



Inmarsat - Classic Aero & SwiftBroadband ATS Communications Services

Cross Polar Trans East Air Traffic Management
Providers' Work Group
– ICAO Eur/NAT Office, Paris

Gary Colledge, Yasmine Ibnayahya - Inmarsat
15th-19th December, 2014



Agenda

> Inmarsat Network Overview

- MSS markets
- L-Band Services Roadmap
- Achievements in Last 18 Months

> Classic Aero Services

- Dual I-3/I-4 Constellation
- Benefits of Network Harmonization
- Greenland coverage

> Flight tracking

> ACARS and FANS1/A over SwiftBroadband Safety

- AOC ACARS over SBB position reporting

MSS markets (as of June 2014)

- > **Market leader in all sectors**
- > **Mission critical remote connectivity**
- > **Safety services**
- > **Strong subscriber growth**
- > **I4 Spare satellite in orbit**
- > **I4 Satellite lifetimes to 2023**
- > **Wholesale EBITDA margin ~70%**

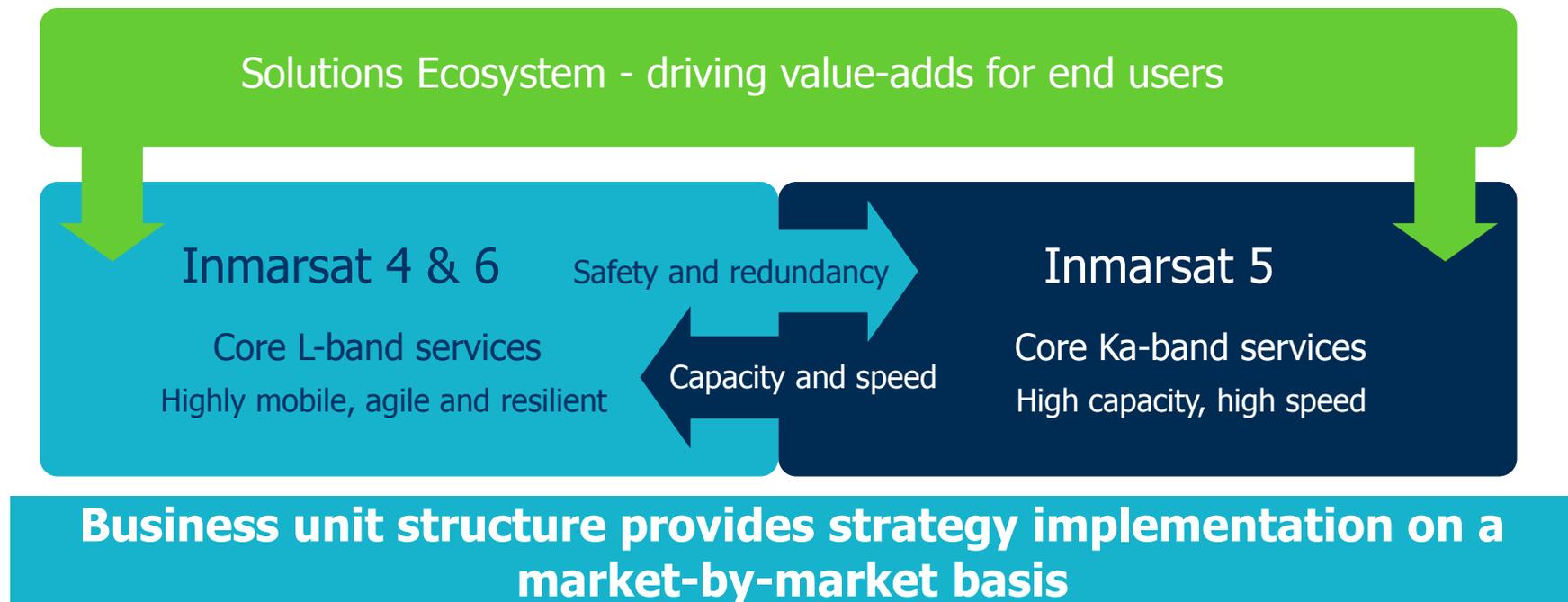
(1) Based on 2013 MSS revenue reported for Inmarsat Global

<p>Maritime</p> 	<ul style="list-style-type: none"> > 57% of MSS revenue > 190,000 subscribers > Drivers: Ship management > Automation cost savings > Crew welfare / access > Smaller vessel adoption
<p>Land Mobile</p> 	<ul style="list-style-type: none"> > 17% of MSS revenue > 172,000 subscribers > ~60% government business > Drivers: Military special ops > International aid agencies > Media: on-the-spot reporting
<p>Aviation</p> 	<ul style="list-style-type: none"> > 15% of MSS revenue > 17,000 subscribers > ~60% government business > Drivers: Military, VIP aircraft > Business jets > In-flight passenger connectivity

Our Strategy

Operational progress matched by commercial readiness

- L-band growth via Inmarsat-4, Alphasat & Inmarsat-6
- Further growth & diversity via Inmarsat-5 & GX
- Empower a high-value solutions ecosystem centered on Inmarsat
- Re-organised for proximity, agility & efficiency



Achievements in last 18 Months

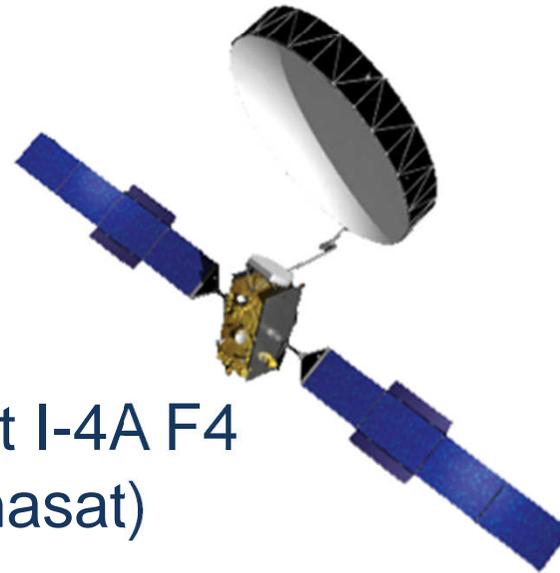


New I-3/I-4/I-5
Ground
Stations

Inmarsat I-4A F4
(Alphasat)



