

# Space-based ADS-B Progress Update

MEVA TMG33 Meeting

May 28-30<sup>th</sup> 2018

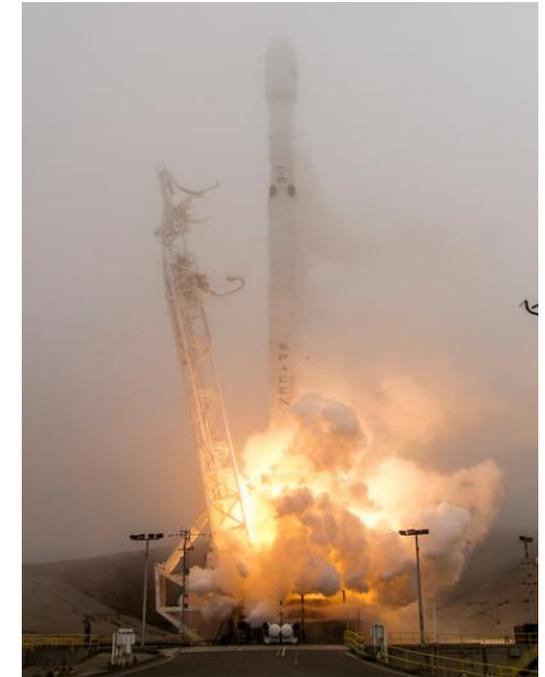


# UK-NATS new Aireon Investor

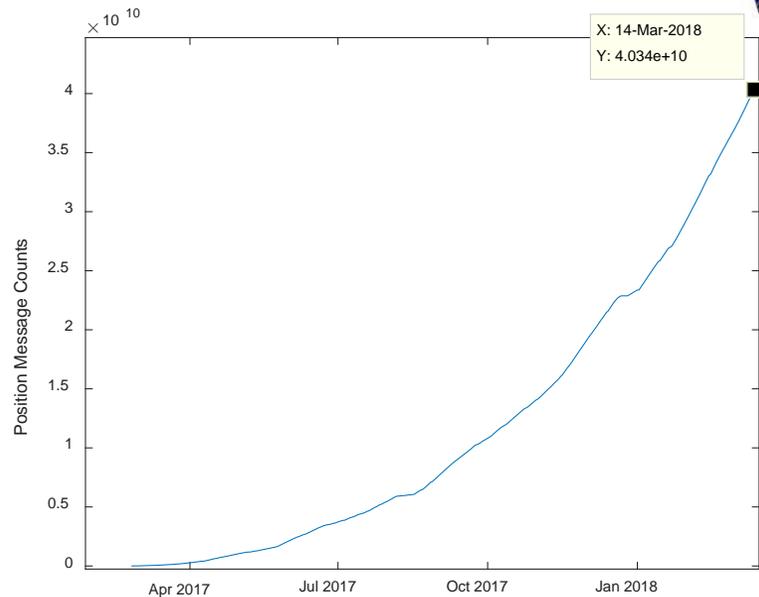
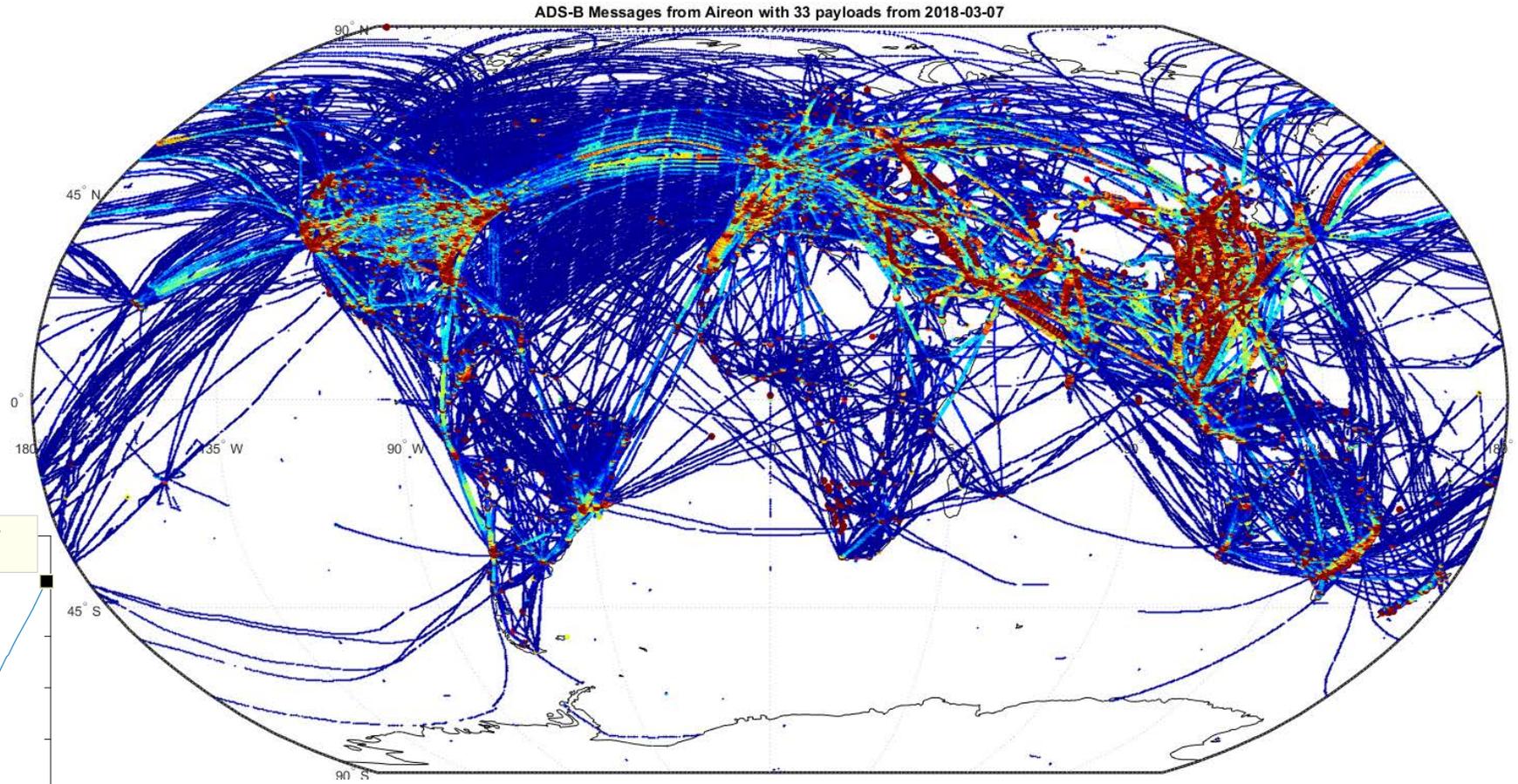


