Iridium Aviation Evolution

ISPAGC FIT/29

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iridium®

Iridium Satellite – Efficient and Safe in the Air, Anywhere

Iridium is the only pole-to-pole satellite operator.

66 orbiting LEO satellites that provide seamless coverage to all aircraft.

Iridium has been offering AMS(R)S services since 2010 and has grown to support thousands of aircraft in the global airspace.

Iridium is committed to aviation and to AMS(R)S cockpit safety.

What is Iridium Certus? Status?

- Iridium Certus is the evolution of Iridium to offer IP Broadband services.
- All Iridium Certus devices are multi-service terminals up to maximum Tx/Rx of the system:
  - Background IP data
  - VLAN Segmented IP data
  - Up to Voice x 3 independent lines

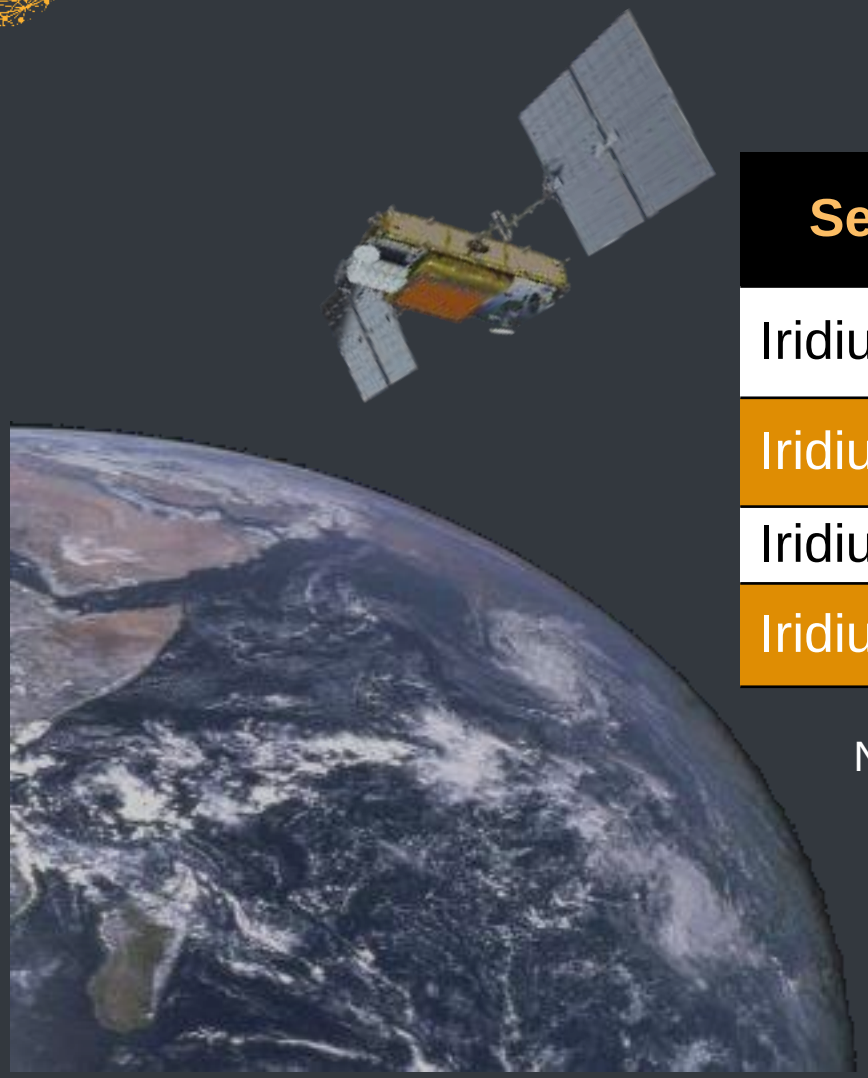
- Iridium partners have launched Certus products to maritime, land mobile, and IOT. Several thousand in operation today.
- Aviation products launch status:

  - SkyTrac DLS-100 and BlueSky SkyLink 7100 - launched

  - Collins, Honeywell, and Thales - launching near future

  - Additional products and AMS(R)S in late 2023

Iridium Evolution - Certus Broadband Service Classes

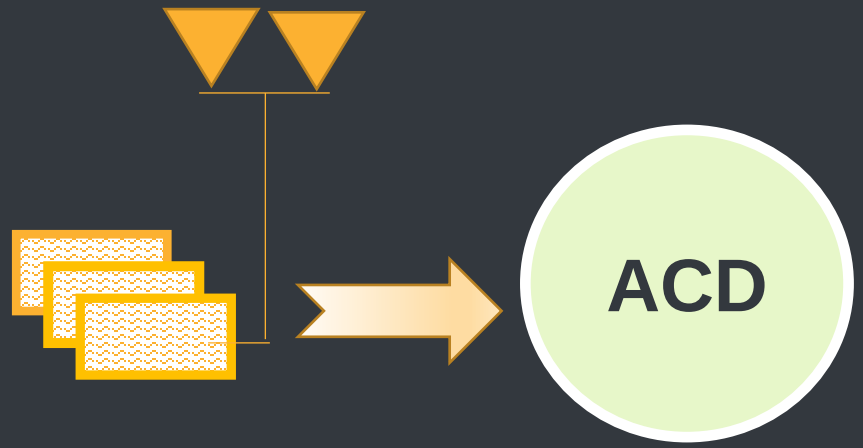


Service Class	Max Tx Speed	Max Rx Speed	Min Antenna Type
Iridium Certus 100	88Kbps	88Kbps	Active Low Gain
Iridium Certus 200	176Kbps	176Kbps	Active Low Gain
Iridium Certus 350	352Kbps	352Kbps	High Gain
Iridium Certus 700	352Kbps	704Kbps	High Gain

Notes: Not all configurations shown in table – only Max Tx and Max Rx shown

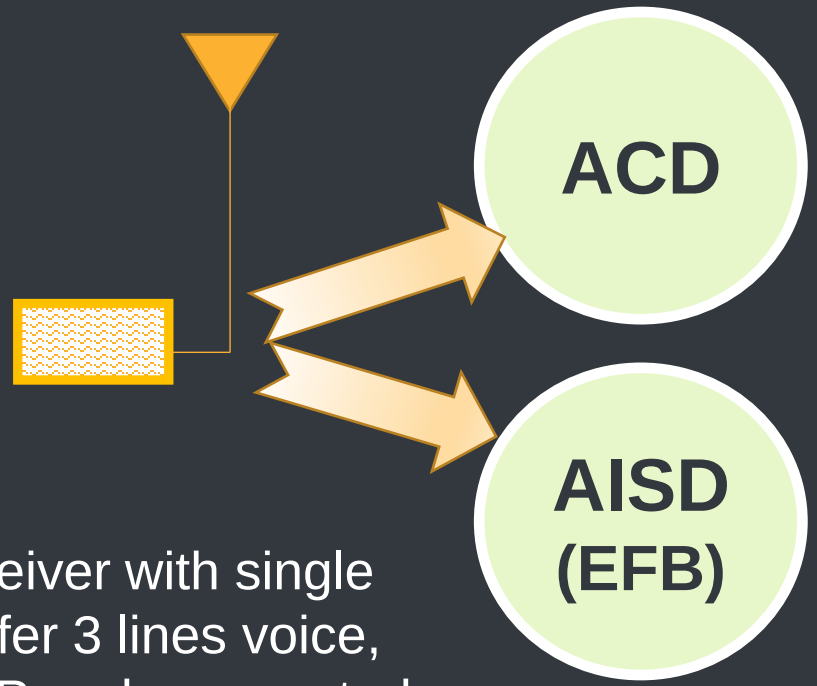
Iridium Evolution – Expanded Capabilities

Iridium Narrowband



Multiple transceivers with multiple patch antenna to offer two voice lines and FANS data.