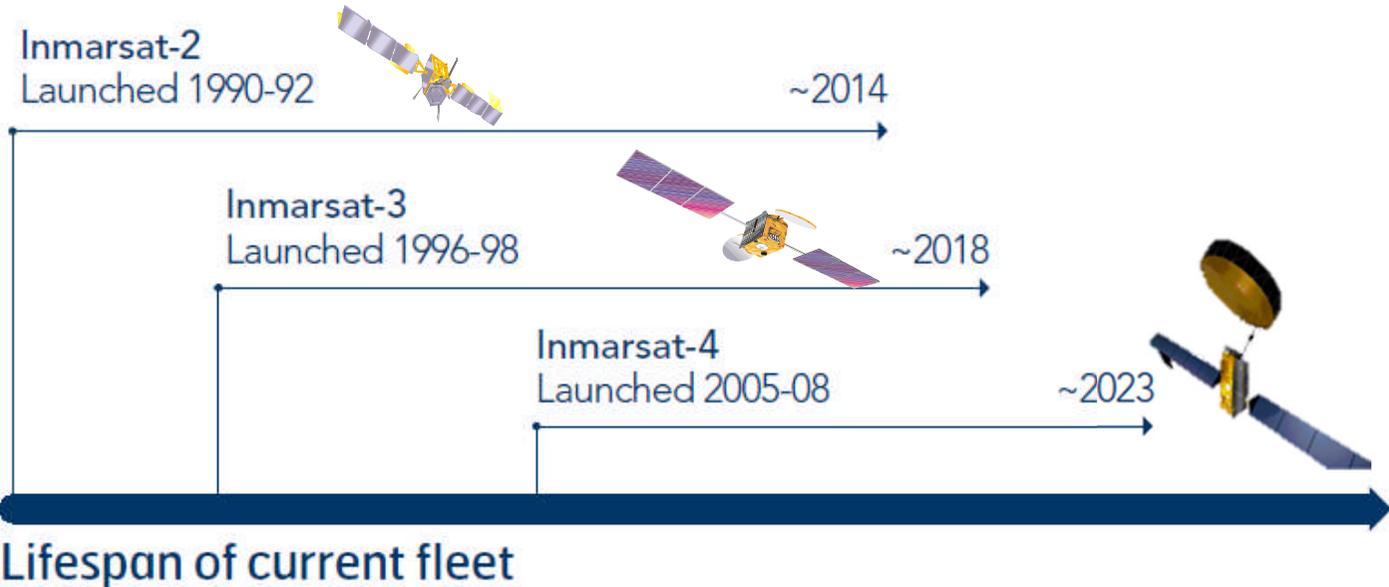
FANS/ACARS
over
SwiftBroadband

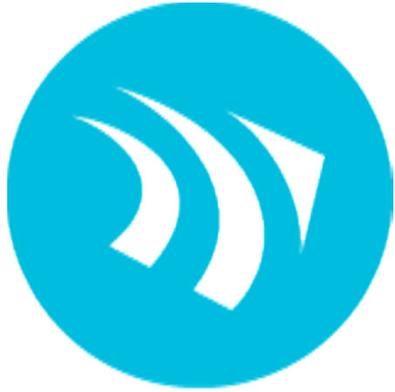


Inmarsat I-5
Global Xpress



Constellation Review





Classic Aeronautical Services

I-3 Ground Stations



IOR & POR: Perth, Australia

NEW GES 2013

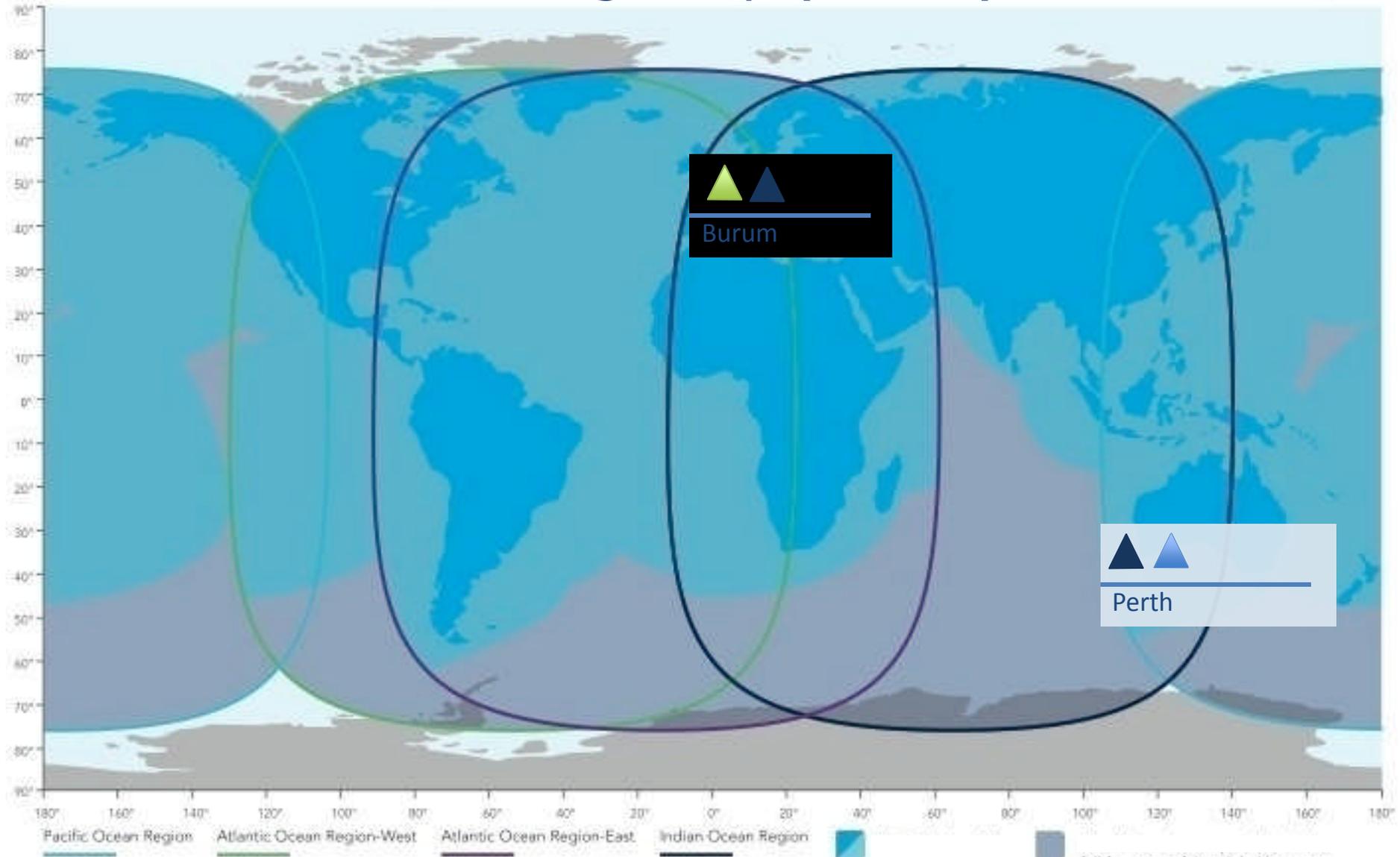


AOR-E & AOR-W
Burum,
The Netherlands



Bringing the latest I-4
Ground Station
Technology to the I-3s

I-3 Classic Aero Coverage Map (L-Band)



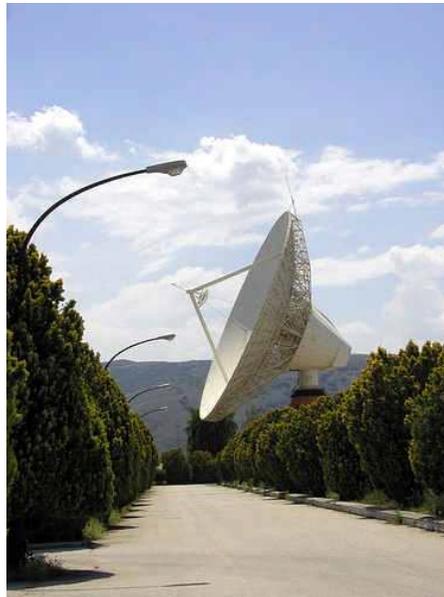
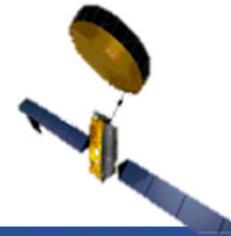
This map depicts Inmarsat's expectations of coverage, but does not represent a guarantee of service. The availability of service at the edge of coverage areas fluctuates depending on various conditions.

