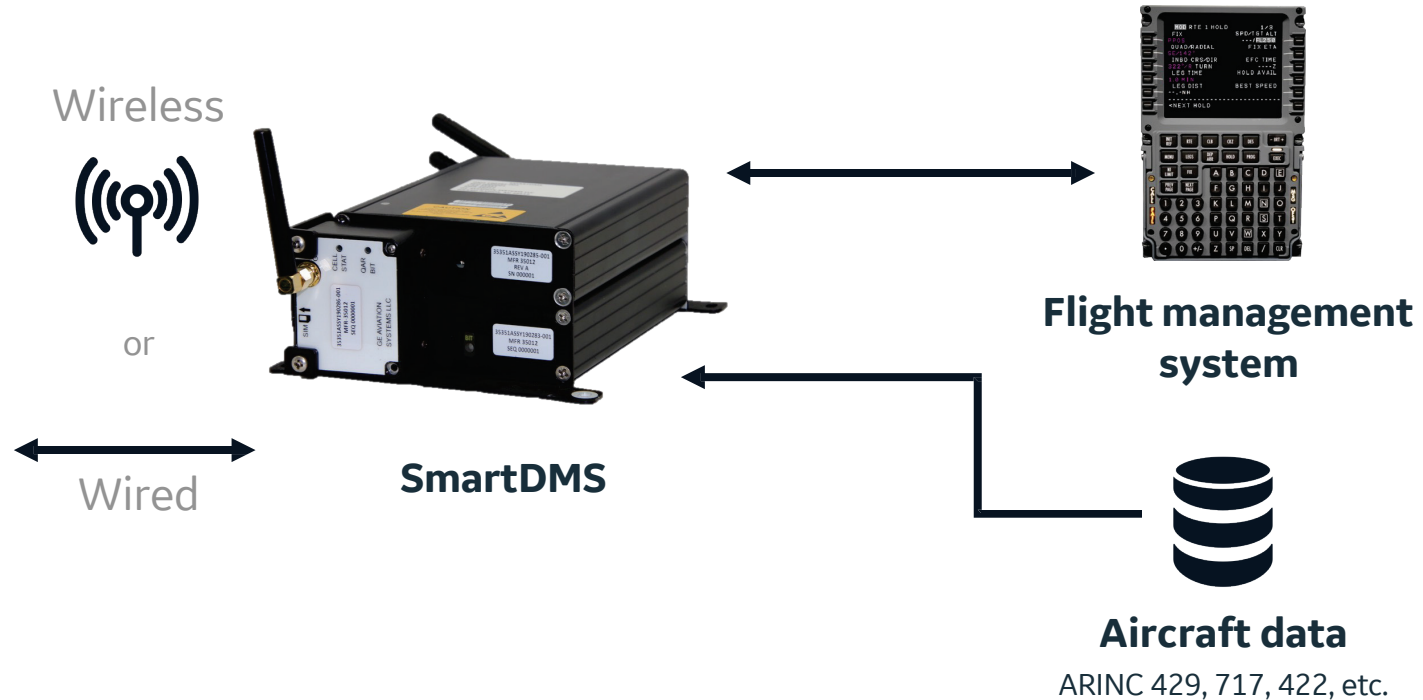
Gulfstream crash after rejected takeoff  
(NTSB report 2014)

# Aircraft data assists completion of checklist ... SmartDMS provides safe, secure data between aircraft and pilot tablet



