



Inmarsat Aeronautical Services

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ANASTASIA User Forum

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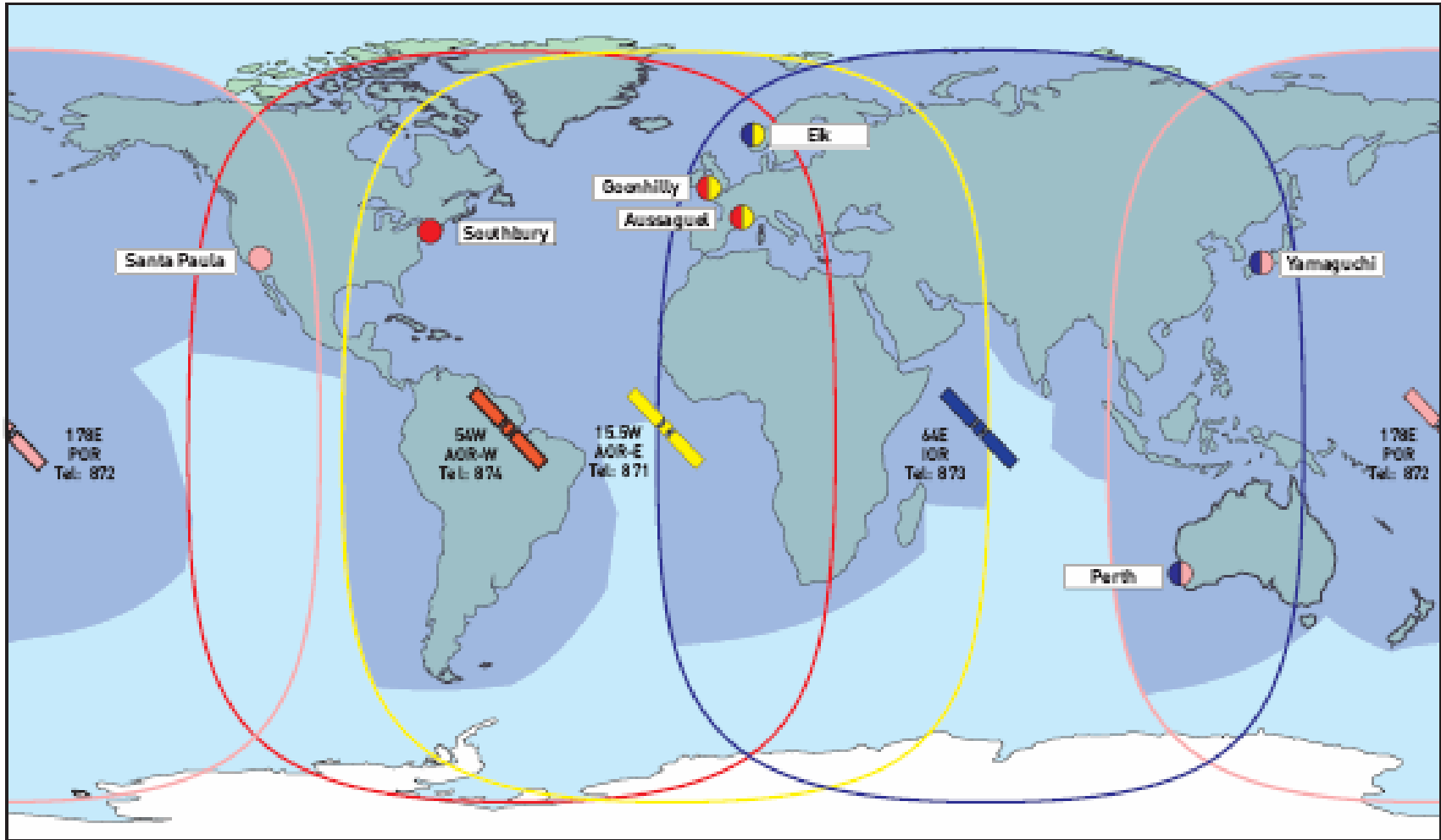
- Background
- Inmarsat Satellites
- Satellite Navigation
- Air Traffic Services
- SwiftBroadband