# Six Successful Launches!

- Successful 6<sup>th</sup> launch on May 22, 2018
- 55 satellites launched to date
- 20 more satellites will be launched in 2018 with three additional launches scheduled
- Remaining launches until Q3 2018
- System fully operational in Q3 2018



# Aireon Aircraft Surveillance Coverage – 33 Payloads

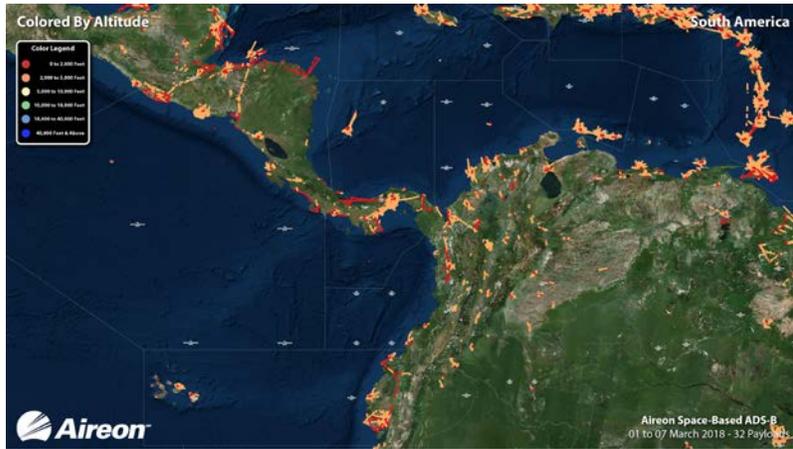


As of Mar 2018, Aireon receives over 8 billion ADS-B position messages received per month!

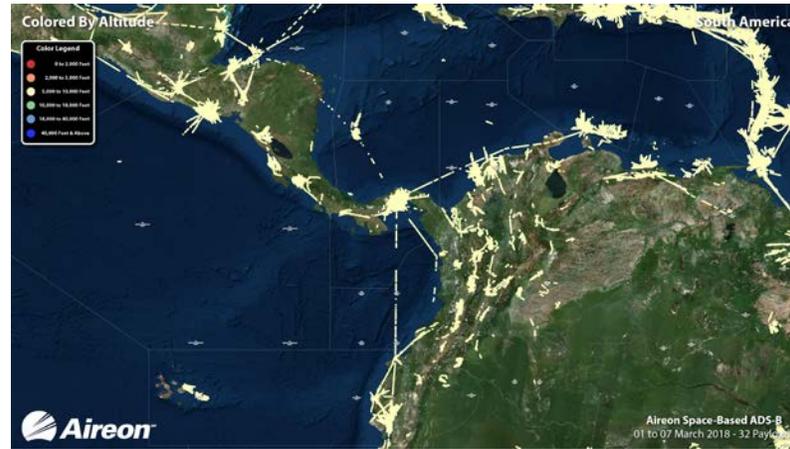




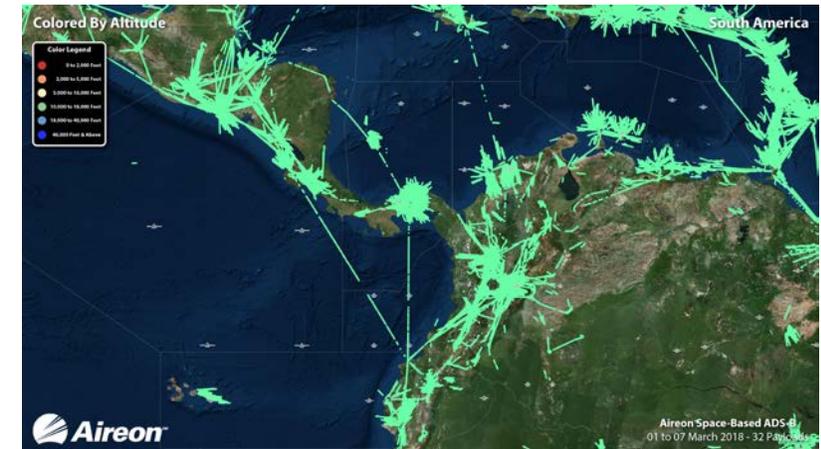
# Satellites capturing flights at all flight levels