## Pilot tablet

Checklist or logbook application



~92%

of the checklist involves aircraft data

## Outcomes

- Reduced pilot workload
- Enhanced safety
- Improved maintenance

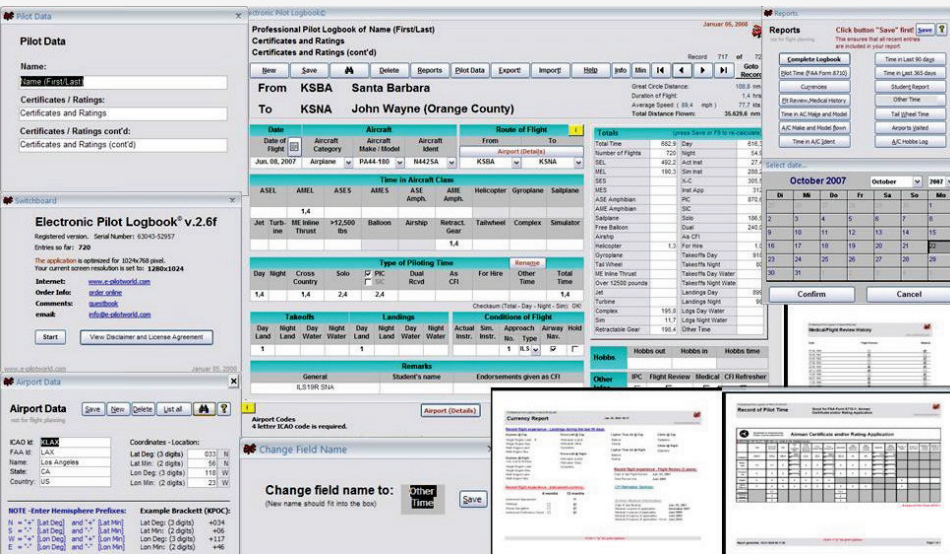


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# Electronic Logbook



# Enhanced electronic logbooks ... backed by industry research



## How Electronic Technical Logbooks Enable Seamless Pilot-to-Maintenance Collaboration

By Kirk Strutt | December 30, 2019

**Case Study: Electronic Technical Logbook at Swiss International Airlines**  
Author: Marcus Di Lorenzo, Technical Project Engineer, SWISS International Airlines, and Udo Stapf, CEO, CrossConsense

## Outcomes

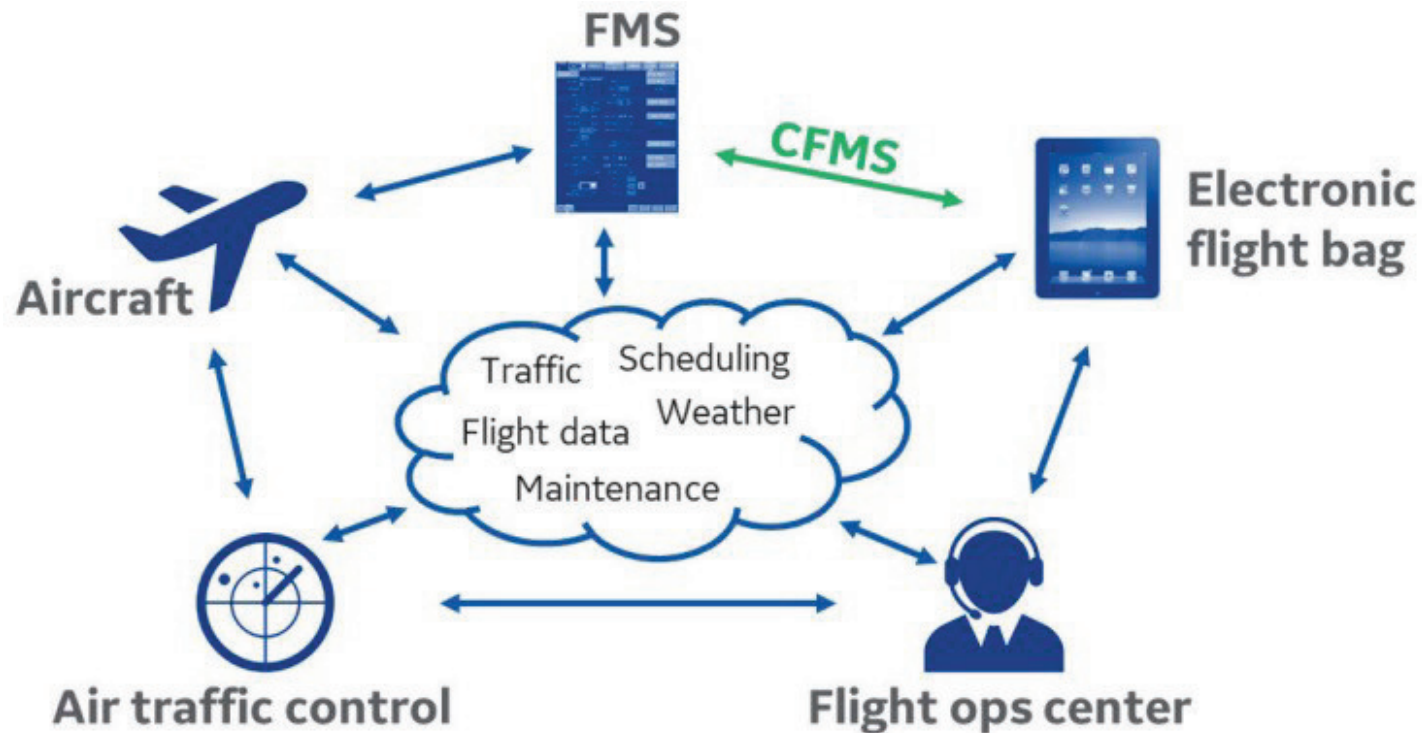
- Reduce data entry errors
- Enhance reports w/ aircraft data
- Reduce mx troubleshooting
- Initiate/and enable in-air troubleshooting
- Reduce NFF events
- Reduce AOG events
- Enhance overall fleet reliability



