Inmarsat Aviation Services Network Capabilities for Tracking and Surveillance

Overview of Observed Benefits & Performance

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OUR BACKGROUND: WE GET SAFETY

- Inmarsat established 35 years ago under UN/IMO to provide Safety of Life at Sea (SOLAS) services
- Aviation safety services founded on same principle of reliability, dependability and availability
- Inmarsat Classic Aero:
  - 120-130k position reports per day
  - Over 11,000 aircraft installed
  - 90% of oceanic flights use Future Air Navigation System (FANS) ADS-C and CPDLC message application sets
  - >90% equipage on wide-body trans-oceanic fleet

Between 2001 and 2016, in oceanic regions, satcom generated a **$3 billion benefit** for airlines

*2017 Helios study

A $3 BILLION BENEFIT FOR AIRLINES

AOC Benefits

$1.9B

- Improved delay management and scheduling
- Improved maintenance capability
- Better fleet management
- Better flight crew management
- Reduced turnaround time
- Increased efficiency and predictability

ATC Benefits

$1.1B

- **Reduced separation standards**
- User preferred route
- Tailored arrivals
- Dynamic airborne reroute procedure

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81% OF ATC BENEFITS DELIVERED FROM REDUCED SEPARATION STANDARDS

$890 Million in Benefits

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CLASSIC AERO: ~120,000-130,000 ADS-C REPORTS EVERY DAY
OVER 44,000,000 ADS-C REPORTS PER YEAR

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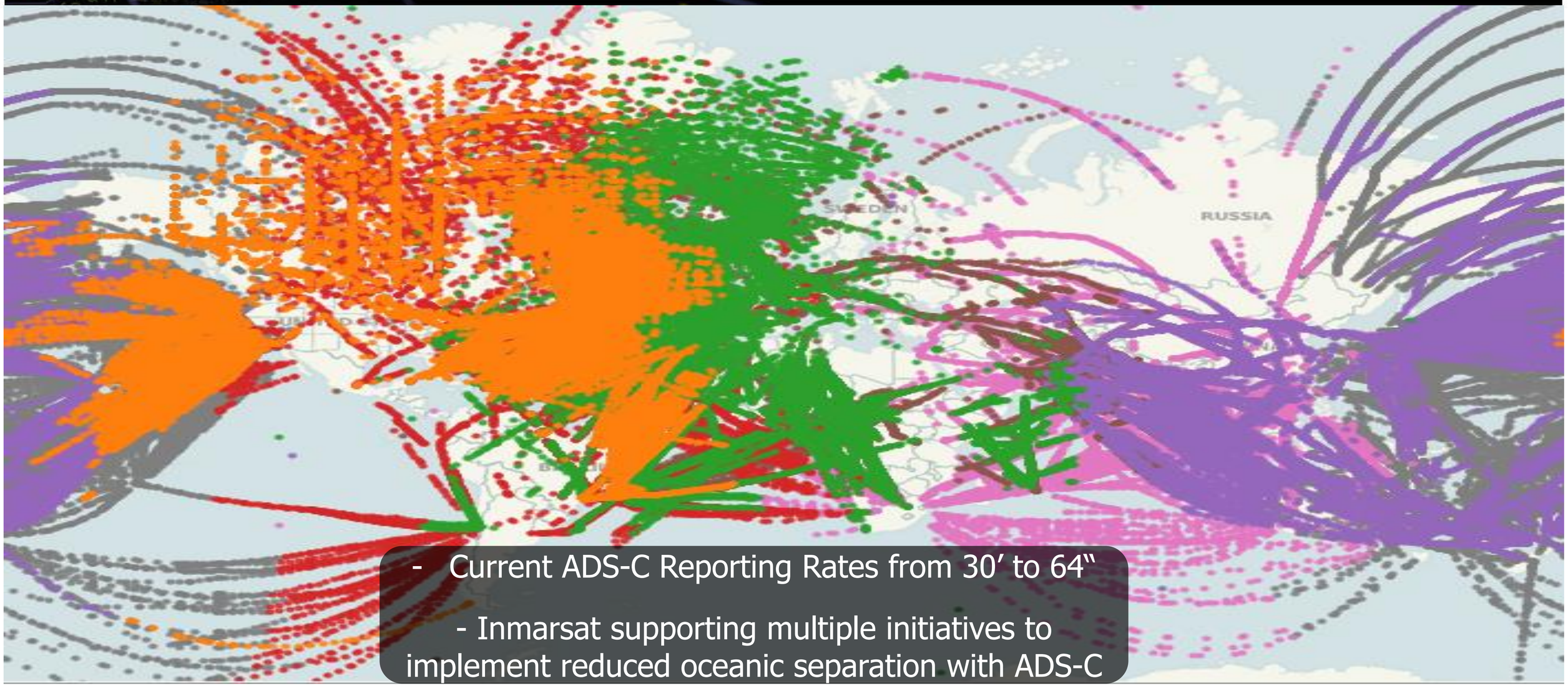