Inmarsat today



- The company
 - Established in 1979 as an inter-governmental organisation (IGO)
 - Privatised in April 1999
 - Majority share holding taken by Apax and Permira December 2003
 - IPO in June 2005. Listed on London Stock Exchange.
 - Services cover the maritime, aeronautical and land mobile markets
 - Owns, controls and manages a network of 11 geostationary satellites, serving 400 000 user terminals
- The track record
 - 25 years of successful service
 - Trusted with Maritime and Aeronautical distress and safety services through compliance with IMO and ICAO requirements overseen by IMSO (International Mobile Satellite Organisation)
- The technology
 - 14 F1 launched March 11th 2005, 14 F2 launched November 8th 2005, 14 F3 anticipated launch in 2007 (POR) subject to business case and successful service introduction on IOR and AOR
 - Enterprise BGAN service started in IOR 1st Dec 05
 - Five I3 satellites launched 1996-1998. Four I2 satellites launched in early 1990s.

Inmarsat Aeronautical Global and Spot Beam Coverage



Limits of global beam coverage for Inmarsat Aeronautical Services

- Pacific Ocean Region
- Atlantic Ocean Region West
- Atlantic Ocean Region East
- Indian Ocean Region

Inmarsat Aeronautical Spot Beam coverage

No Spot Beam coverage

The map displays Inmarsat's approximate coverage areas and does not represent a guarantee of service. The availability of service at the edge of coverage areas is not guaranteed and may vary depending on a variety of factors.

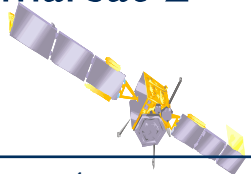
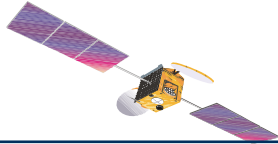

For more information on Inmarsat Aeronautical Services, contact our Customer Service & Operations team:
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Aero Product evolution

- 1990 Aero – H & L
- 1996 Aero - H+
- 1996 Aero - I
- 2002 Swift64 - ISDN
- 2003 Swift64 – MPDS
- Q4 2006 SwiftBroadband (early entry case approval)
- Q2 2007 SwiftBroadband Class 6 and 7