FL 0-5,000 feet



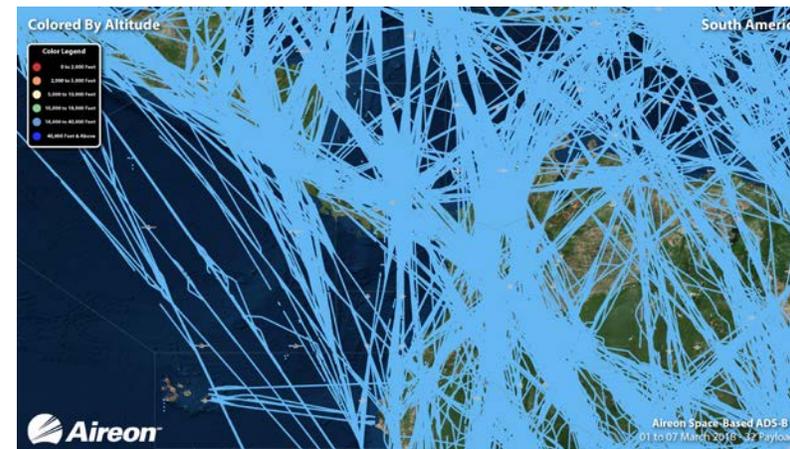
FL 5K-10,000 feet



FL 10K-18,000 feet



FL 18K-25,000 feet



FL Higher than 25,000 feet



# Servicing our Customers

## **Goal:**

Operate and maintain the most reliable aviation surveillance data system and service in the world.

## **Aireon Safety Mandate:**

Aireon Operations must operate and maintain the Aireon system in a manner that ensures we meet requirements for availability, update interval, latency, and data integrity in order to facilitate the SAFE use of our data for the purposes of aviation surveillance and separation services

# Technical Performance Measures

Parameter	Source (Standard)	Required Value
Service Volume Availability	ICAO Global Operational Data Link Document (GOLD); April 26, 2013	$\geq 0.999$
Latency (Message Receipt to Customer SDP)	Eurocontrol GEN SUR, Section 3.7.3.1.5 (ATC SUR Sensor + SUR Distribute)	$\leq 2.0s$ (99th percentile)
Probability of Update	EUROCAE Technical Specification for an 1090 MHz Extended Squitter ADS-B Ground System, ED-129B	$\geq 96\%$ for an Update Interval of 8 seconds (for low density en route airspace)