Iridium Certus Broadband

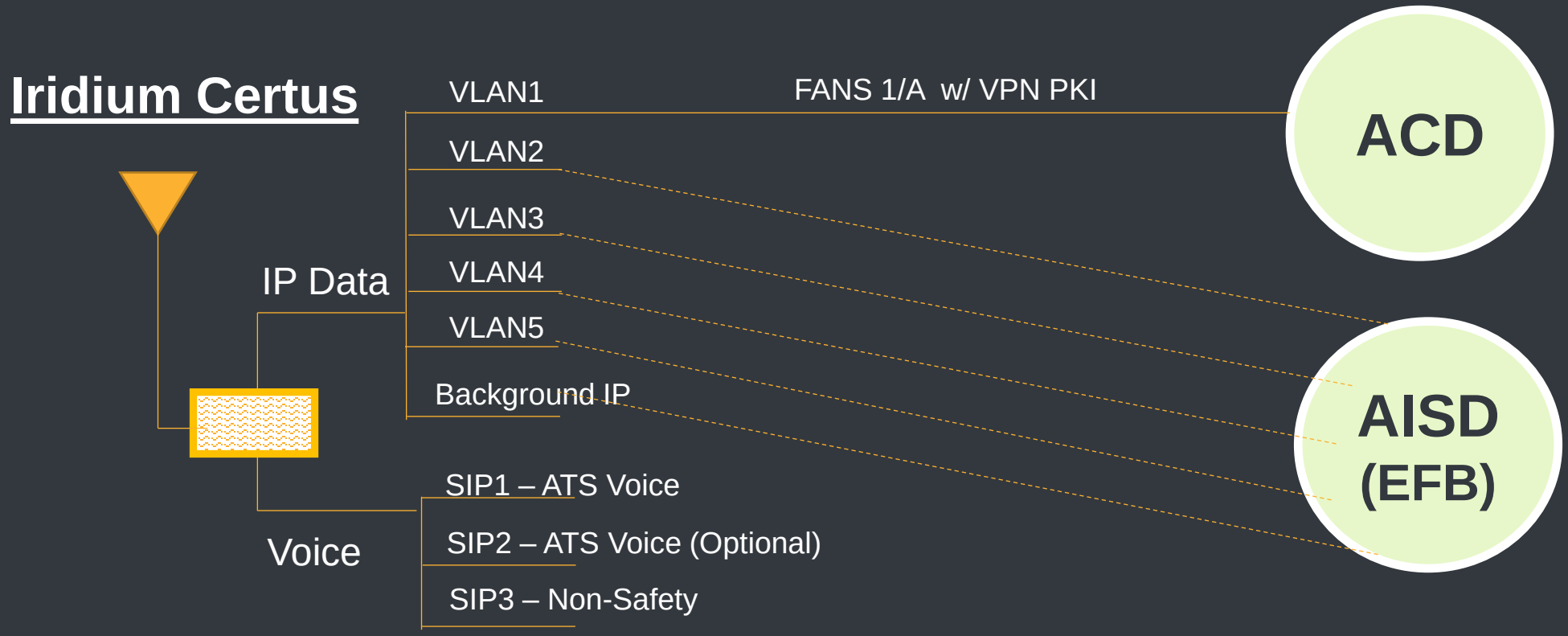


Single transceiver with single antenna to offer 3 lines voice, background IP and segmented VLAN IP.

Iridium Evolution – Expanded IP Routing

Iridium Certus enables both ACD and AISD services with a single system.

IP traffic may be addressed to one or more end applications in the AISD domain. Up to 5 VLANs can be uniquely addressed for sperate billing and data usage reporting in addition to the background IP which can support many destinations through standard IP routing.



Iridium Evolution – Continuity

- While developing the new IP capabilities, all legacy narrowband services (voice and data) are still supported including AMS(R)S cockpit terminals.

- Iridium is in the middle of a multi-phase program to bring Iridium Certus AMS(R)S to the global aviation markets.

- Phase 1: Initial plans for RCP240/RSP180 services and RCP400V voice
- Phase 2: Future plans for RCP130/RSP160 performance & ATN OSI/IPS and new RCP for voice (in development in ICAO)