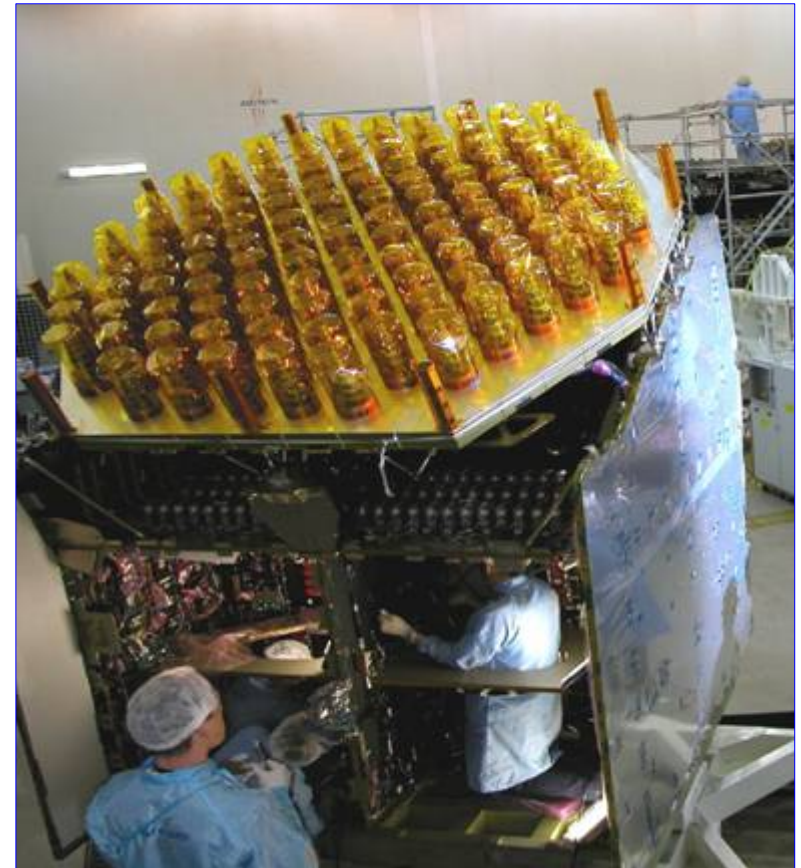
Inmarsat Satellites

| | Inmarsat-2  | Inmarsat-3  | Inmarsat-4  |
|------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| No. Satellites | 4 | 5 | 2 + 1 |
| Coverage | 1 Global Beam | 7 Wide Spots 1 Global Beam | 228 Narrow Spots 19 Wide Spots 1 Global Beam |
| Mobile Link EIRP | 39 dBW | 49 dBW | 67 dBW |
| Channelisation | 4 channels (4.5 to 7.3 MHz) | 46 channels (0.9 to 2.2 MHz) | 588 channels (EOL) (200 KHz) |
| S/C Dry Mass | 700 kg | 1000 kg | 3340 kg |
| Solar Array Span | 14.5m | 20.7m | 45m |
| Voice (4.8kbps) | 250 | 1000 | 18000 |
| M4 (64 kbps) | N/A | 200 | 2250 |
| PMC (384 kbps) | N/A | N/A | 588 |

Inmarsat 4 Satellite

- Can fully support existing services (Aero L, H, H+, I, Swift64)
- Optimised to support new BGAN and SwiftBroadband service via small spot beams

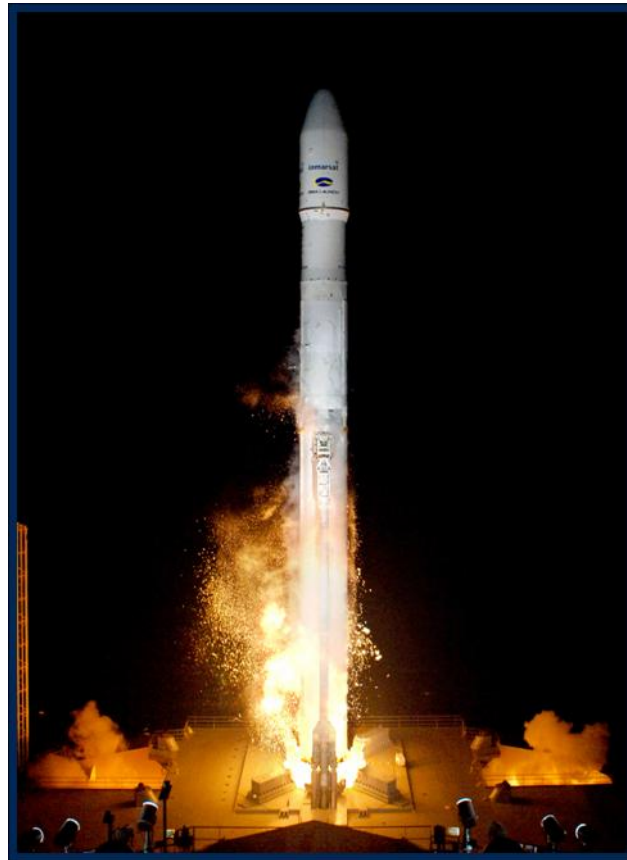
Inmarsat-4 payload



Final inspections before fuelling (spacecraft dry mass is 3.3 tonnes)