Key safety requirements enabling reduced separation

# New Service = New Approach

Part ANSP Ops Center



Part Global Customer Service Center

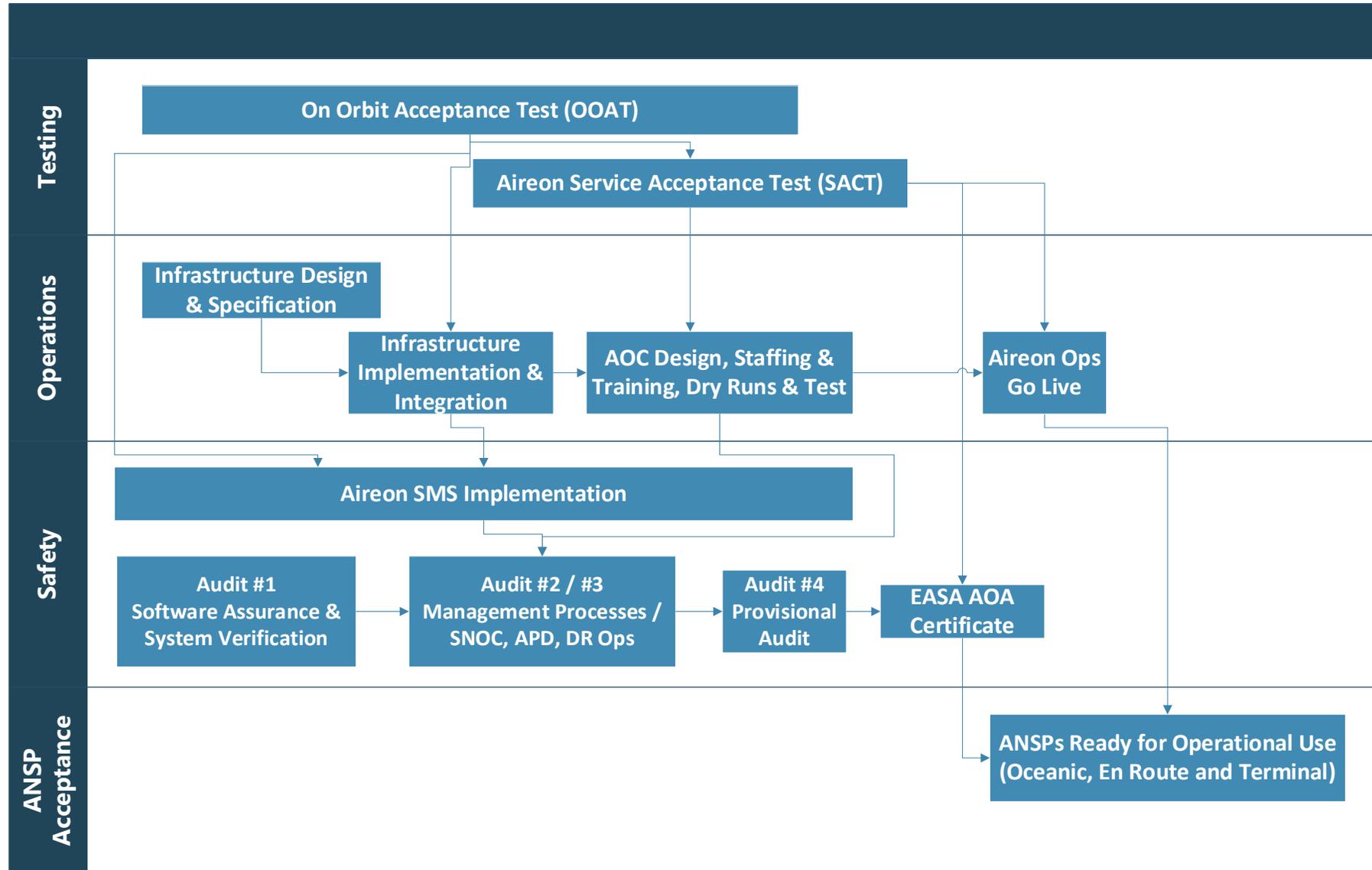


ATM / ANSP Service Provider Organizational Approval



AIREON LLC PROPRIETARY INFORMATION

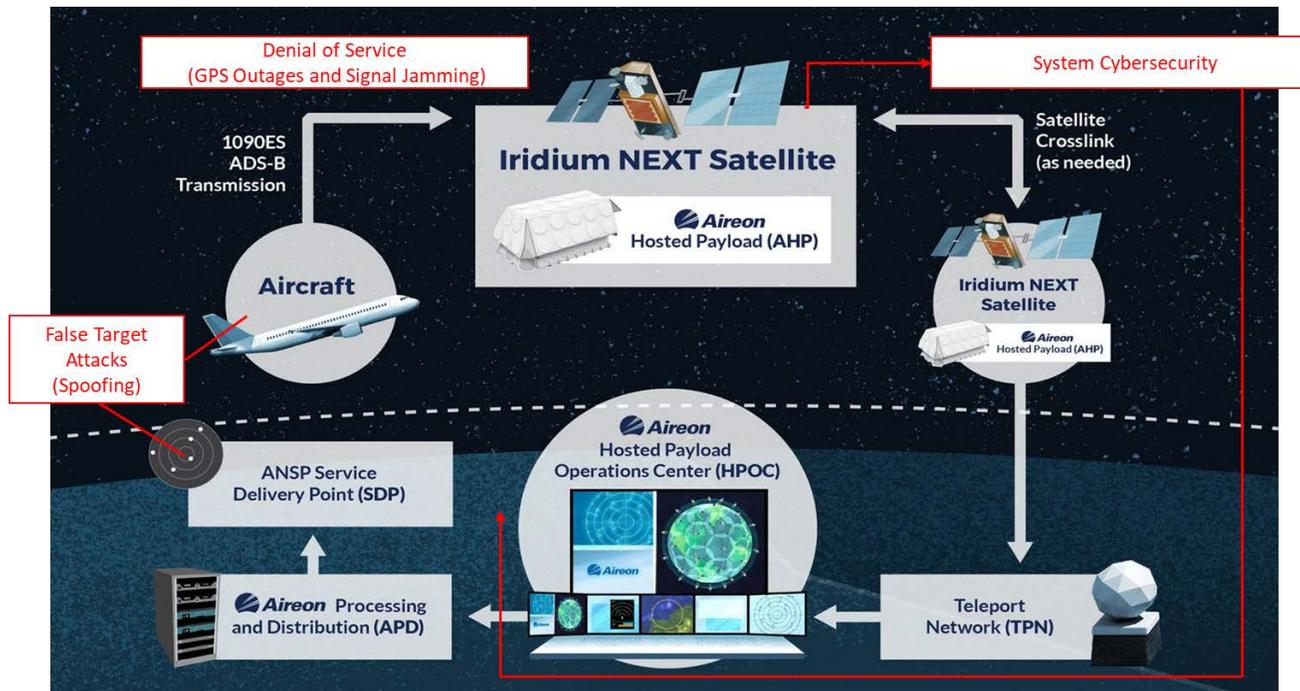
# Path to EASA Certification



# Aireon Tech Ops – Key Functions



# Cybersecurity



- Aireon is committed to reducing vulnerabilities to security related incidents, GPS jamming and spoofing, and cybersecurity management techniques throughout the system and service offering.
- Aireon treats security as an evolving threat that will be intentionally addressed over the lifecycle of the service through *governance, design assurance, standards and regulations*.
  - Involvement within RTCA, EUROCAE, EUROCONTROL, ICAO, AIA and ATCA ensures alignment with industry “best practices”
  - Following guidance contained in NIST Standards
  - EASA audits address software assurance, integrity of management processes, and validation of operational continuity of services
- ANSP customers provide specific security requirements that Aireon addresses in operational service deliverables.