Swift 64, Aero I Coverage

Aero H/H+ services are provided in the full footprint of the global beams



I-4 Ground Stations



EMEA

Fucino

(Classic/SBB) – Italy

Burum (SBB) – The Netherlands



AMER & APAC

Paumalu

(Classic/SBB) – Hawaii



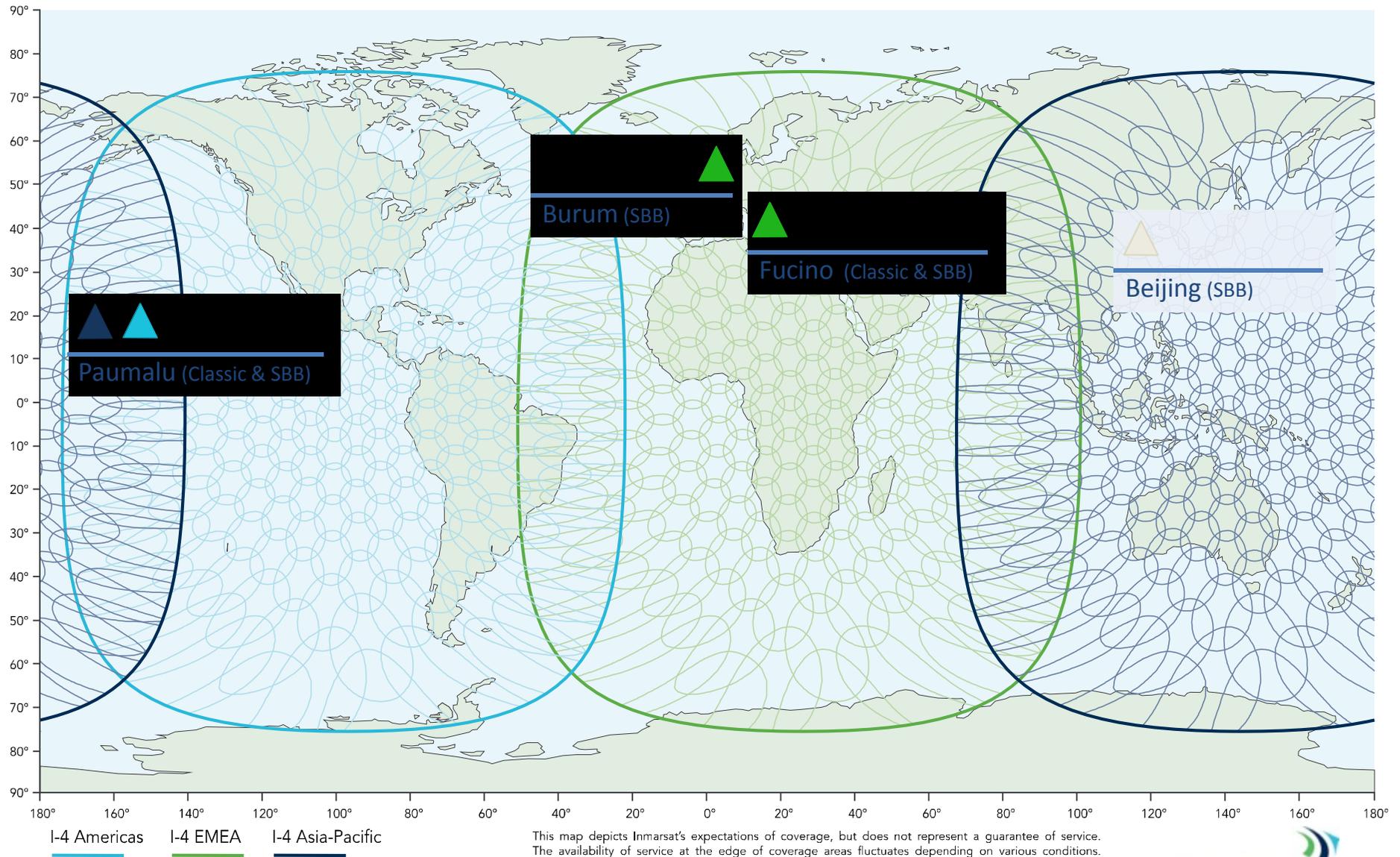
MCN

Beijing

(SBB) - China

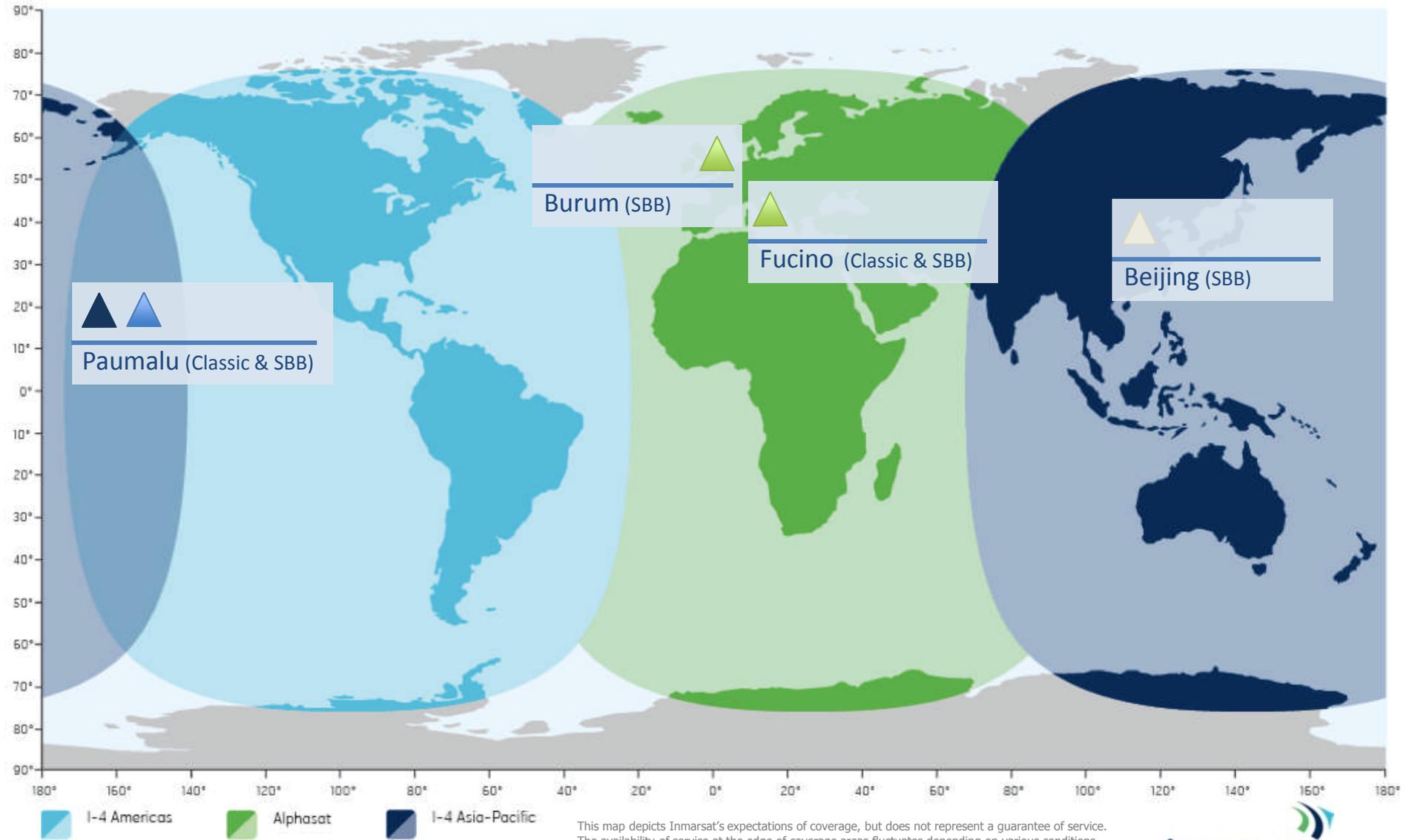
DEC 2013

I-4 Classic Aero & SwiftBroadband Coverage Map (L-Band)