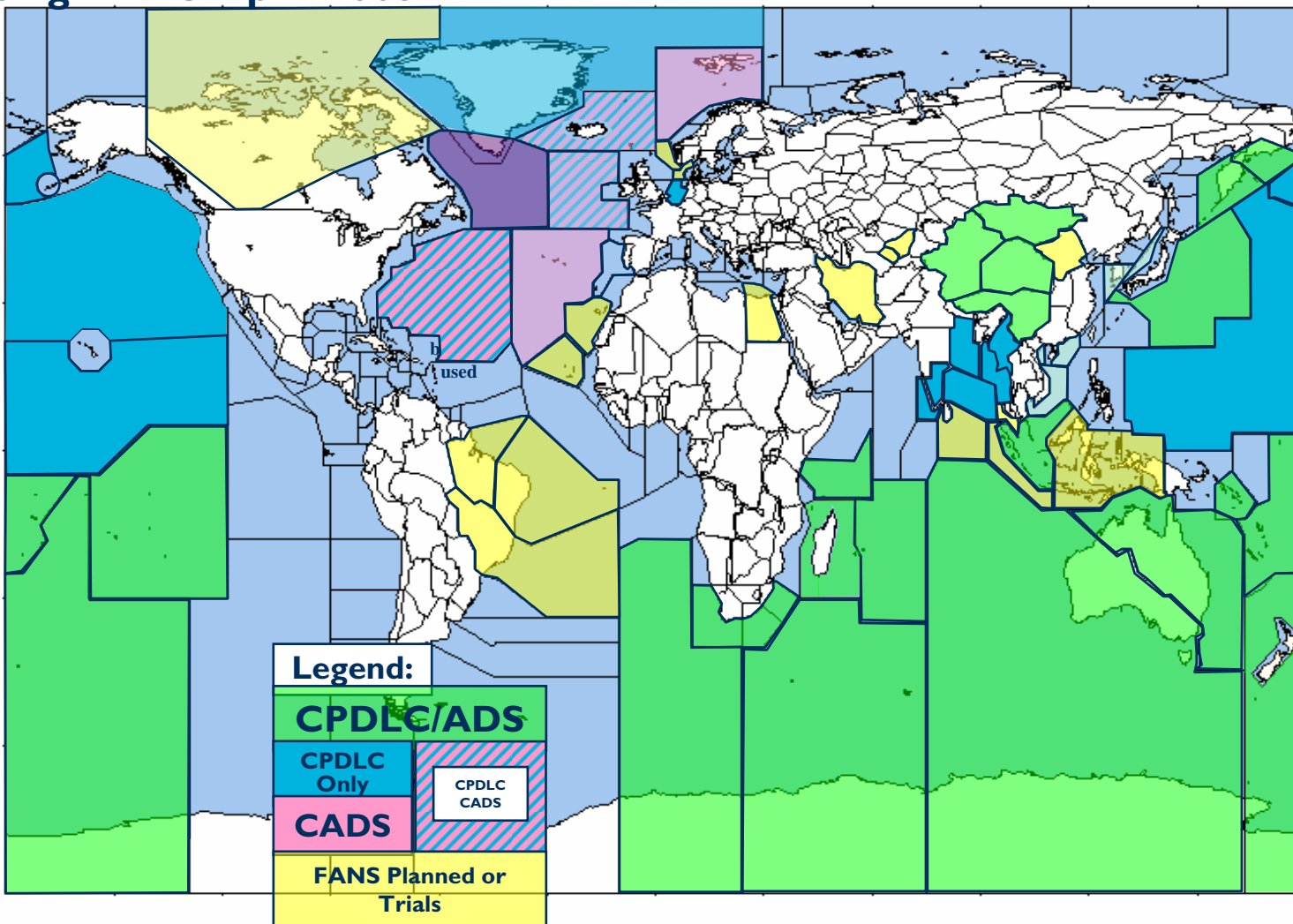
8th November 2005. Sea Launch of I4 F2



Sea Launch

Use of Satcom for ATS (I)