# Tools to support operations and maintenance – Payloads Dashboard

 Serv. Perf. Dash  
 Biz. & Billing Dash  
 Cust. Serv. Dash  
 Cust. Jrny. Dash

## Customer Portal

Available on PC, Tablet, Phone

 Comms. Dash



**Aireon** 14:21:28 UTC Michael Olsen

3888 Targets
25 / 32 Payloads
0 / 61 Service Volumes

Wallboard

- Dashboard
- Traffic

Service Volumes

EGGX DEGRADED	EGGX DEGRADED	EGTT DEGRADED	EGPX DEGRADED	ABS1 DEGRADED	ABS2 DEGRADED
ABS03 DEGRADED	ABS04 DEGRADED	ABS05 DEGRADED	ABS06 DEGRADED	ABS07 DEGRADED	ABS08 DEGRADED
ABS09 DEGRADED	ABS10 DEGRADED	FAJO DEGRADED	FACT DEGRADED	FAJS DEGRADED	KZWY DEGRADED
KZNY DEGRADED	LPPO DEGRADED	ASV1 UNKNOWN	ASV2 UNKNOWN	KZBP DEGRADED	MMFO DEGRADED
NTTT DEGRADED	TMPA DEGRADED	TNCF DEGRADED	WSJC DEGRADED	RCS17 DEGRADED	BIRD DEGRADED
FSSS DEGRADED	EGTT UNKNOWN	ROIO DEGRADED	ROIG DEGRADED	ROIM DEGRADED	ROIU DEGRADED
ROIT DEGRADED	ROIW DEGRADED	ROIE DEGRADED	ROIV DEGRADED	EKDK DEGRADED	BGGL DEGRADED
FAW UNKNOWN	FAW UNKNOWN	EKDK DEGRADED	EISN DEGRADED	EGGX DEGRADED	LIRR DEGRADED



# Tools to support operations and maintenance - Service Performance and Customer Service Dashboards



Availability (average)		
Last Month	Last Quarter	Last Year
100.000%	99.978%	99.996%

Update Interval (average)		
Last Month	Last Quarter	Last Year
5.1 seconds	4.9 seconds	5.2 seconds

Latency		
Last Month	Last Quarter	Last Year
1.26 seconds	1.19 seconds	1.41 seconds

**Export**



# Tools to support operations and maintenance - Maintenance Dashboards



**Customer Portal**  
Available on PC, Tablet, Phone

- Serv. Perf. Dash
- Biz. & Billing Dash
- Cust. Serv. Dash
- Cust. Jrny. Dash
- Comms. Dash
- Maint. Dash
- Ref. Library

**Report a Problem**

Start C

Email Tech Support - [techsupport@aireon.com](mailto:techsupport@aireon.com)

Call us at 1-800-999-99

### New Case: Customer Case

\*Subject: Possible Problem

\*Type: --None--

- ✓ --None--
- Billing
- Service
- General Question
- Portal Question
- Dashboard
- Other

Contact Name: Search Contacts...

Account Name:

Contact Phone:

Contact Email:

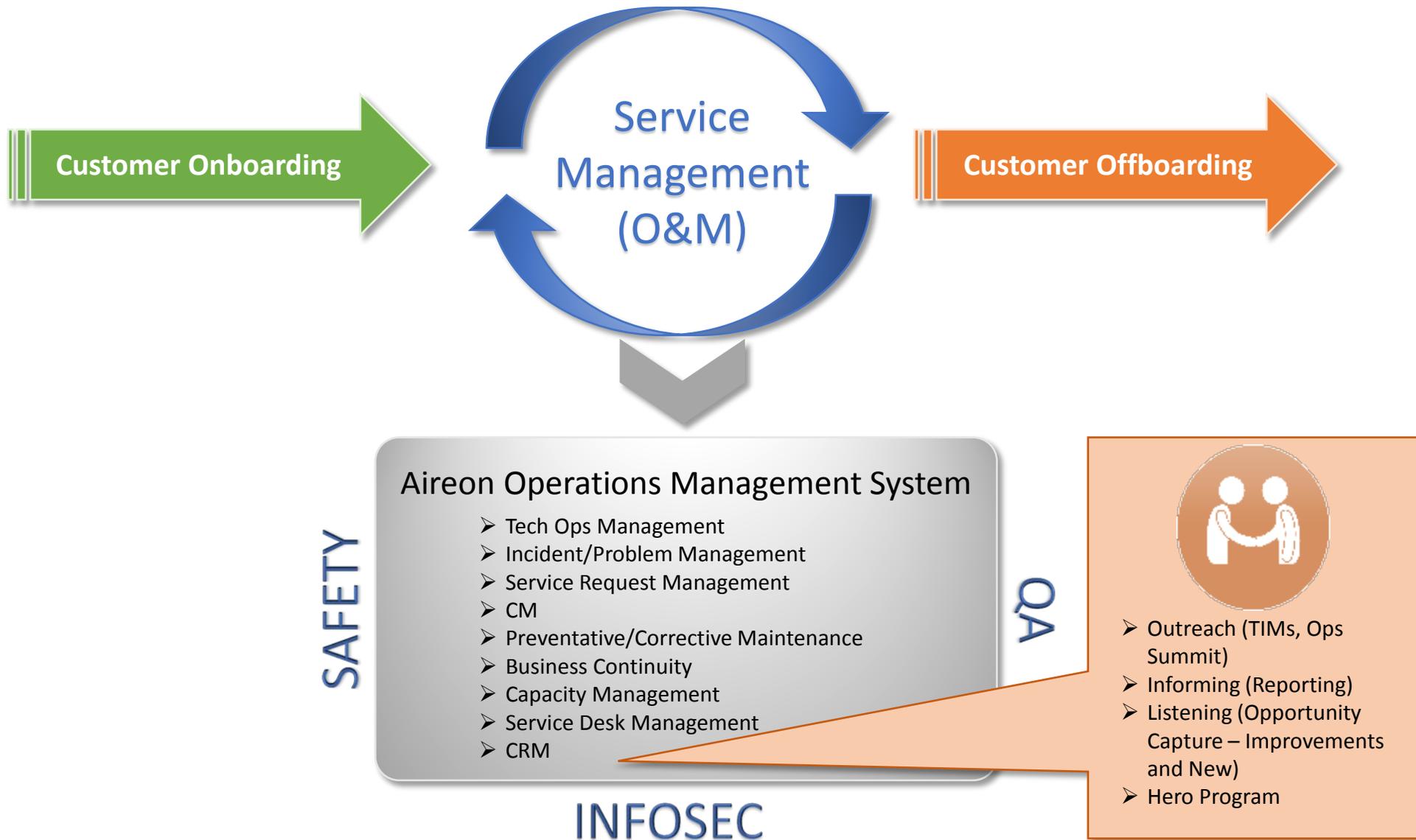
Case Owner: Sharon Community

Additional Information

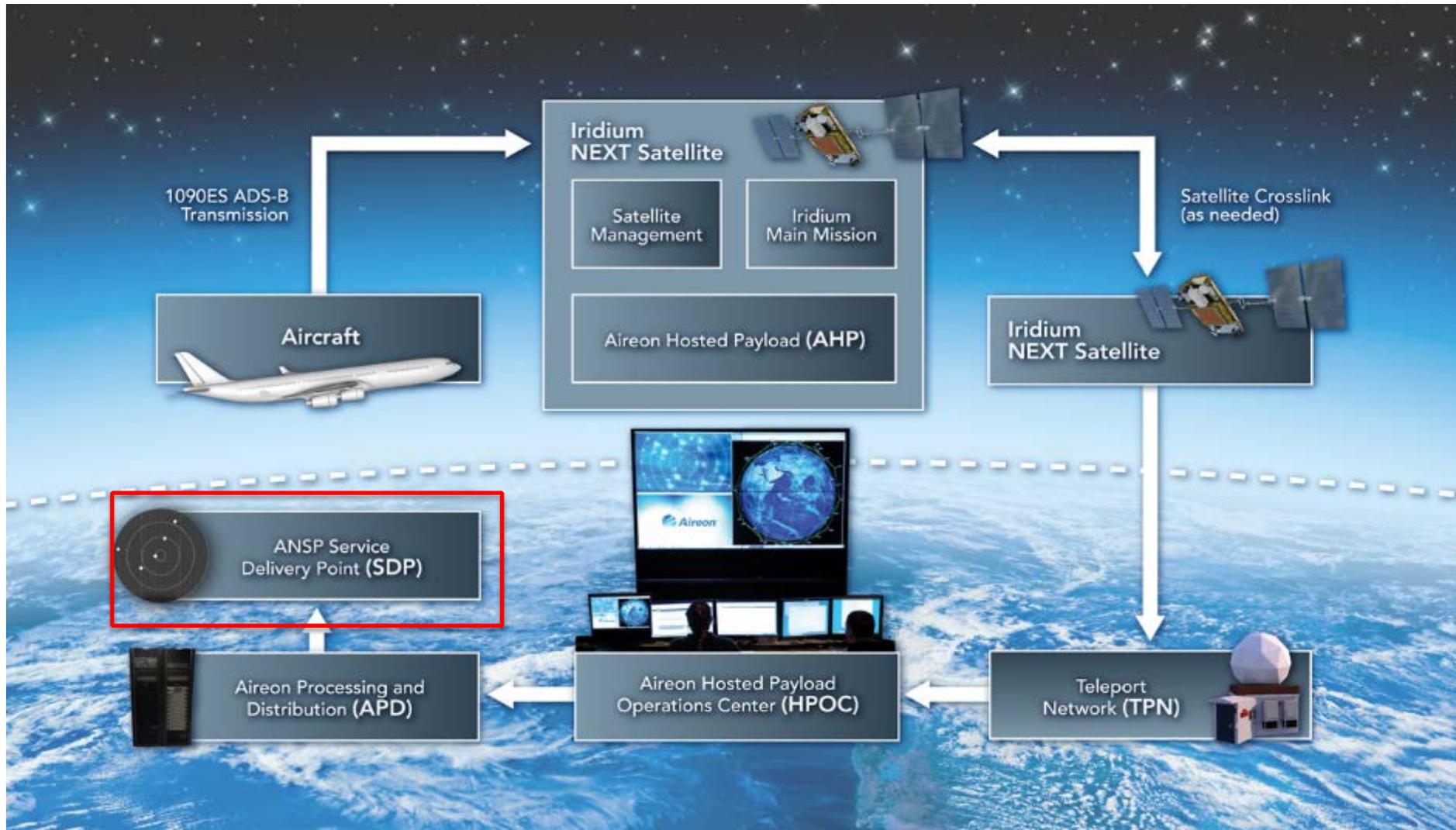