I-4 Classic Aero & SwiftBroadband Coverage Map (L-Band)

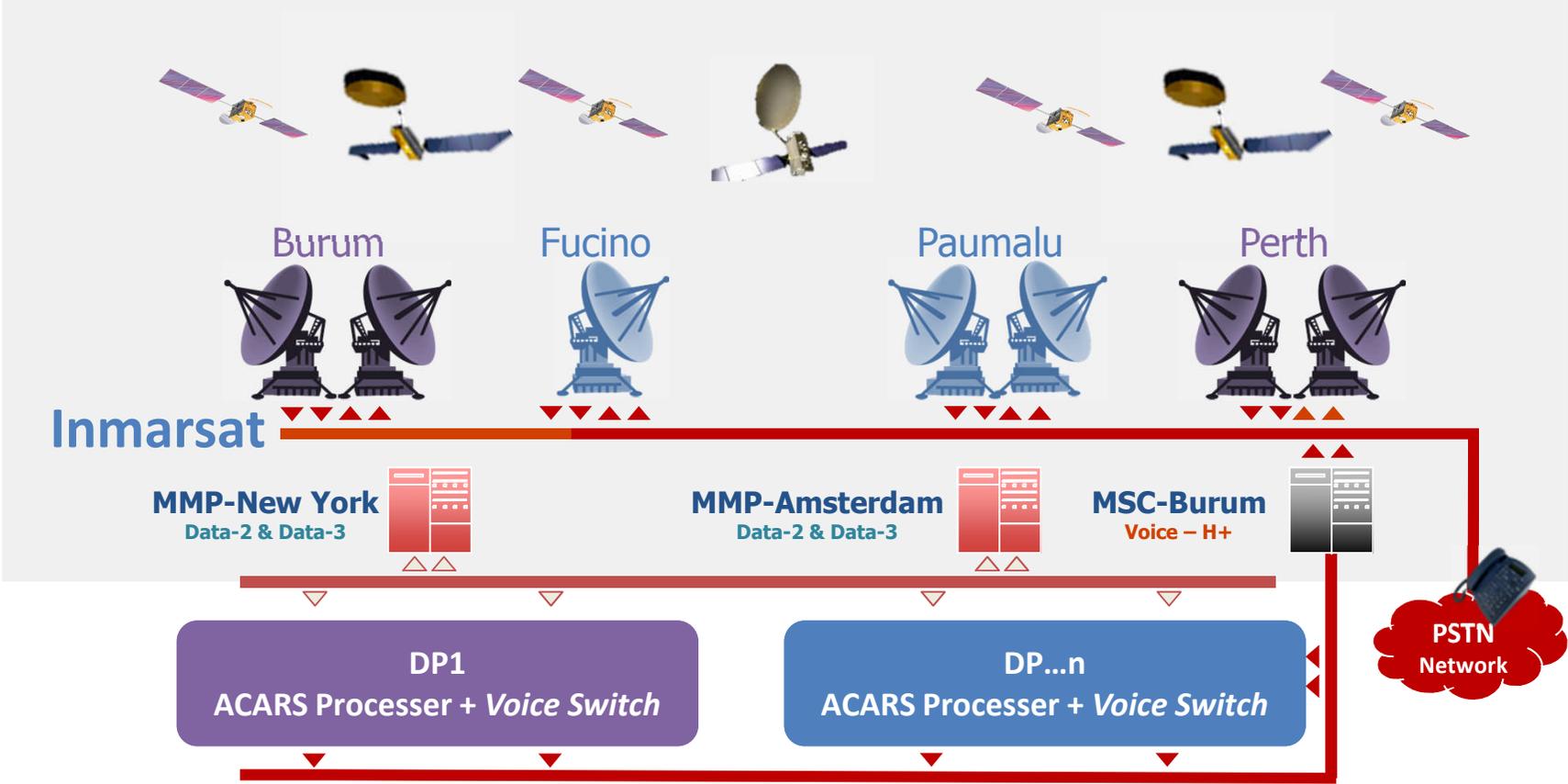
Updated for Alphasat I-4A F4 introduction (planned March 2015)



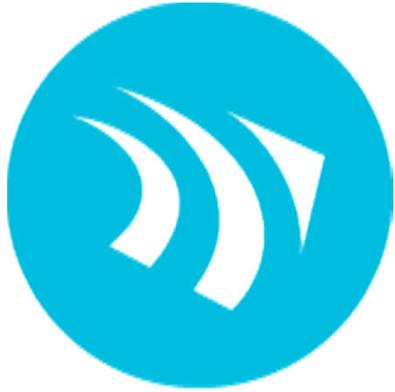
This map depicts Inmarsat's expectations of coverage, but does not represent a guarantee of service. The availability of service at the edge of coverage areas fluctuates depending on various conditions. SwiftBroadband coverage January 2014.



I-3 and I-4 Network Harmonization



End State: Simplified networks access to I-3 and I-4 Classic Aero and I-4 SwiftBroadband