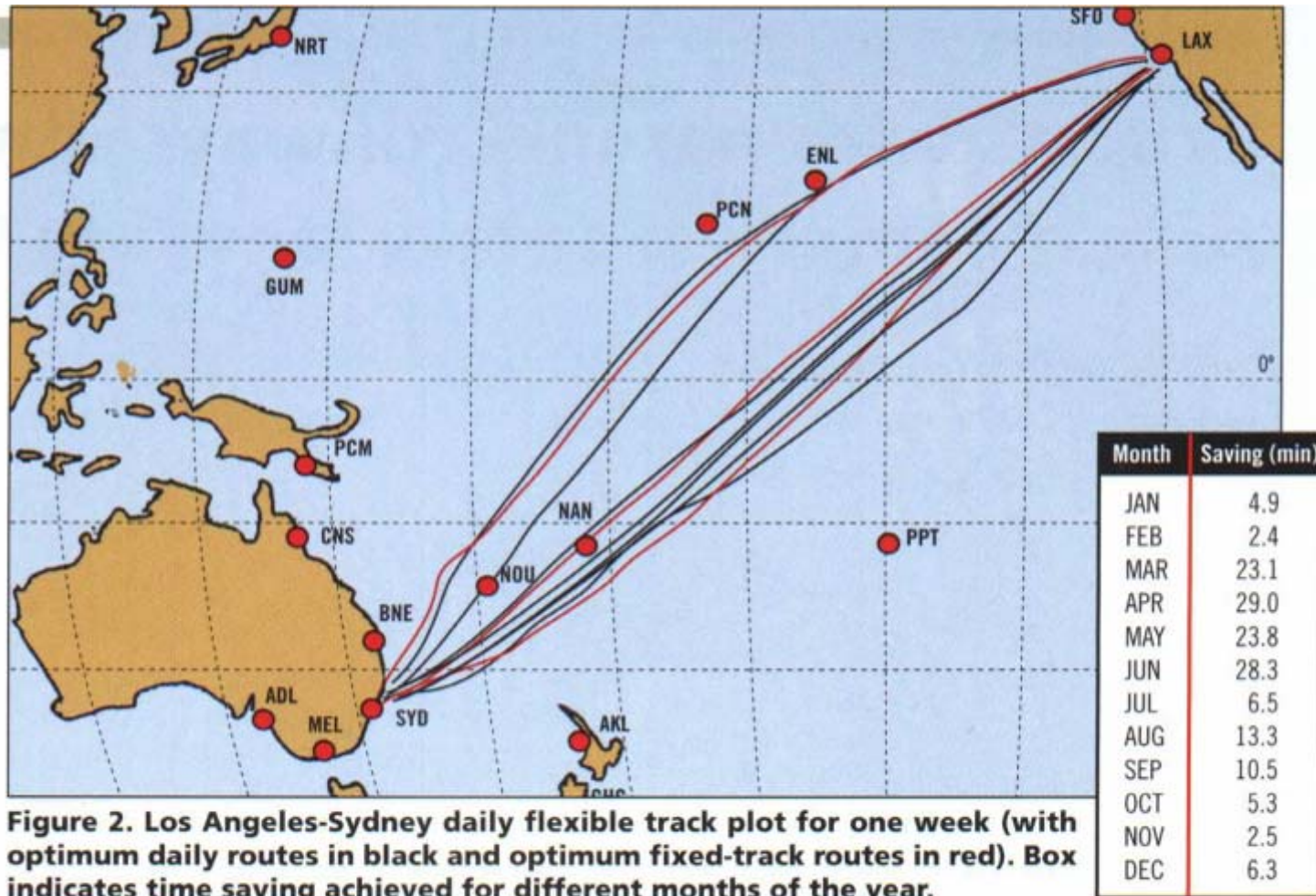
FIRs using FANS April 2005



Courtesy - Bill Fischer, Boeing

Use of Satcom for ATS (2)