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# Connected Flight Management

# Connected flight management ... delivering operational efficiencies



## Safety

- Less manual entries
- Enhanced manual cross checks
- Increased accuracy

## Efficiency

- Cloud analytics
- Faster preflight
- Wind optimization
- Fuel management
- Route time/fuel savings





## Enhanced capabilities

- Trajectory overlay with traffic, weather, charts
- Real-time performance
- Aircraft health

# Connected Flight Management Use Cases



## Connected FMS Use Cases

	Use case scenario	Unconnected	Connected	Value
	<b>Pop up thunderstorm causing immediate reroute need</b>	Ask ATC via VHF to find a new altitude, route, or manual vectors for reroute	EFB app has real-time weather and advises optimal route to avoid turbulence	Quicker action avoids turbulence, optimizes fuel savings
	<b>Much stronger jet stream tail wind is reported 2,000 feet above current cruise altitude</b>	Request altitude change with ATC, risk of never getting cleared for another altitude change	Request clearance for all lateral and vertical optimizations simultaneously	Fuel savings, faster enroute times capitalized on more often by pilots than manual entry methods
	<b>Tight turnaround time and AOC datalink is down/unavailable</b>	Manually enter and crosscheck entire preflight and route, may take up to 10+ minutes, prone to human (entry) errors	Transfer entire filed flight plan and preflight entries with a click of a button	Less chance for safety mishap, less dependence on AOC/ACARS availability, reduce ACARS costs
	<b>Trajectory data gathering and sharing</b>	Unable to access/share data other than from the cockpit	Can safely meet airspace constraints and enable airspace network optimization	Network benefits such as preferred time slots, ease congestion, especially at major hubs