- Current ADS-C Reporting Rates from 30’ to 64“

- Inmarsat supporting multiple initiatives to implement reduced oceanic separation with ADS-C

MOVING FROM OCEANIC COMMS TO EVERYDAY OPS

SWIFTBROADBAND-SAFETY

IP

Black box
in the cloud

Engine and
airframe data

Electronic
Flight Bag

Graphical weather

1995 2000 2005 2010 2015 2018 2019 2020 2022 2024 2020 2025 2030 2035

CLASSIC AERO

Meeting ICAO standards
for oceanic communication
and surveillance

CPDLC /
ADS-C

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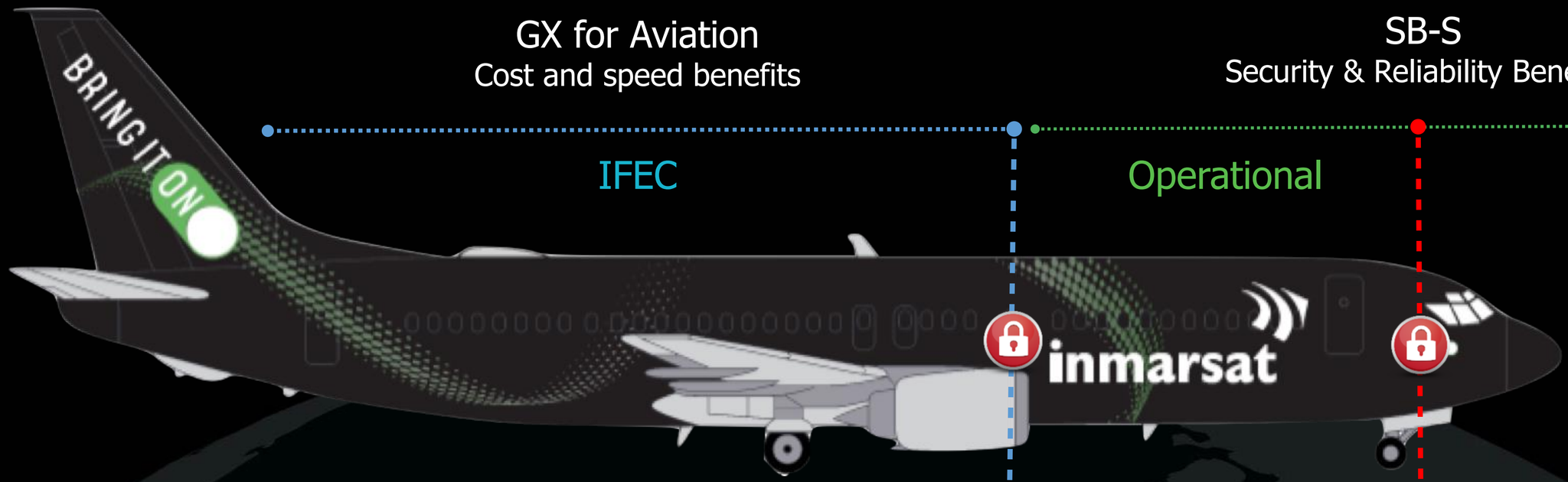
THE INMARSAT CONNECTED AIRCRAFT



GX for Aviation
Cost and speed benefits

SB-S
Security & Reliability Benefits

IFEC

Operational

Safety

Passenger Information and Entertainment Services Domain (PIESD)