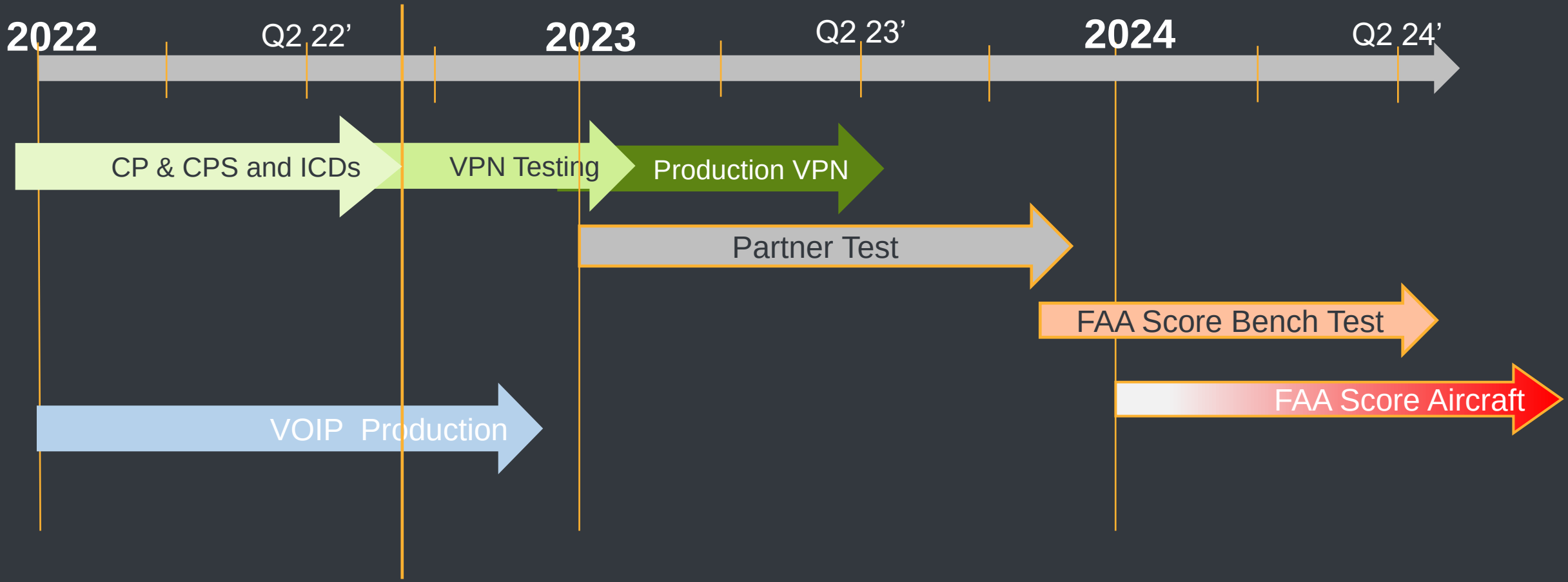
Iridium Evolution : Phase 1 – Expanded Detail

The scope of the project is large, but the following list summarizes the major actions that are under this program.

1) SC-222/WG-82 MASP/MOPS - Completed
   - VPN PKI Security – In Progress Q2 2023
   - FAA Evaluation Certus – FAA PARC CWG workbook drafted - start Q3 2023 (bench) and aircraft flying Q4 2023
2) Single Stage Dialing – In Progress Q3 2022
   - Working with Collins and SITA on integration
   - Supports both current legacy ATS platforms and Certus
3) Disaster Recovery – In progress Q4 2024
   - Redundant gateway and ground infrastructure

Certus Phase 1 Project Timeline - AMS(R)S

Status Line



Iridium Evolution : Phase 2 – Expanded Detail

Phase 2: (Future 2025 - 2026)

Iridium is planning a major update to the ground network and transceivers in support of upgraded performance.

Iridium ground/satellite updates:

- Enhancements to ground/network (control channel/ring management)
- Enhancements to Iridium core transceiver
- Enhancements to satellite

Specific enhancements required for aviation AMS(R)S for RCP130/RSP160 and for ATN OSI/IPS.