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# AID Architecture

# Aircraft interface device (AID) ... proven interface between aircraft data and non-traditional aircraft systems



Standardized ARINC 834 protocol for lower cost application development

Supports wired or wireless connectivity to EFB

Supports 1-way or 2-way communications with Aircraft Systems

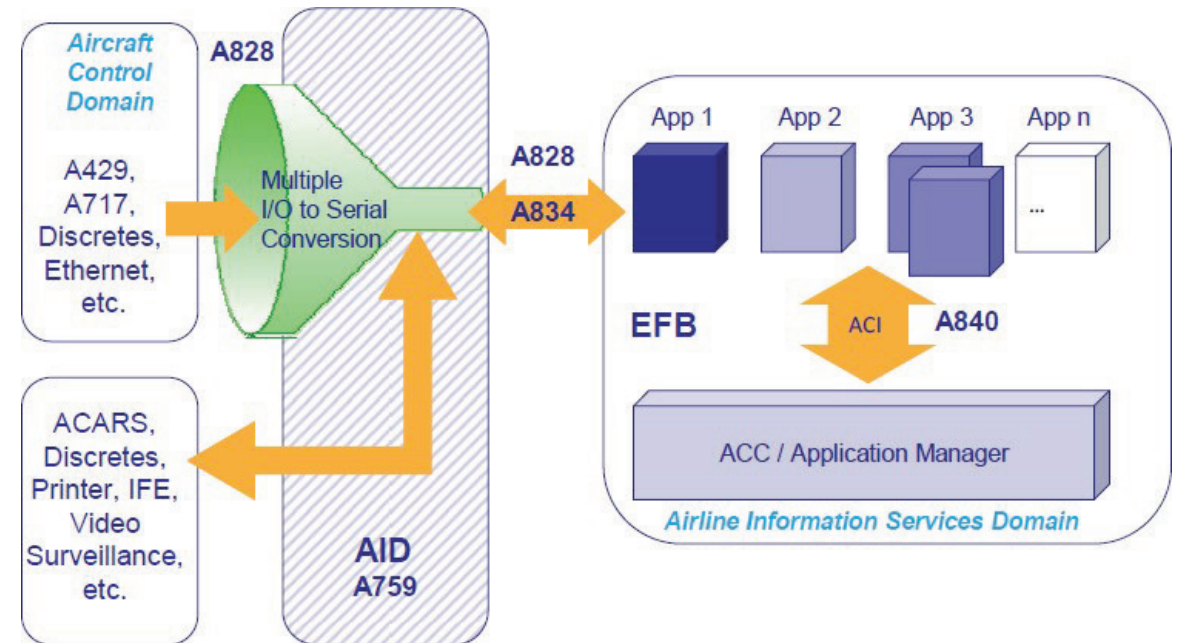
Enables greater airline integration with

- Live aircraft data
- Aircraft systems (e.g. FMS)

