

# **FAA Office of NextGen (ANG)**

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## **REDAC / NAS Ops**

Review of FY2022 – 2024 Proposed Portfolio

***Flight Deck Data Exchange Requirements***

***BLI Number:***

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***Date: 08/31/2022***

# FD DER Overview

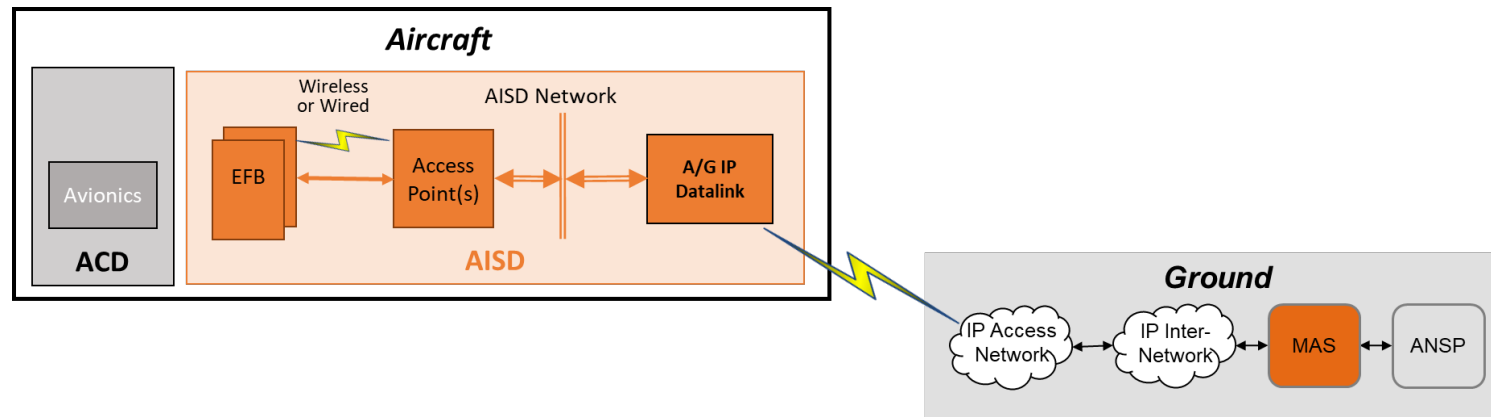
## Project Description:

- FD DER project supports advanced exchanges of information between aircraft and ground systems by identifying and addressing cybersecurity gaps for onboard avionics with specific focus on Electronic Flight Bag (EFB) and Aircraft Interface Device (AID) as well as Internet Protocol (IP) datalinks
- Identify mitigations to guarantee data integrity, when the data is coming from
  - Untrusted sources (e.g. EFB), or
  - Untrusted networks (e.g. IP Datalinks), into the Airline Information AISD or ACD Domain
- Conduct security analysis through selected test cases of applications.



# Project Focus Area

- The FD DER project conducted a comprehensive cybersecurity analysis for connected aircraft applications\*
  1. Identified a generic connected aircraft architecture:



2. Analyzed sample applications such as Trajectory Negotiation and Digital Taxi Instructions

\*"Cybersecurity for Flight Deck Data Exchange," 2021 IEEE/AIAA 40th Digital Avionics Systems Conference (DASC), 2021