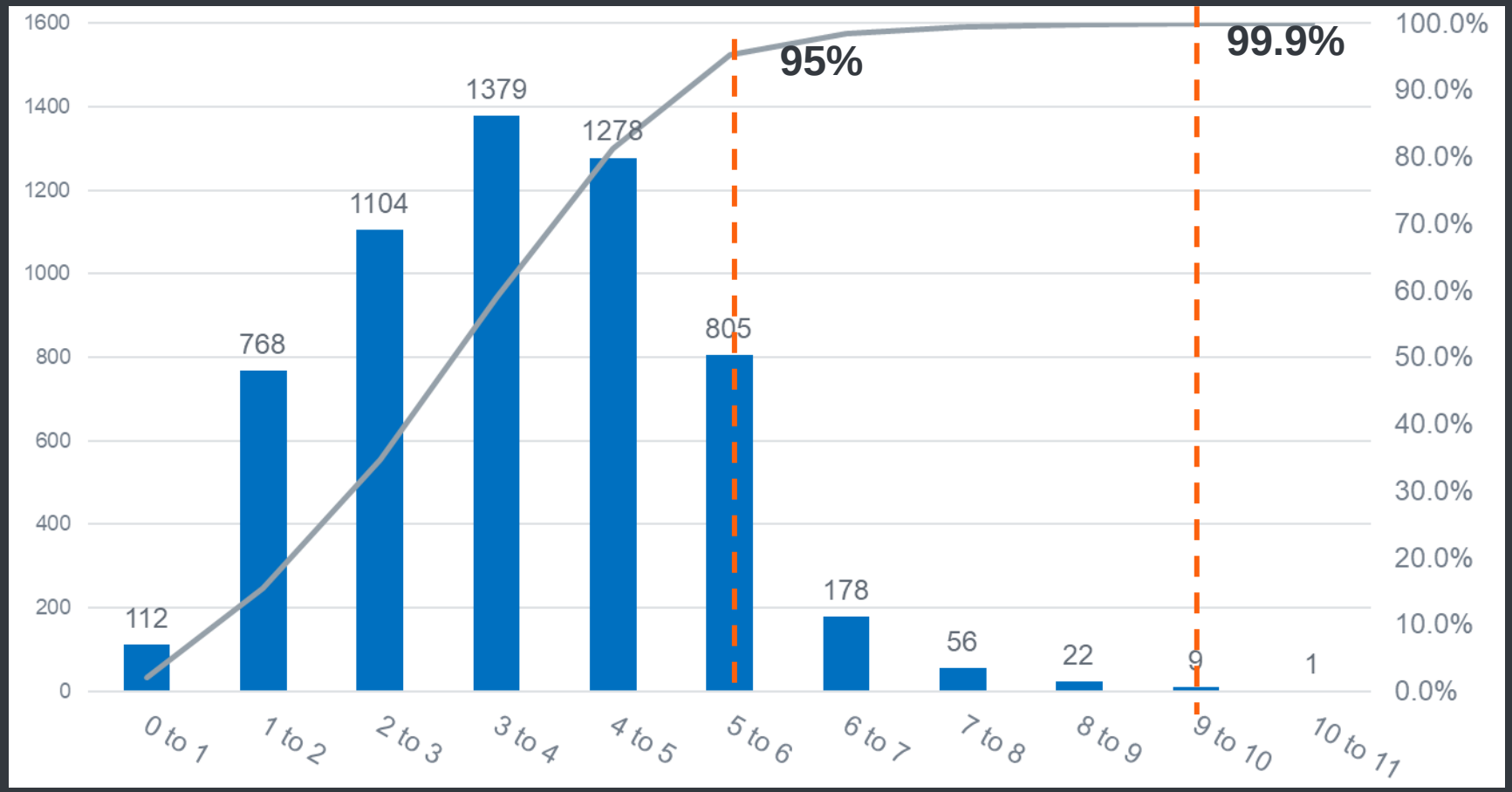
Iridium Technical Evaluation of Phase 2

Iridium has developed the technical details of the Phase 2 program and is able to simulate these results using ground-based assets.

Iridium has completed bench testing of the network using the Phase 2 infrastructure as per of the latency performance requirements of RCP130/RSP160

$RSTP_{CSP}$ RSP160 Bench Testing Results

This testing was for 575 byte messages.