Reduce Pilot workload

Enhance Safety

Fosters collaboration



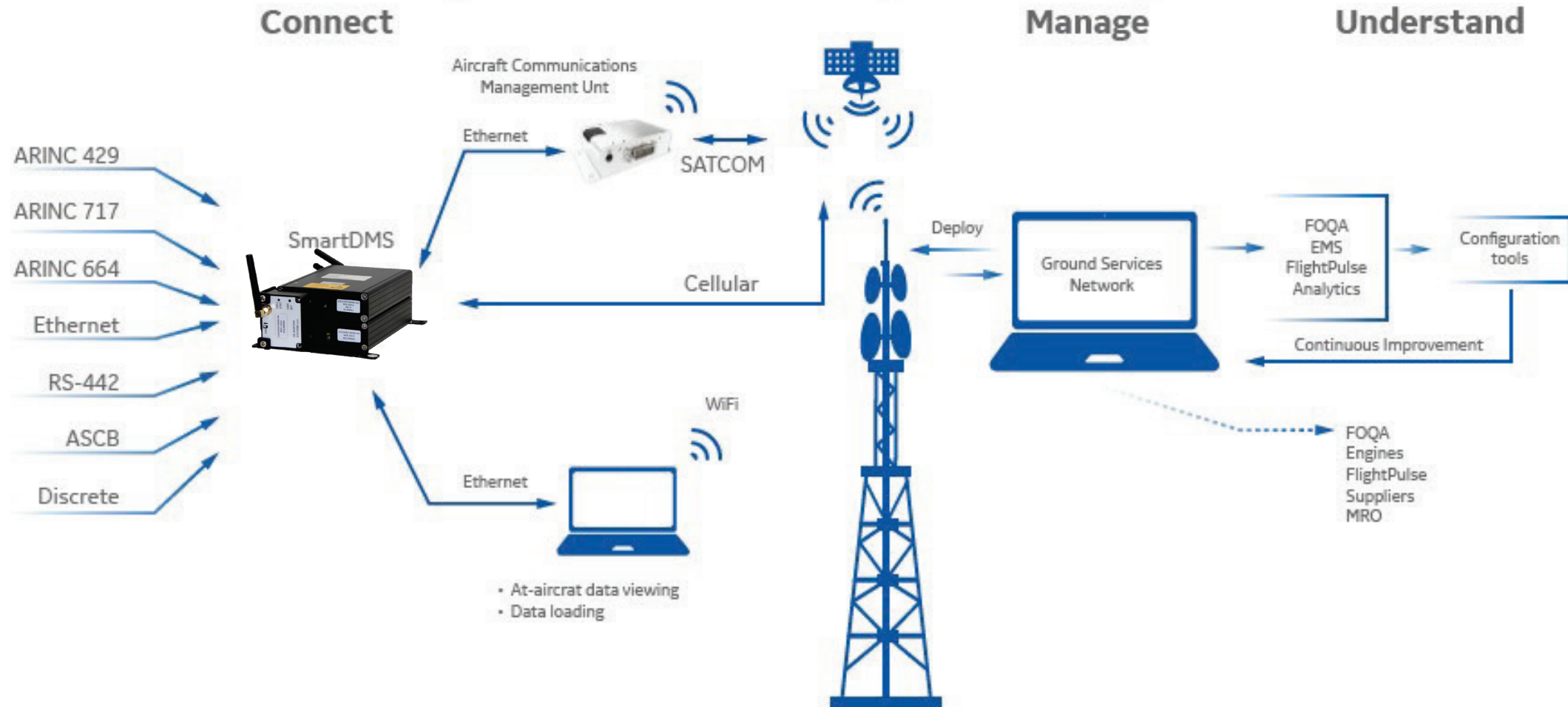


# — SmartDMS

# IVHM Operational Diagram

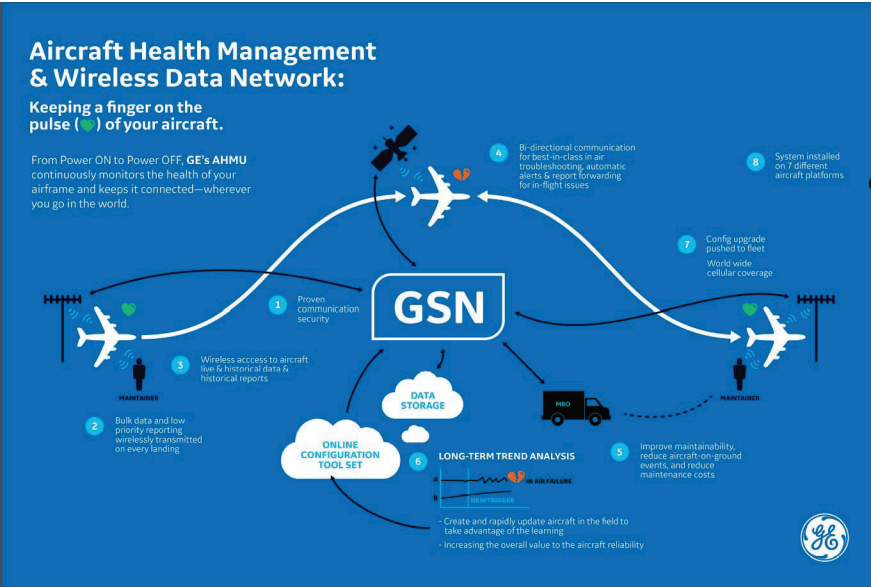


## GE Integrated Vehicle Health Management (IVHM) System





# SmartDMS Product



## SmartWIFI Module

- WIFI Modem
- Fielded Product
- Established Pedigree

## SmartHMU Module

- Primary Module

## SmartCM Module

- Cellular Module
- Fielded Product
- Established Pedigree

## Ground Services

- Connect to aircraft anytime anywhere
- Interact with aircraft (e.g. remotely query for data)
- Data visualization and flow status
- Platform to deploy analytics and integrate further with operations (e.g. maintenance systems)

## Key characteristics

Size: 2.48" x 5.91" x 8.26"  
 Weight: 2.33lbs Max wt.  
 Power: 28Vdc power input; 2.45A Max; 1.01A Nominal  
 Interfaces:

1 - 10/100/1000 Ethernet	1 - 802.11N CWLU
6 - 10/100 Ethernet	3 - RS422 (1) Tx (2) Rx
8 - A-429 Receive	1 - ASCB-C
1 - A-717 Receive	15 - OG Discrete Inputs
1 - 4G Cat6 Cellular	3 - OG discrete Outputs

DAL D Certified SW  
 Security Certification per aircraft platform  
 Configuration Toolset  
 Real-time in air alerting/Data Query  
 At aircraft live data viewing  
 AID interface capable  
 Ground Services data & fleet management