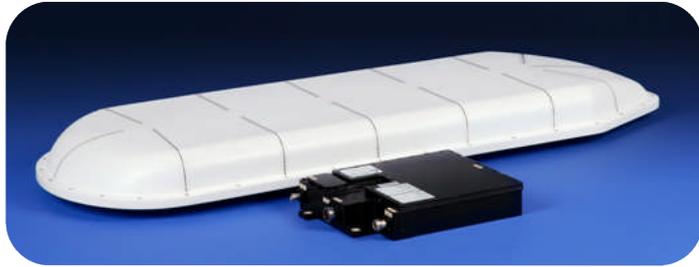


Greenland Coverage – case study

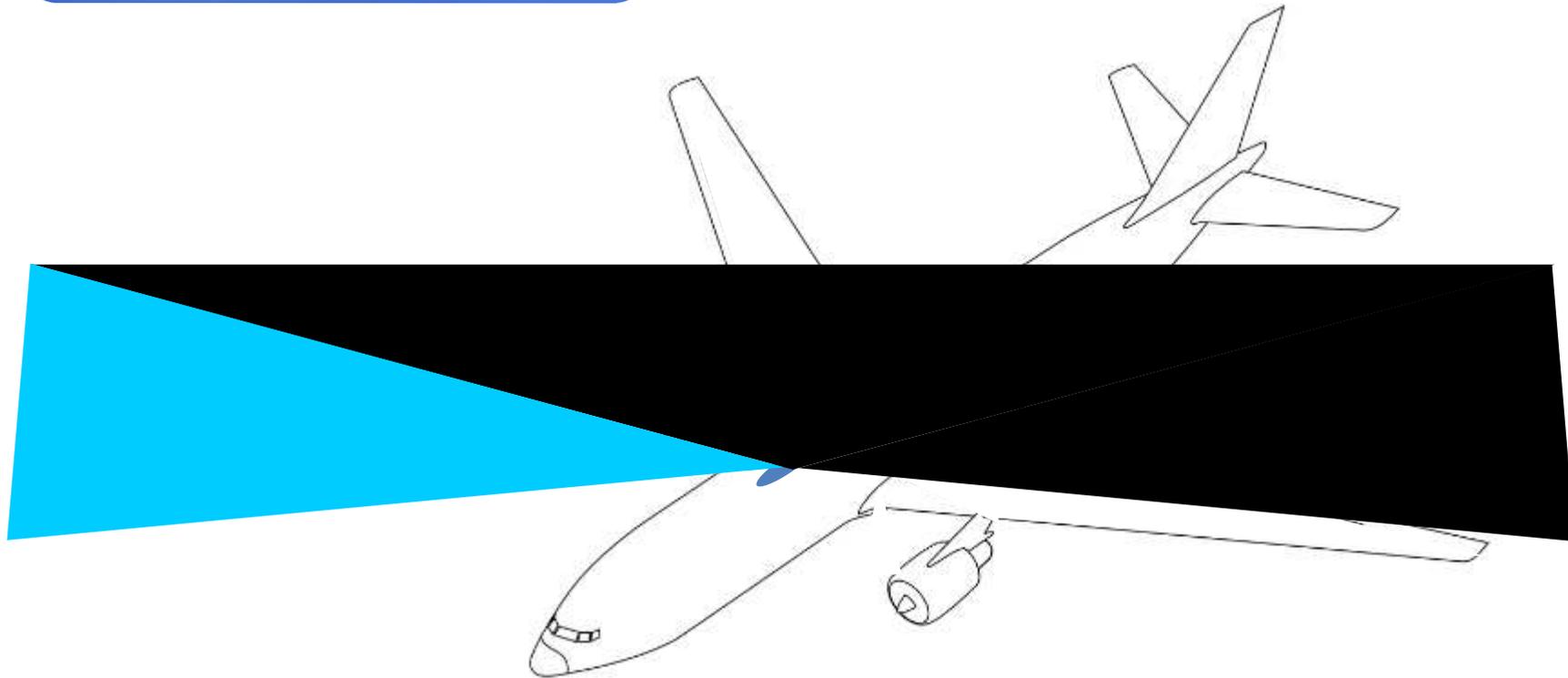
NAT CNSG action - coverage over Greenland

- Inmarsat regularly observes reports to 84 degrees North in the Greenland region
 - Greenland land mass extends to approx. 83 degrees North
- Good coverage for Classic Aero operating on I-3 and I-4 networks
 - Inmarsat on-target to have four operational I-3s in service until the end of 2018 (we currently operate with four satellites in service and one in-orbit spare)
 - I-4 lifetime to 2023, with Alphasat to 2028
- I-3 and I-4 coverage near Greenland illustrated in following slides
 - Alphasat coverage will have a different coverage footprint, and different beam radiated power – effect on Greenland coverage still being evaluated
- Requirements capture has started for the L-band I-6 constellation
 - Aero requirement to provide contiguous coverage and to maximise coverage in the North Atlantic including Greenland

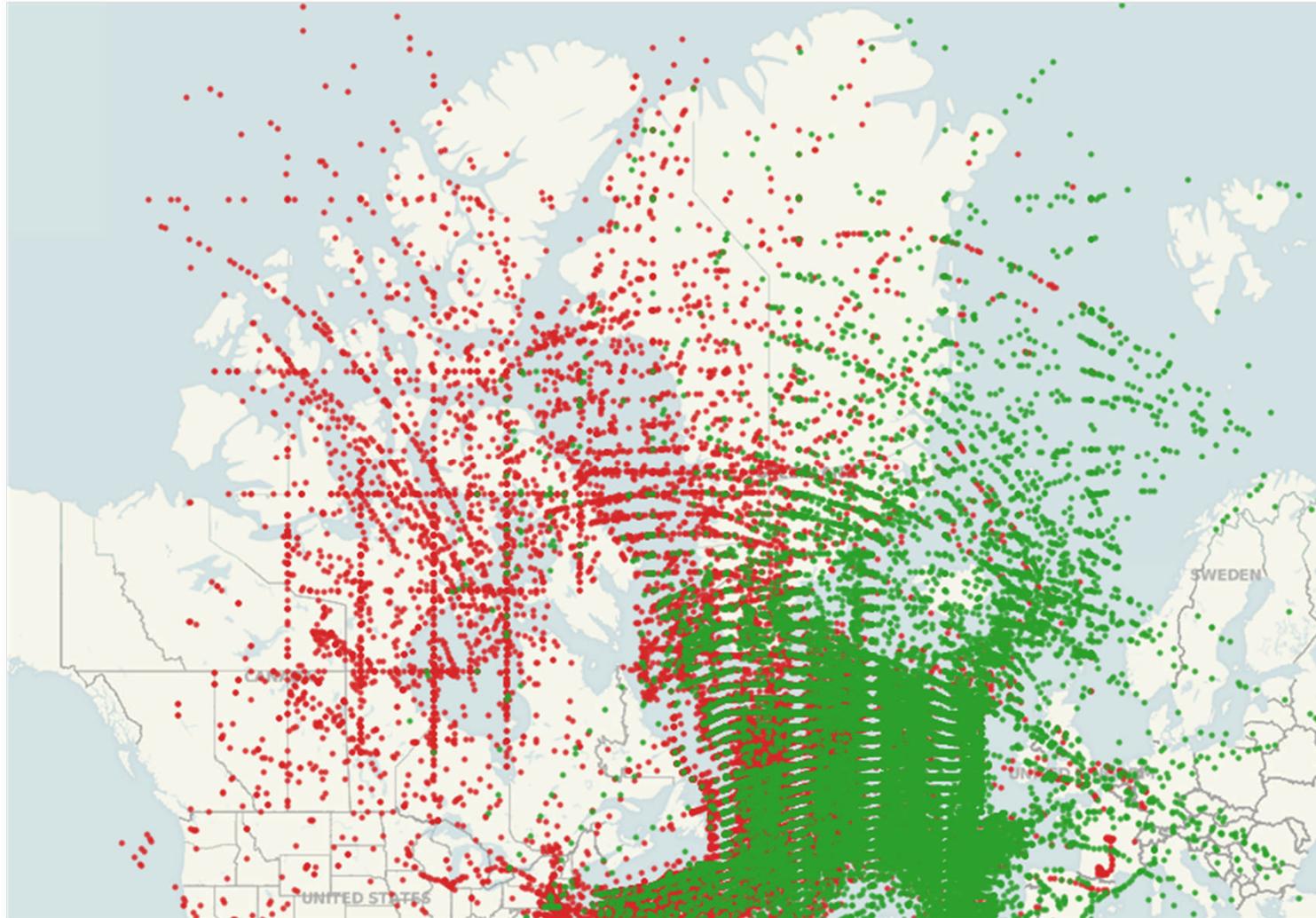
Centerline Topmount Antenna



High Gain (Class 6)



Greenland: Tracks for Flights using I3s (Classic Aero on I-3 AOR-E and AOR-W – reports from 7 days Oct 14)