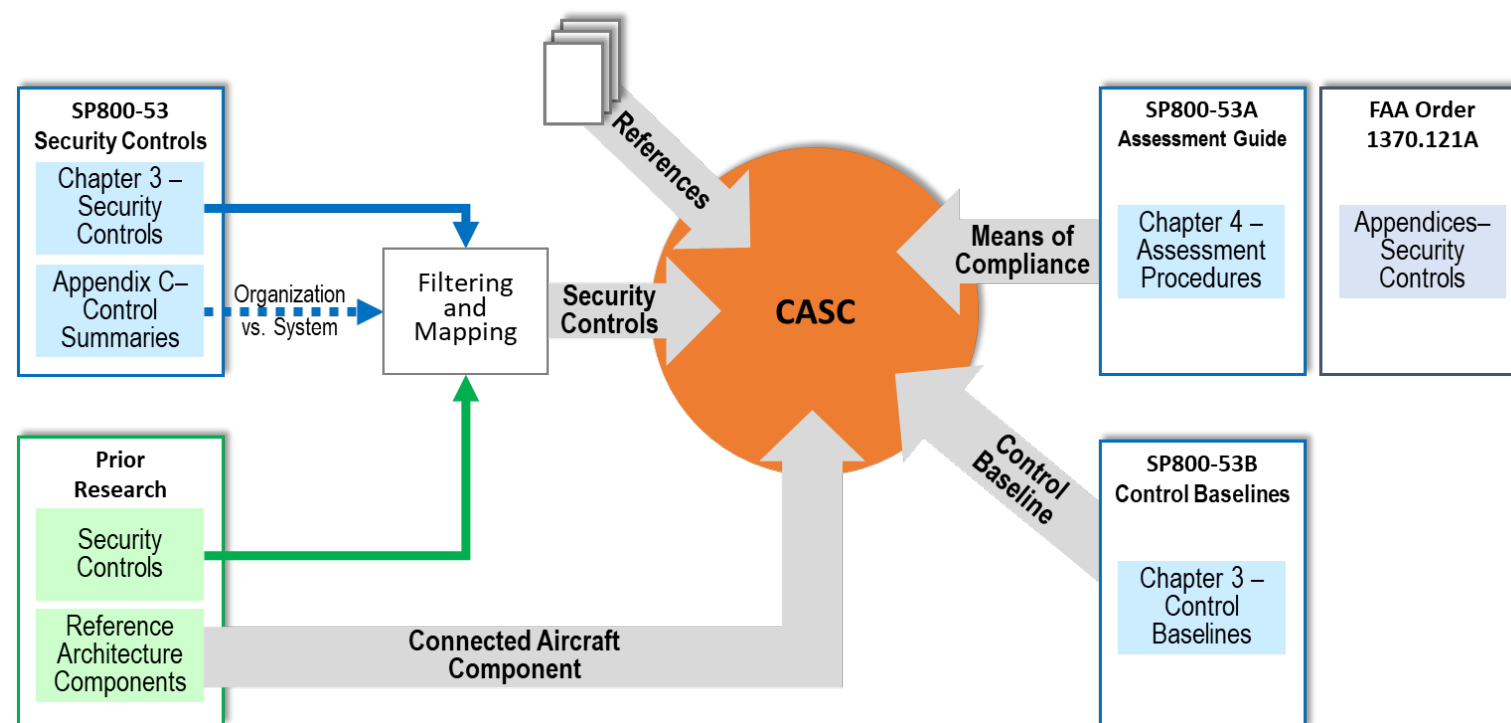
The Connected Aircraft Security Controls (CASC) tool was developed to capture the results of this work and make it easier for others to use the results in new projects