Airline Information Service Domain Control (AISD)

Airline Control Domain (ACD)

Internet

Airline IP- VPN

ACARS

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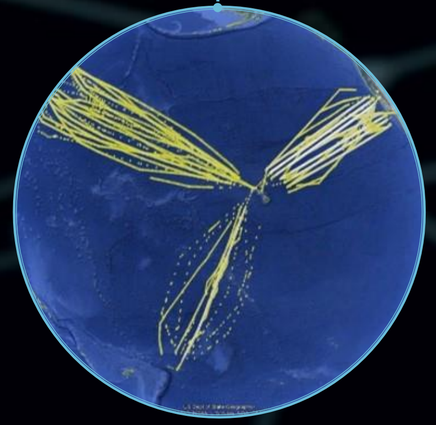
SWIFTBROADBAND-SAFETY:
NEXT GENERATION FLIGHT DECK COMMUNICATIONS PLATFORM

High speed secure communications

Data fortress door

Real-time information with IP Connectivity (Voice, ACARS, EFB & e-Tech Log)



Black Box in the Cloud

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GADSS AUTONOMOUS DISTRESS SYSTEM – HELPS RESCUERS PINPOINT AIRCRAFT IN EMERGENCIES

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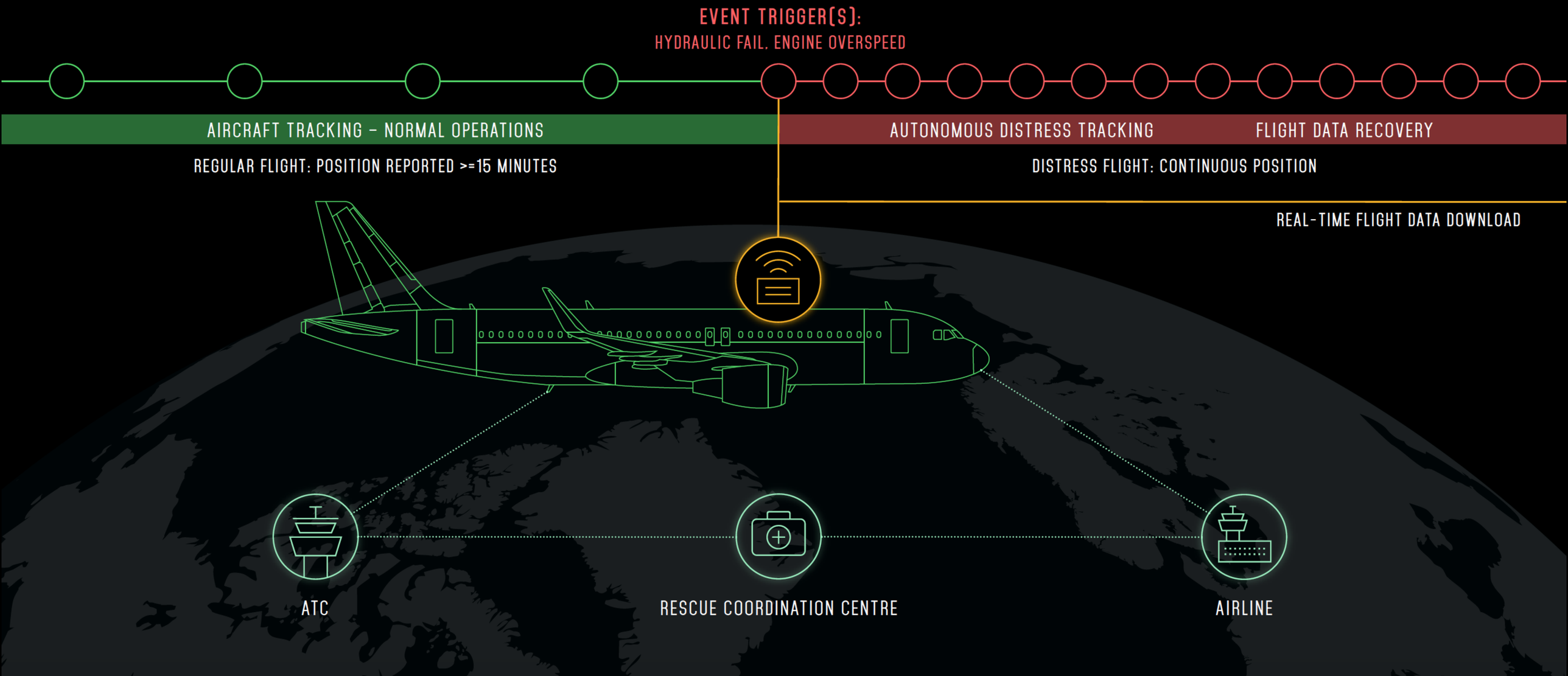
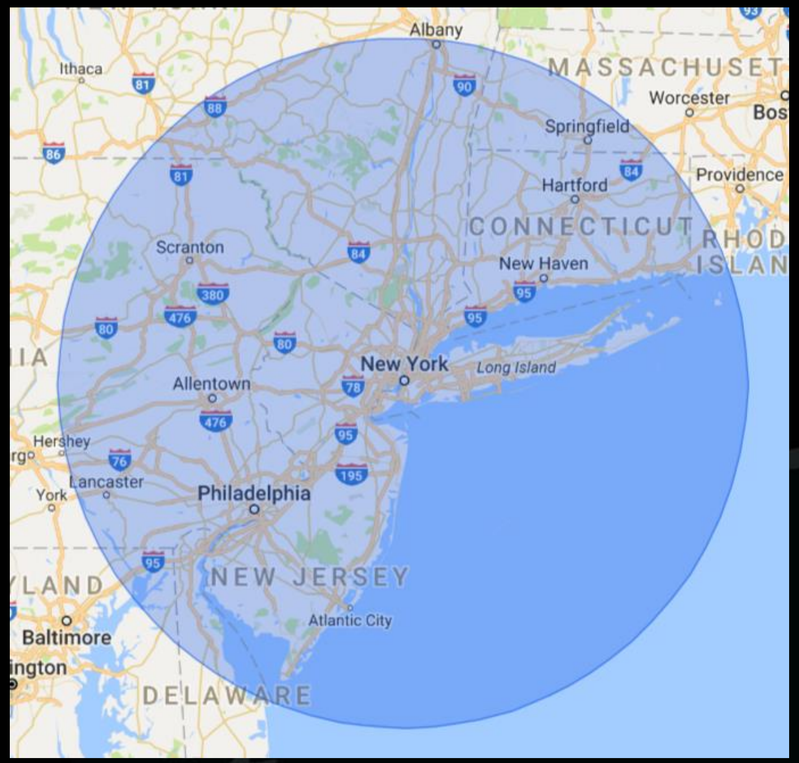
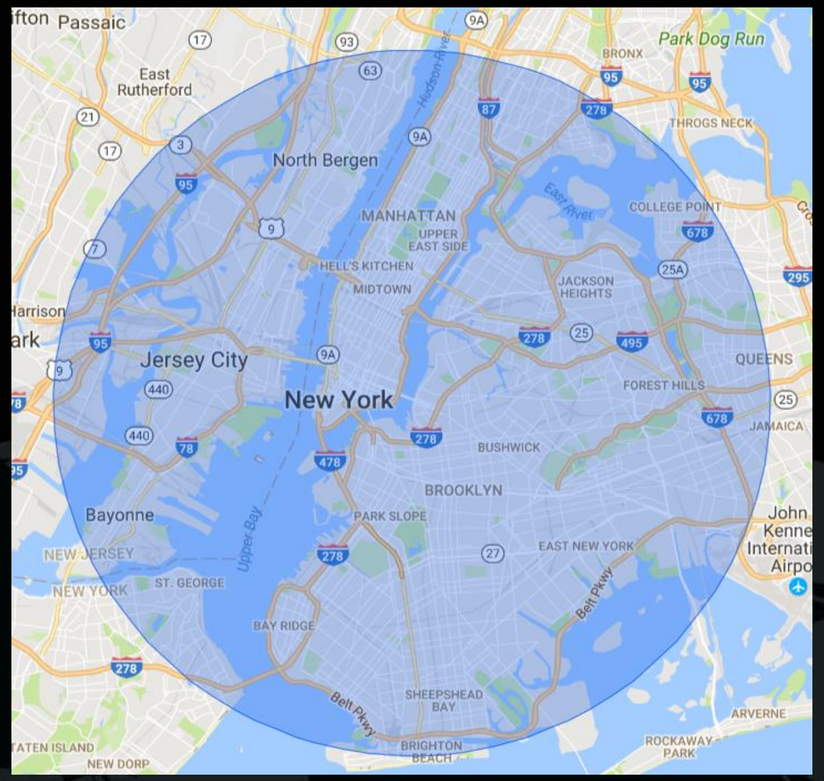
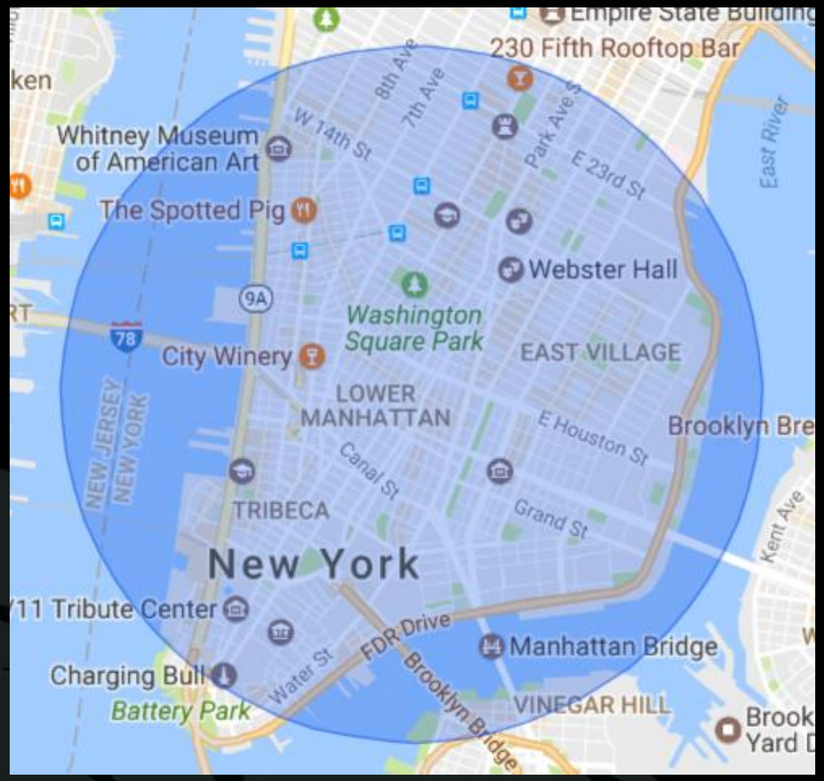