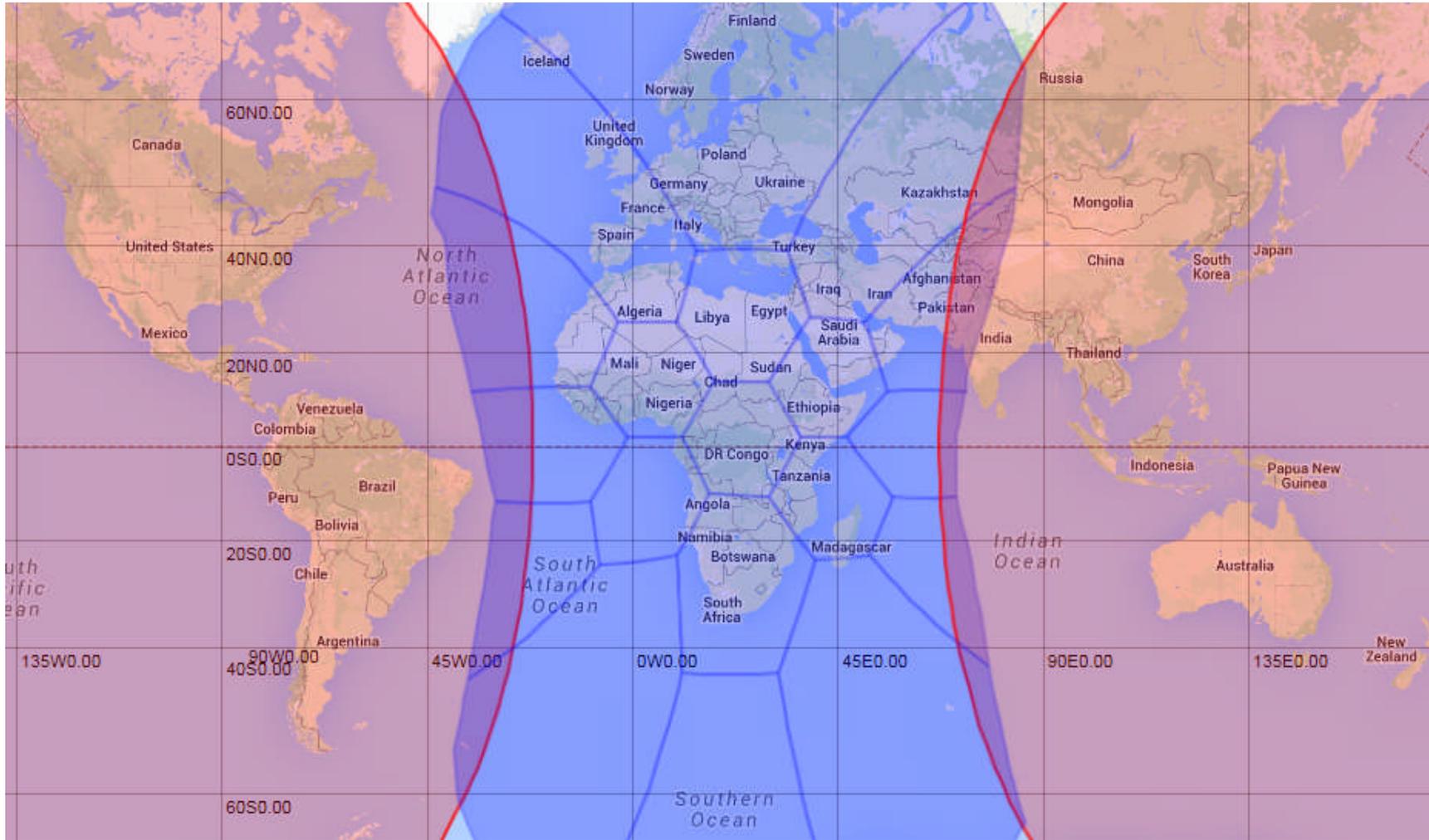
Greenland: Tracks for Flights using I4s

(Classic Aero on I-4 EMEA and AMER – note currently fewer aircraft on I-4 network compared to I-3 – reports from 7 days on Oct 14)



Alphasat

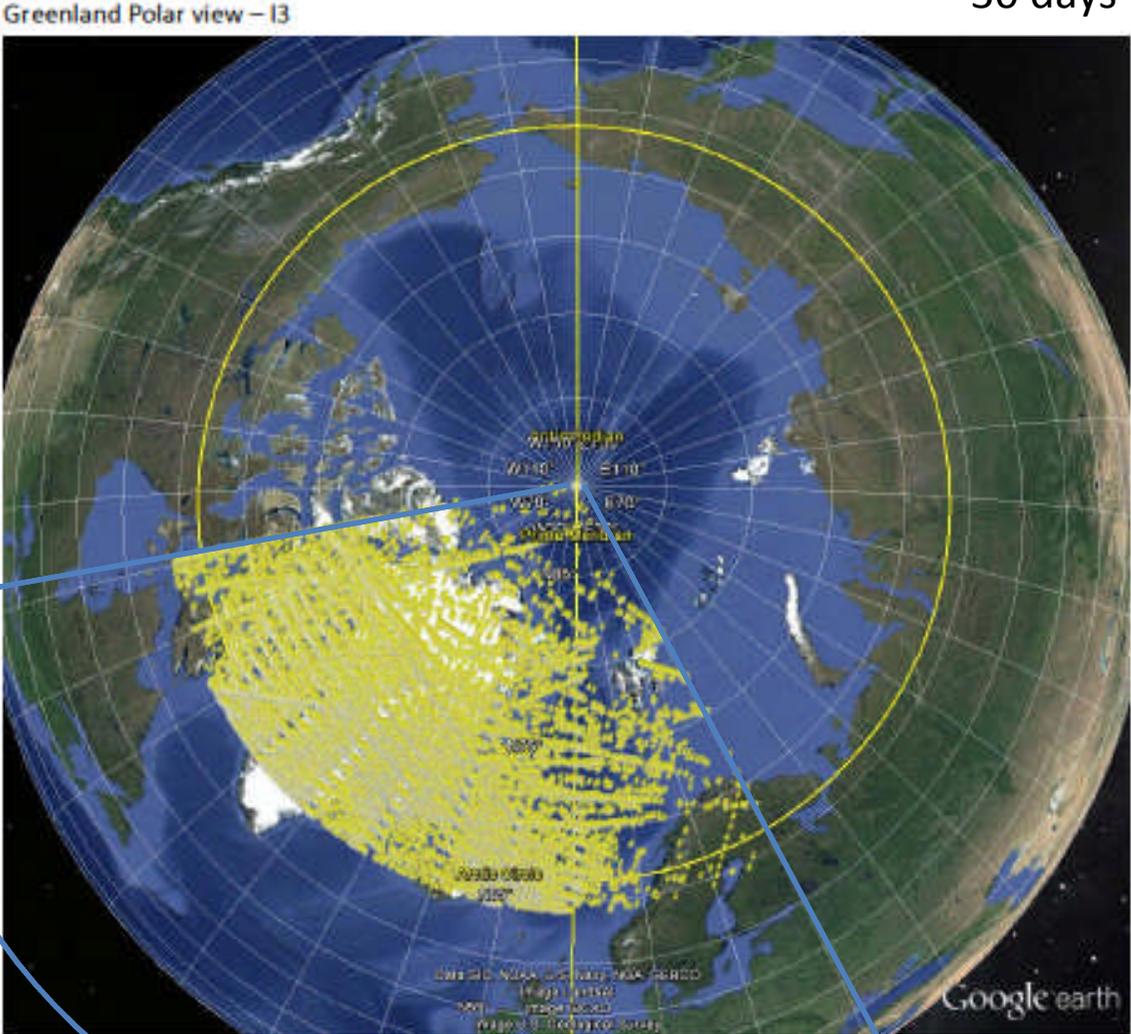
Change to EMEA Coverage Area – from March 2015



This map depicts Inmarsat's expectations of coverage, but does not represent a guarantee of service. The availability of service at the edge of coverage areas fluctuates depending on various conditions. SwiftBroadband spot beam coverage February 2009.