# Security Controls Framework

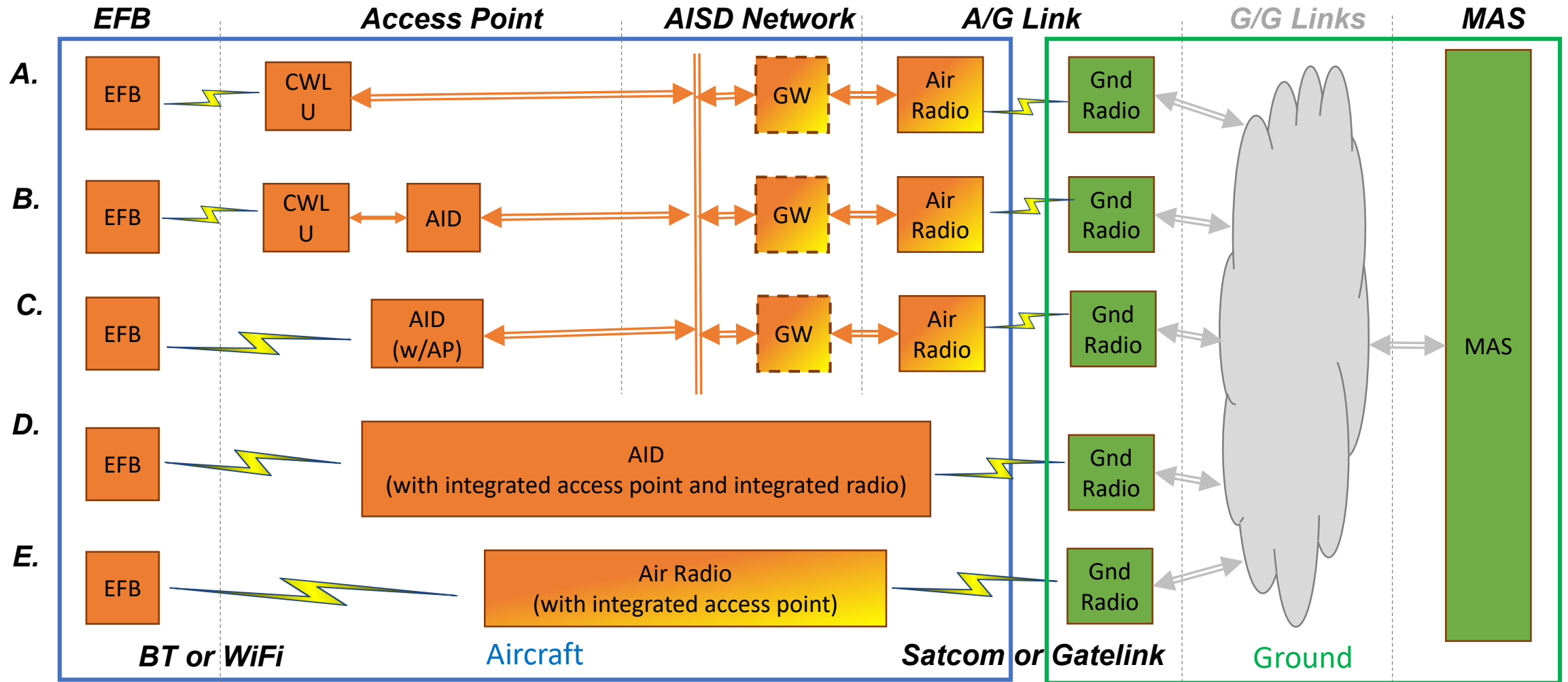
- Safe Guarding Confidentiality, integrity and availability of information
- Security Controls can be:
  - Technical – i.e., capabilities implemented technically in system hardware and/or software
  - Organizational – i.e., capabilities implemented through organizational processes and procedures
- NIST SP 800-53 organizes Controls into 20 Families where each Family relates to a specific topic