THE IMPACT OF REPORTING INTERVAL ON SEARCH AREA







Normal Tracking

15 minutes position report interval

Abnormal Tracking

1 minute position report interval

SB-S Tracking

10 seconds position report interval

10s position reporting

kbps
0.01
(~120 bit / report)

VDL
kbps
31

Classic Aero
kbps
10.5

VHF
kbps
2.4

HF
kbps
0.3

Secure
Global
Broadband for the cockpit
High Speed

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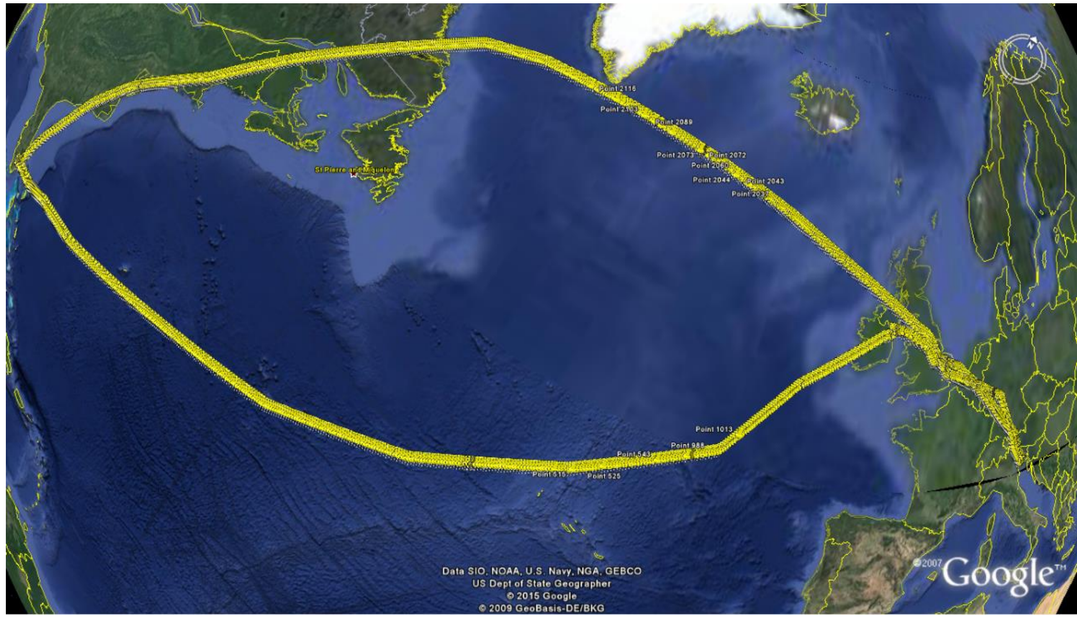
SB-SAFETY INTEGRAL POSITION REPORTING

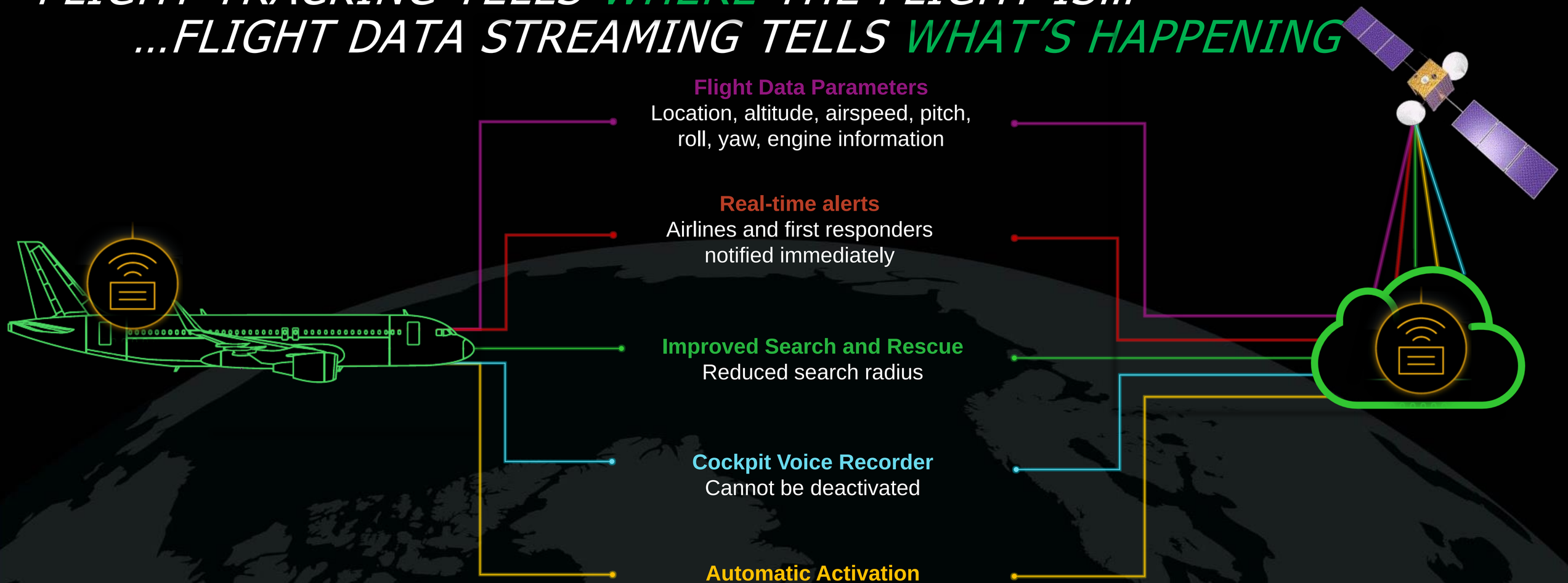
- SwiftBroadband-Safety continuous high-update 4D position reporting (up to 10 seconds)
- Safety Benefits
  - Exceeds requirements for normal/distress tracking and end-of-flight location
  - Eliminates triggering-related risks
  - Even tighter search radius
  - Integrated into Inmarsat-managed GMDSS maritime safety network