Greenland polar view – ADS-C reports via I3

30 days to 26th Oct 2014

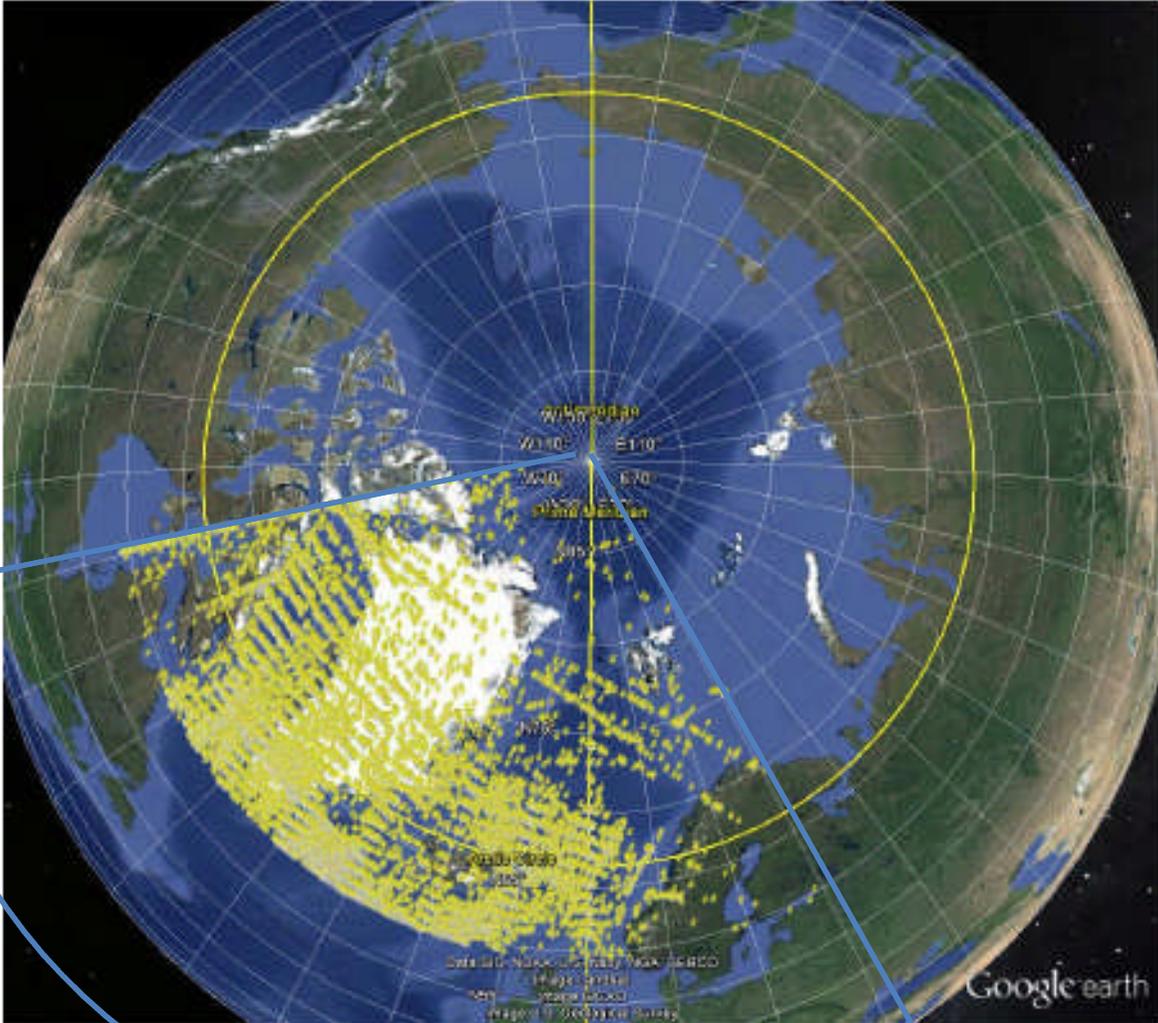


Area of analysis

Greenland polar view – ADS-C reports via I4

Greenland – Polar View -I4

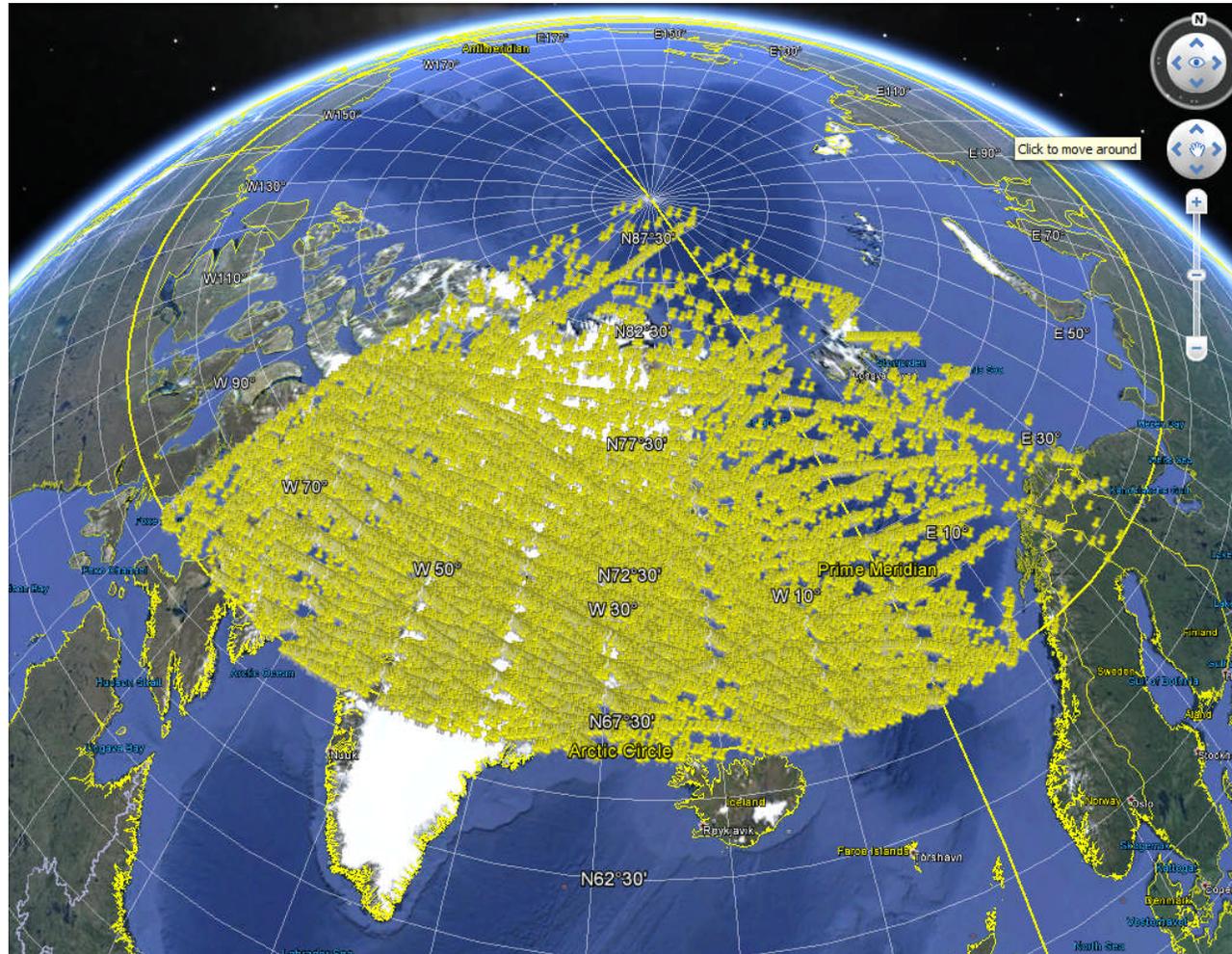
30 days to 26th Oct 2014

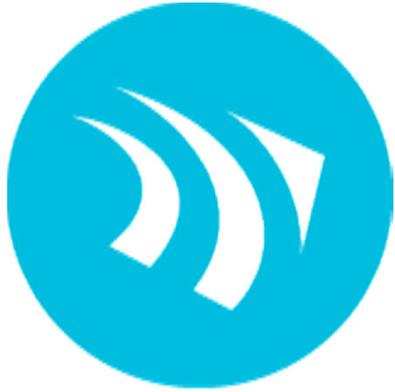


Area of analysis

Combined I3 and I4 – 30 days of ADS-C reports

30 days to 26th Oct 2014





Flight Tracking

Assistance to Flight Tracking Improvements

- Since the tragic disappearance of MH370, Inmarsat has been working with our Distribution Partners (including SITA and Rockwell Collins/ARINC), and a number of other industry partners to assist in defining solutions for aircraft flight tracking
- Inmarsat continues to provide support to the ICAO and IATA flight tracking initiatives
- Need for an industry wide solution:
 - To locate aircraft in a more systematic way, with more accuracy than with existing procedures and systems
 - To increase the reactivity in case of abnormal route deviation or event