Cancel Save



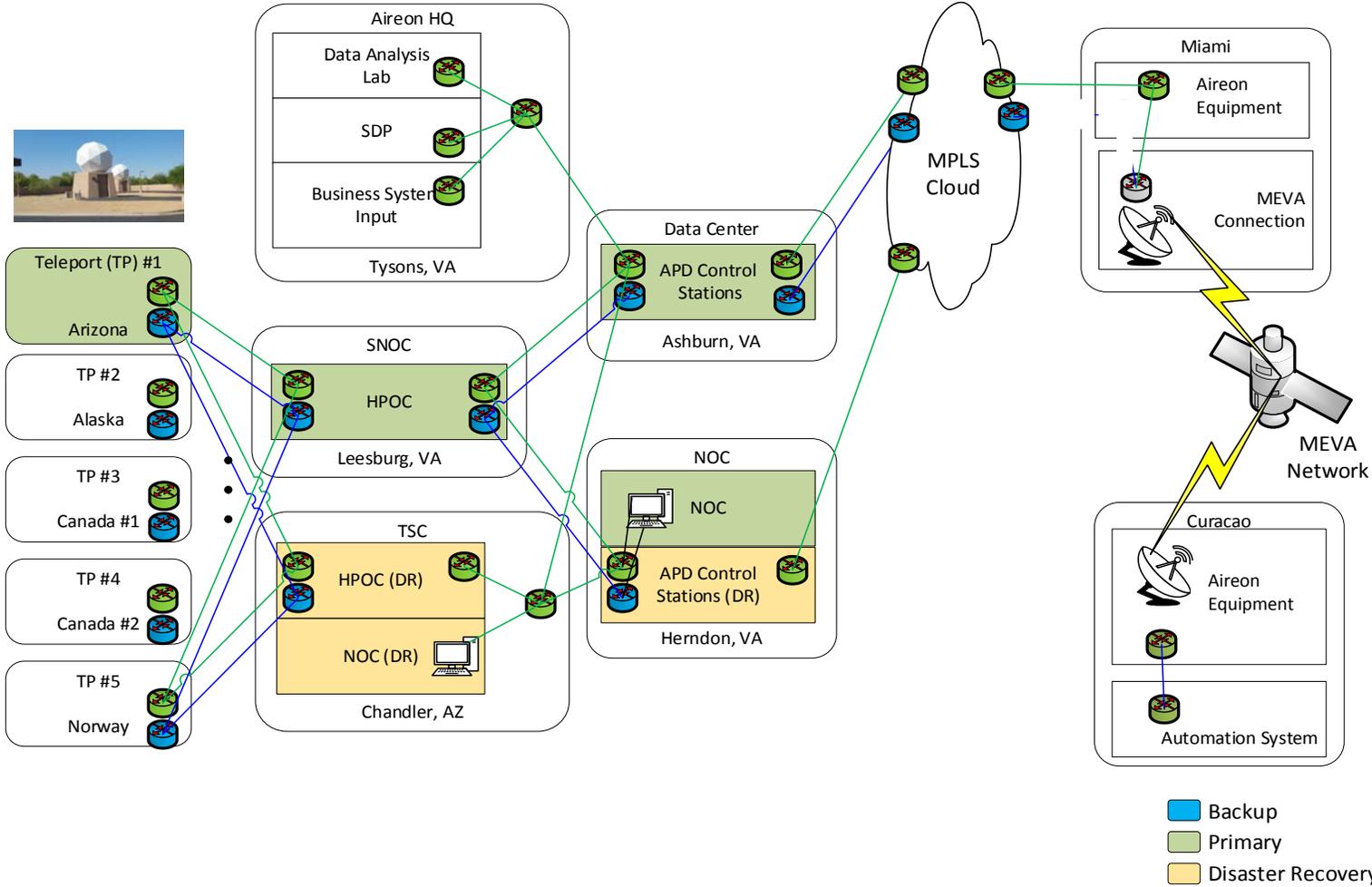
# A day in the life of Aireon Operations