SB-S continuous integral tracking
Inherently tamper-proof
1 MIN RATE

INMARSAT INTEGRATED FLDR APPROACH:

FLIGHT TRACKING TELLS WHERE THE FLIGHT IS…
…FLIGHT DATA STREAMING TELLS WHAT'S HAPPENING



Flight Data Parameters
Location, altitude, airspeed, pitch, roll, yaw, engine information

Real-time alerts
Airlines and first responders notified immediately

Improved Search and Rescue
Reduced search radius

Cockpit Voice Recorder
Cannot be deactivated

Automatic Activation
Tamper proof, always on, always powered

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SWIFTBROADBAND - SAFETY ROADMAP

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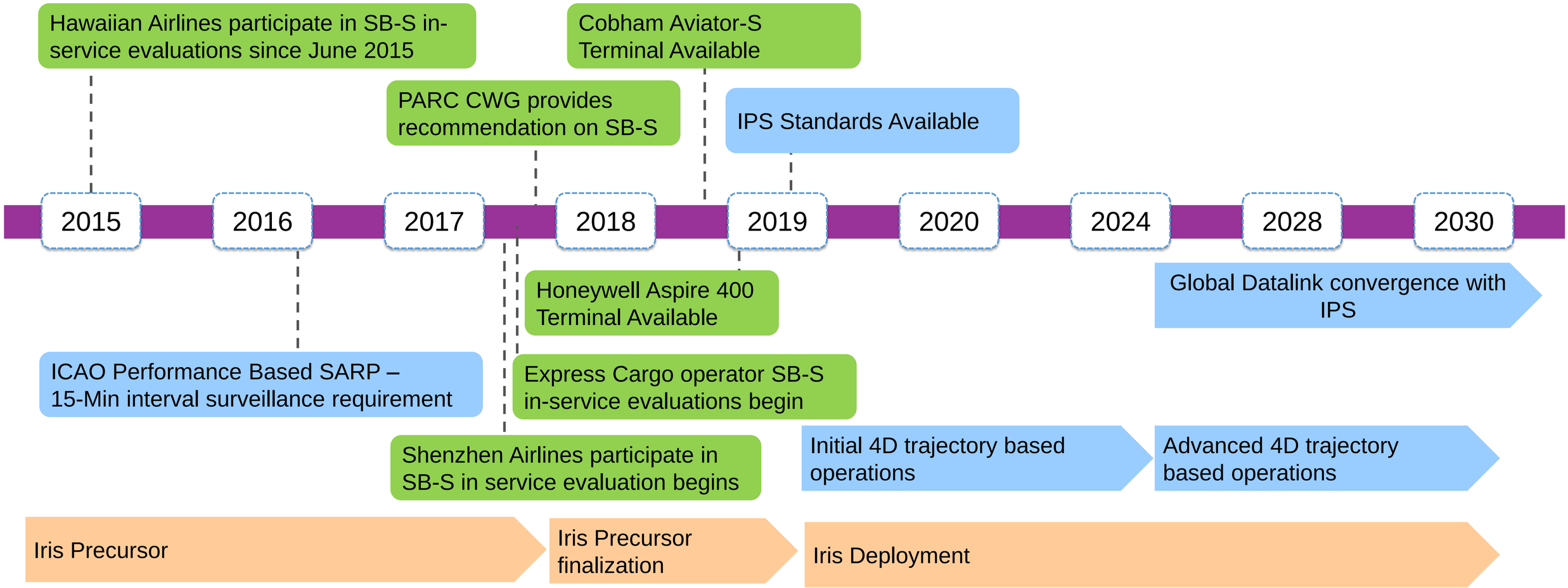

Timings are indicative and subject to change without notice