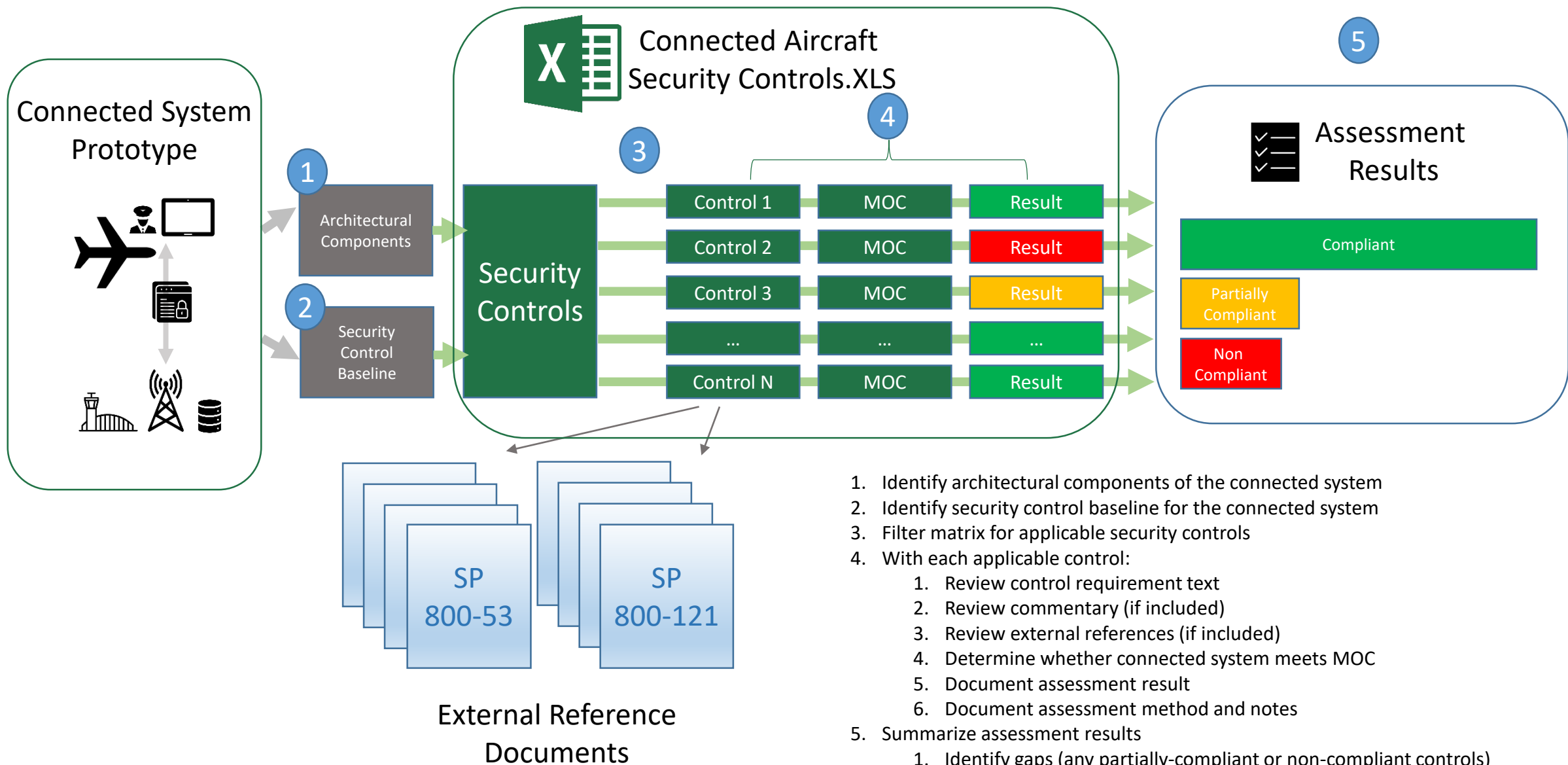
# Connected Aircraft Security Controls

- Harmonization and distillation of Security Controls from NIST SP800-53 & FAA Order 1370-121A
- Follow risk assessment methodology per NIST SP800-53A and RTCA DO-326A, Airworthiness Security Process
- Leverage security controls for Low, Moderate and High Impact Baselines per NIST SP 800-53B
- Tailored & allocated Controls to CA architecture components to satisfy the Baseline requirements