Inmarsat Support to Aircraft Tracking

- Inmarsat communications technology supports many ways of providing aircraft tracking information in oceanic and remote airspace
 - ADS-C is and will be supported on aircraft equipped with:
 - Classic Aero satcom terminals (existing service)
 - Classic Aero/SwiftBroadband combined terminals (existing service)
 - SwiftBroadband Safety terminals (new service)
 - ADS-C is available now and is cost-effective for airlines

Inmarsat offer on ADS-C Tracking

- Inmarsat is working with its partners to offer a Basic Tracking ADS-C message for free, every 15 minutes
 - To trans-oceanic aircraft that are FANS equipped

Classic Aero: Current typical ADS-C Tracks

(one week Sept 2014) Inmarsat – I-3 & I-4 Satellites

Reports regularly received to 84N



15 min log-on verification running in the background



SwiftBroadband Safety Services

Features and benefits

- Cockpit communications replicating Classic
 - 2 x Cockpit Voice
 - Enhancement: Support for VoIP
 - 1 x ACARS Data, supporting FANS 1/A
 - Targeting reduced ACARS message delivery times
- Prioritised IP data pipe supporting:
 - EFB Applications
 - New ATS/AOC IP-based applications
 - FDR data download
- Aircraft position reporting and tracking
 - Integral position reporting - rate is highly configurable
 - Additional to WPR and ADS-C ACARS messaging
- Low cost terminals
 - 2 MCU SDU size with Enhanced Low Gain Antenna
 - Opex expected at least 30% less than Classic Aero
 - Anticipate up to 100 lbs in weight + drag savings



**Low cost +
lightweight terminals**



**In-built aircraft position
reporting and flight tracking**

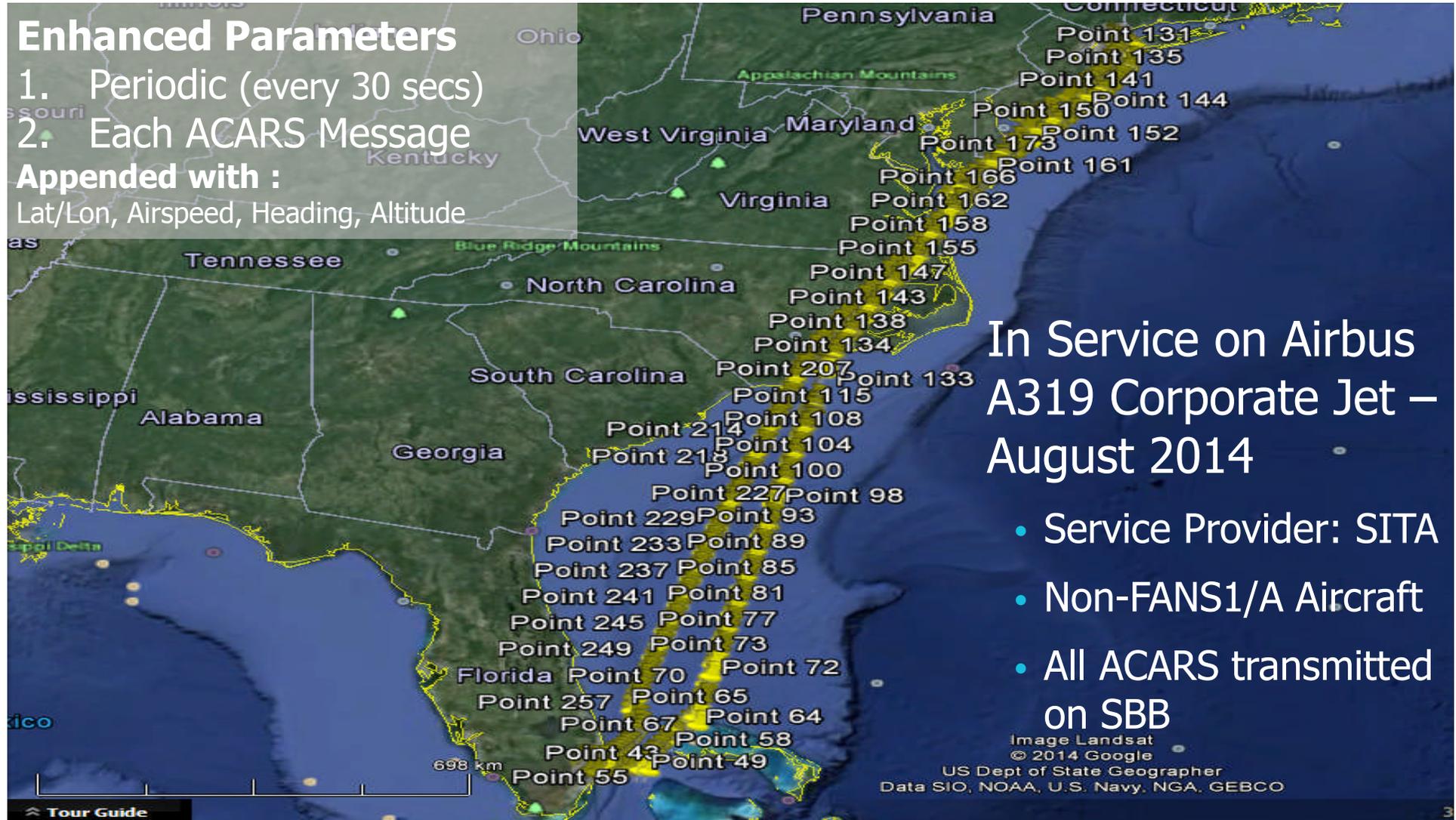
Trials of AOC ACARS over SBB ongoing – position reporting at higher rates

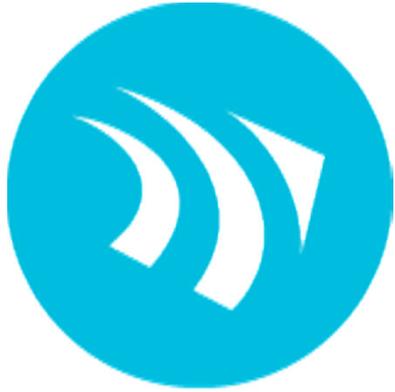
Enhanced Parameters

1. Periodic (every 30 secs)
2. Each ACARS Message Appended with :
Lat/Lon, Airspeed, Heading, Altitude

In Service on Airbus A319 Corporate Jet – August 2014

- Service Provider: SITA
- Non-FANS1/A Aircraft
- All ACARS transmitted on SBB





Thank You

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