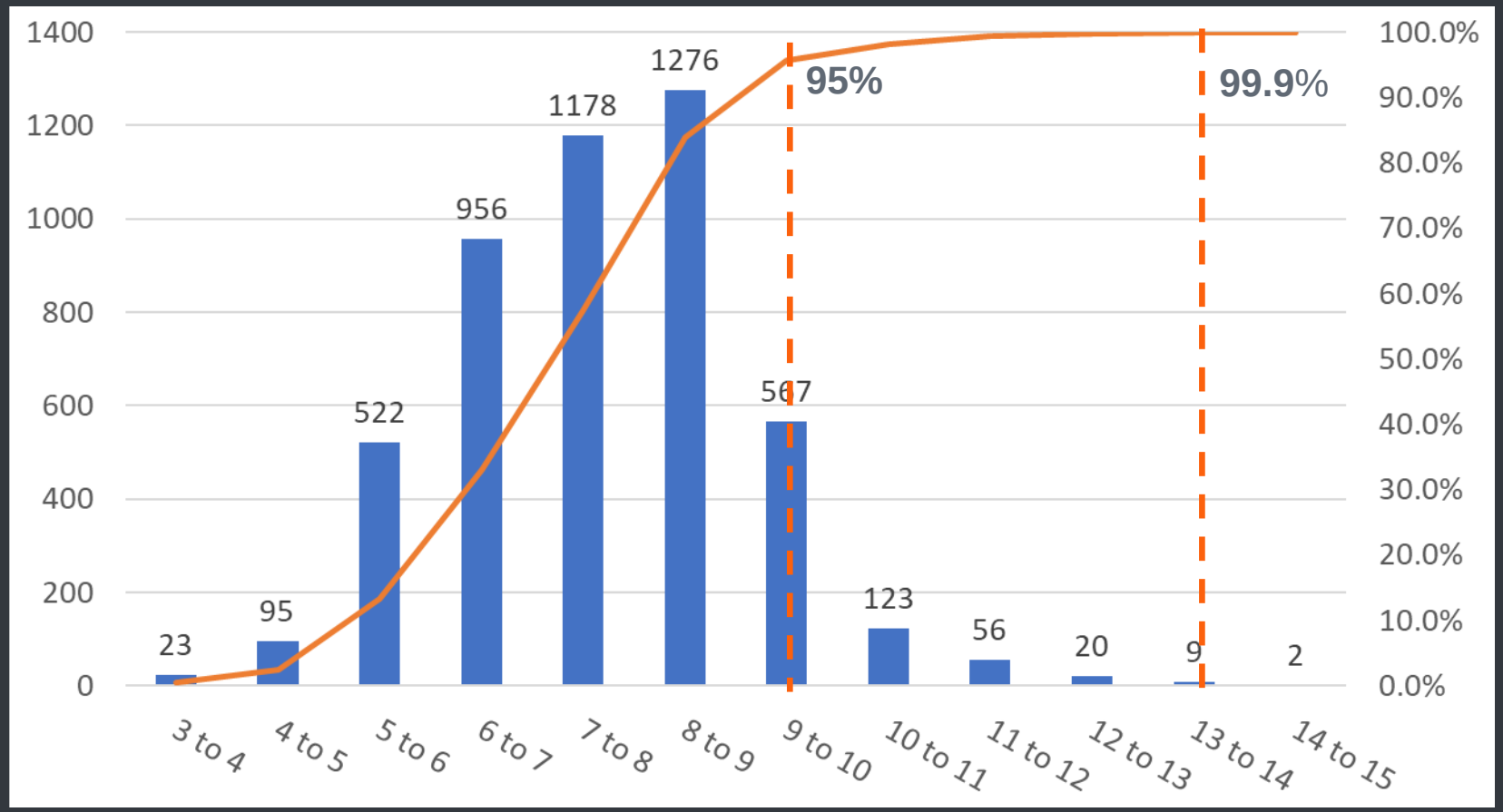


Time	Count	Percentage
0 to 1	112	1.96%
1 to 2	768	15.41%
2 to 3	1104	34.73%
3 to 4	1379	58.88%
4 to 5	1278	81.25%
5 to 6	805	95.34%
6 to 7	178	98.46%
7 to 8	56	99.44%
8 to 9	22	99.82%
9 to 10	9	99.98%
10 to 11	1	100.00%
	5712	

For $RSTP_{CSP}$ over 5,700 messages of 575 bytes were sent.

$RCTP_{CSP}$ RCP130 Bench Testing Results

This testing was for 275 byte messages and 100 byte response.



Time(Sec)	Count	Percentage
3 to 4	23	0.5%
4 to 5	95	2.4%
5 to 6	522	13.3%
6 to 7	956	33.1%
7 to 8	1178	57.5%
8 to 9	1276	83.9%
9 to 10	567	95.6%
10 to 11	123	98.2%
11 to 12	56	99.4%
12 to 13	20	99.8%
13 to 14	9	99.96%
14 to 15	2	100.0%
	4827	

For $RCTP_{CSP}$ over 4,800 message of 275 byte and 100 byte pairs were tested.

Closing – Summary

Iridium is coordinating with the global aviation industry on multiple fronts to ensure that Iridium Certus will be approved for AMS(R)S services.

Iridium is also coordinating with these groups to ensure future RCP130/RSP160 performance requirements are agnostic for all technologies:

- ICAO DCIWG CLASS B SARPS Development
- SC-214 WG-78 Performance/Safety Group - working on updates to DO-350A

Iridium is also looking forward to the Iridium Certus FAA Evaluations which is planned to start in Q3 2023. This is under the FAA PARC CWG program and will require global ANSP support of the data collection and monitoring.

Thank you