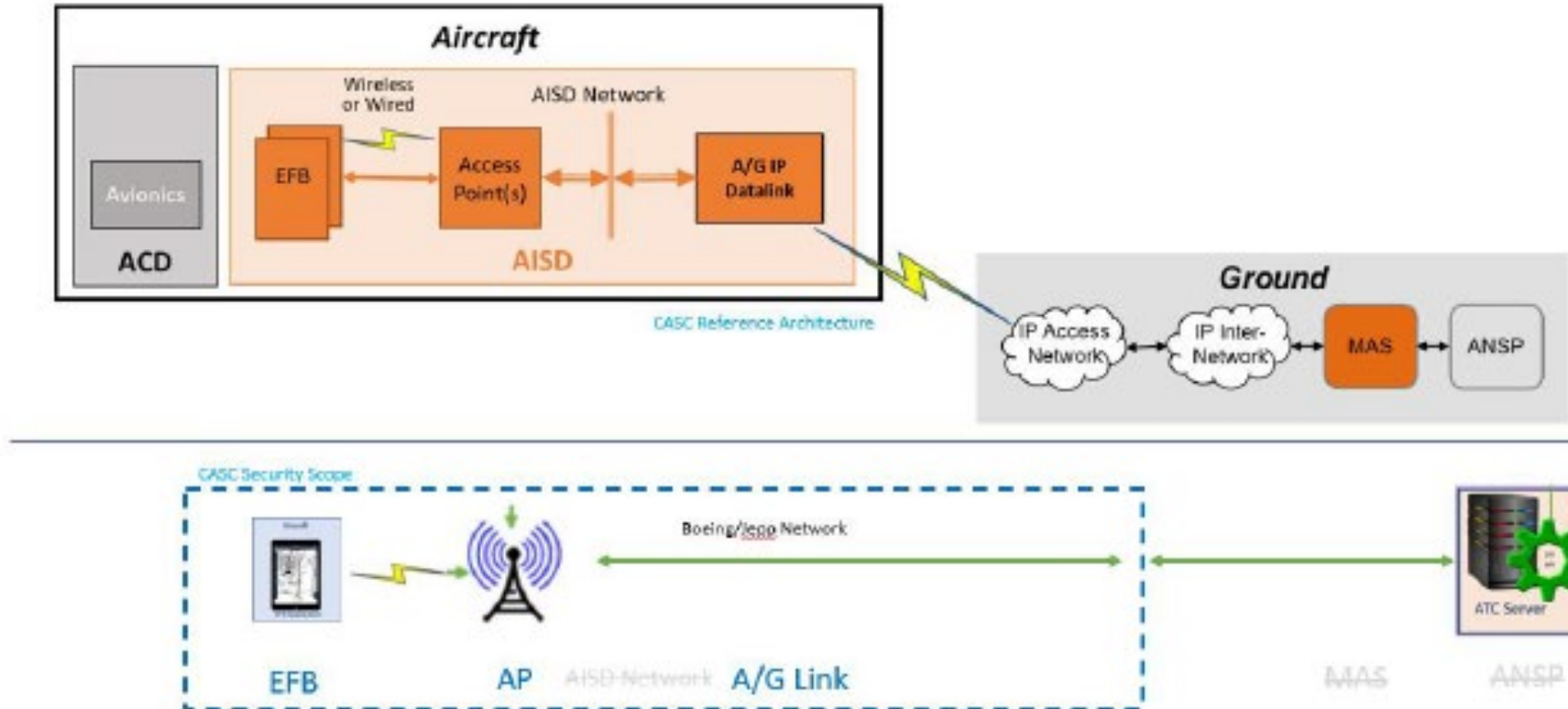


# Various Architectures





# Test Case Example



FD CDM Architecture Mapping



# CASC Tool Application

- A Digital Taxi Instructions prototype application running on an electronic Flight Bag (EFB) Application
- Determining Baseline
  - Low Impact Baseline
- Architecture Selections
  - Option E was aligned with the selected prototype
- Conduct Assessment and share result

<i>Component</i>	<b>Low Baseline</b>	<b>Moderate Baseline</b>	<b>High Baseline</b>	<b>Tailored</b>	<b>All Controls</b>
<i>EFB</i>	41	69	87	33	120
<i>AP</i>	25	45	59	17	76
<i>AISD NW</i>	18	32	40	15	55
<i>A/G</i>	19	34	44	14	58
<i>MAS</i>	42	71	85	33	117
<i>Total:</i>	145	251	315	112	427

All Security Controls by Baseline and Component

	<b>EFB</b>	<b>AP<sup>2</sup></b>	<b>A/G</b>	<i><u>total</u></i>
<b>Low</b>	41	25	19	85
<b>Tailored</b>	16 (of 33)	9 (of 17)	7 (of 14)	32 (of 64)
<i>total</i>	57	34	26	117

Security Control Tailoring for FD CDM

# Summary

- The research provides a capability to distill and tailor cyber security controls for Connect Aircraft system
- CASC Tool will be utilized to determine and develop control for related NextGen projects
- CASC Tool will be available to all Stakeholders

# Current FY22 Accomplishments

## Accomplishments

- Published “*Cybersecurity Controls for Connected Aircraft Systems that Support Safety Services*” for Digital Avionics Systems Conference. (7/23)
- Completed evaluation of prototype system using CASC Tool
- Developed and submitted Security Control Assessment Tool Report (5/05)
- Developed and submitted Security Control Assessment of Representative FAA Implementations (6/30)

## Planned Research Activities

- Complete and submit the last remaining deliverable for the FY19 PLA *Cybersecurity Considerations for Connected Aircraft Applications Final Report*

# FD DER

## Research Requirements

This program will address cybersecurity concerns around avionics and onboard IP Data Link required to enable connected aircraft concept and enhance Collaborative Decision Making (CDM) between flight deck and ground operations. The program will conduct cybersecurity assessment and evaluation exercises to identify risks and determine appropriate mitigation strategy. The findings of this research will serve as recommendations to support development of future standards and policies for connected aircraft.

## Outputs/Outcomes

- The outcome will inform development of an initial security considerations for IP-based flight deck data exchanges concept

## FY 2024 Planned Research

N/A

## Out Year Funding Requirements

RE&D	FY20	FY21	FY22
	\$ 1.014M	\$ 1.005M	\$ 0.879M