# The Aireon System

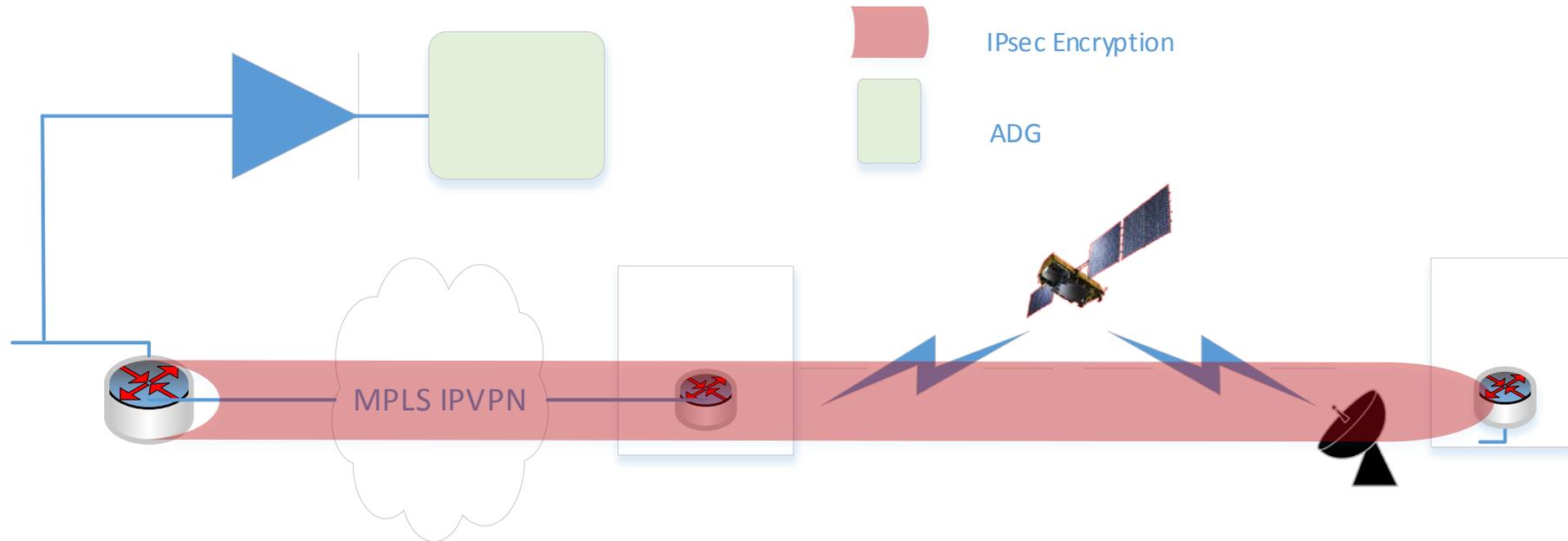


# Curacao SDP Network Diagram using MEVA Network

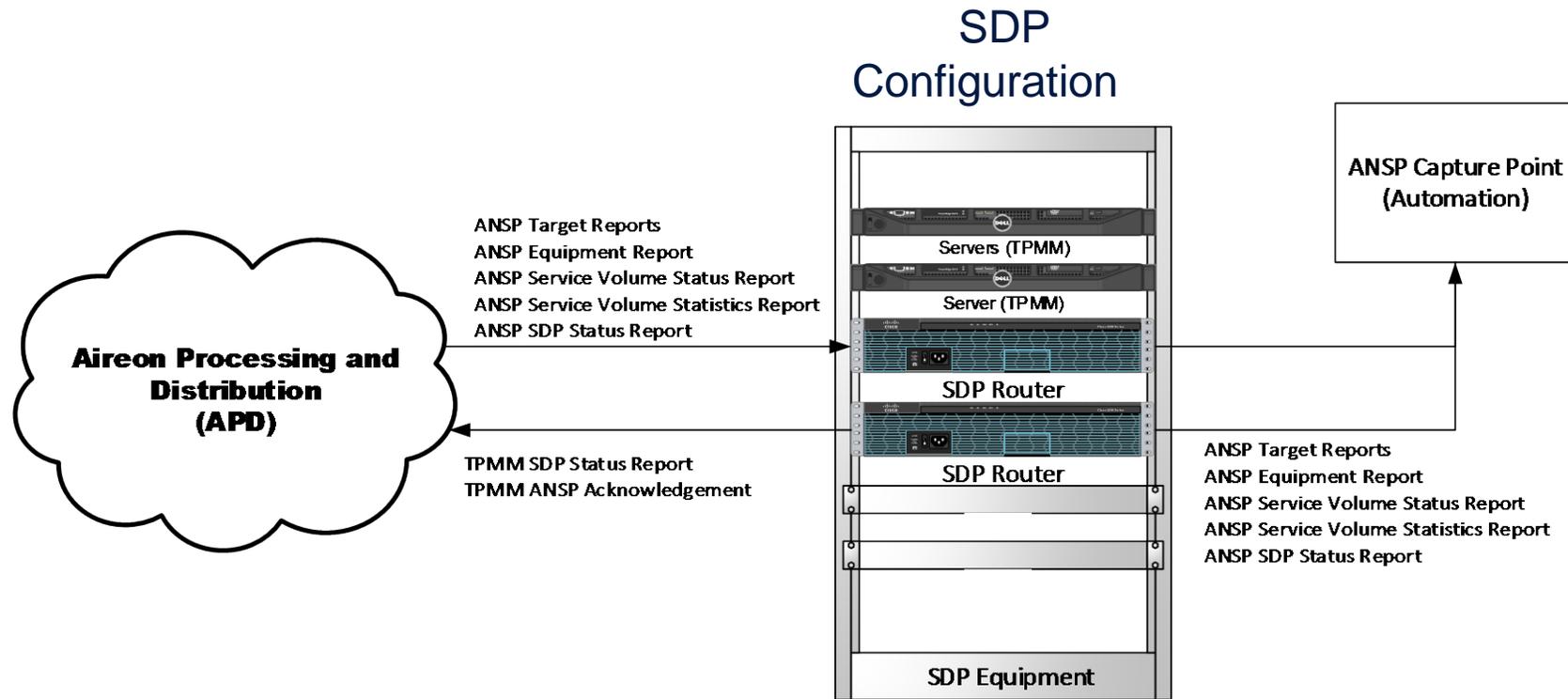


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# Aireon Service Delivery Security



# SDP Architecture (Single Node)



# Network Requirement

- System Availability > 0.999 - This requires 2 connections
  - Backup/Secondary connection needs to be identified
    - MEVA can be one of these connection
- Multicast Data
- Delivery to Automation system with low latency
- Surveillance data segregation for each of the connected ANSP

# Estimated Bandwidth Requirements for Connections

FIR	CAT021		CAT025		CAT238		CAT253		Total	
	Mean (kbps)	Max (kbps)								
MUFH	13	30	0	1	0	17	6	32	19	80
MMFR	37	69	0	1	0	39	6	32	43	141
MHTG	18	34	0	1	0	32	6	32	24	99
MKJK	8	23	0	1	0	17	6	32	14	73
<b>TNCC</b>	<b>6</b>	<b>17</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>16</b>	<b>6</b>	<b>32</b>	<b>12</b>	<b>66</b>
MTEG	1	9	0	1	0	15	6	32	7	57
MDCS	5	15	0	1	0	15	6	32	11	63
TJZS	11	27	0	1	0	18	6	32	17	78
SKED	25	51	0	1	0	22	6	32	31	106
TTZP	9	23	0	1	0	29	6	32	15	85
Total	133	298	0	10	0	220	60	320	193	848

# Thank you!

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