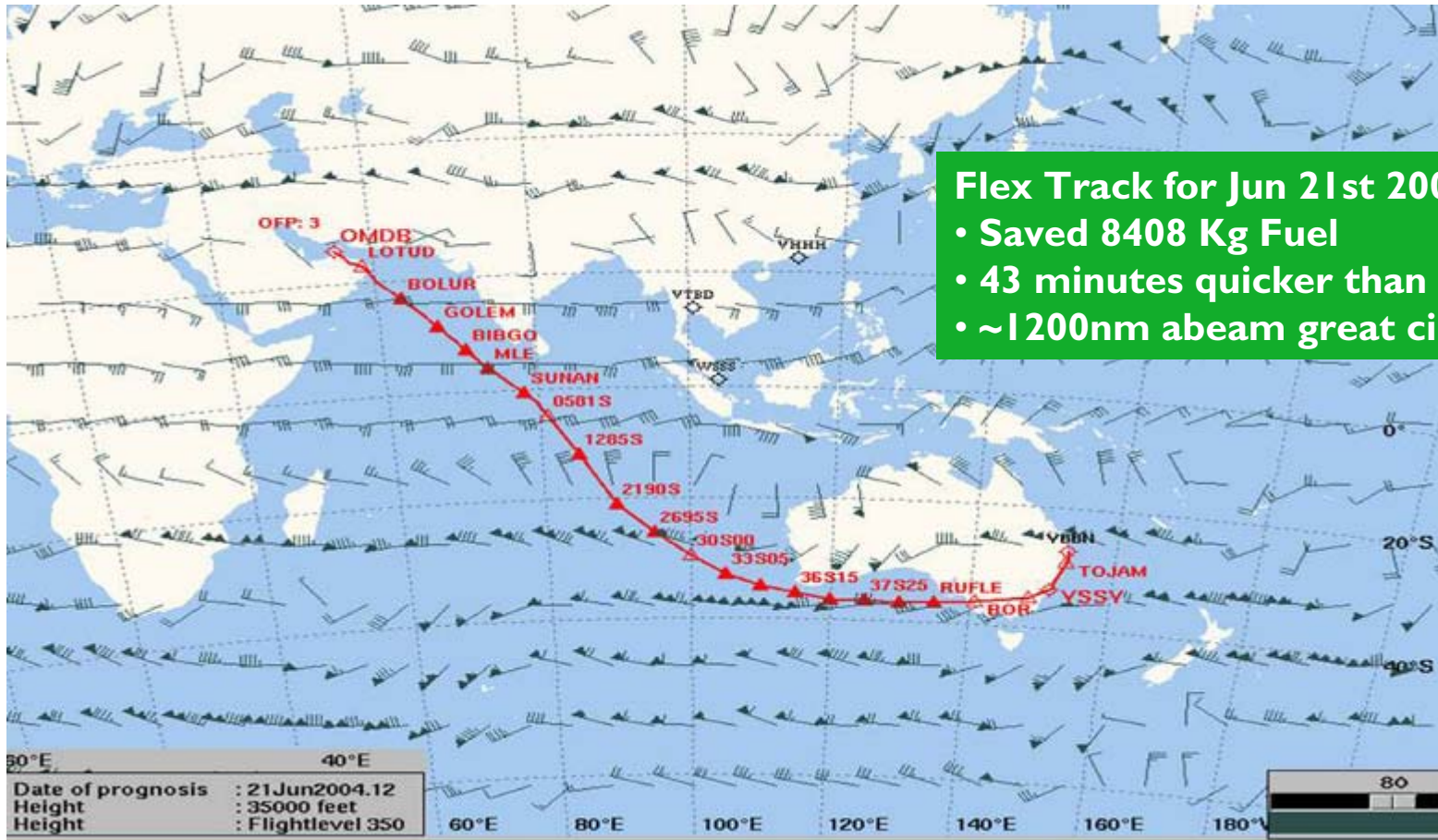
Air services Australia – flextrack operations



Courtesy – Bob Peake, ASA

Use of Satcom for ATS (3)

Air services Australia – flextrack operations



Courtesy – Bob Peake, ASA

Satellite Navigation Payloads

- 13 satellites contain L1 GPS look-alike payloads for use by SBAS systems:
 - Used by both EGNOS and WAAS
- 14 satellites contain L1/L5 GPS look-alike payloads for use by SBAS systems

Galileo Operations

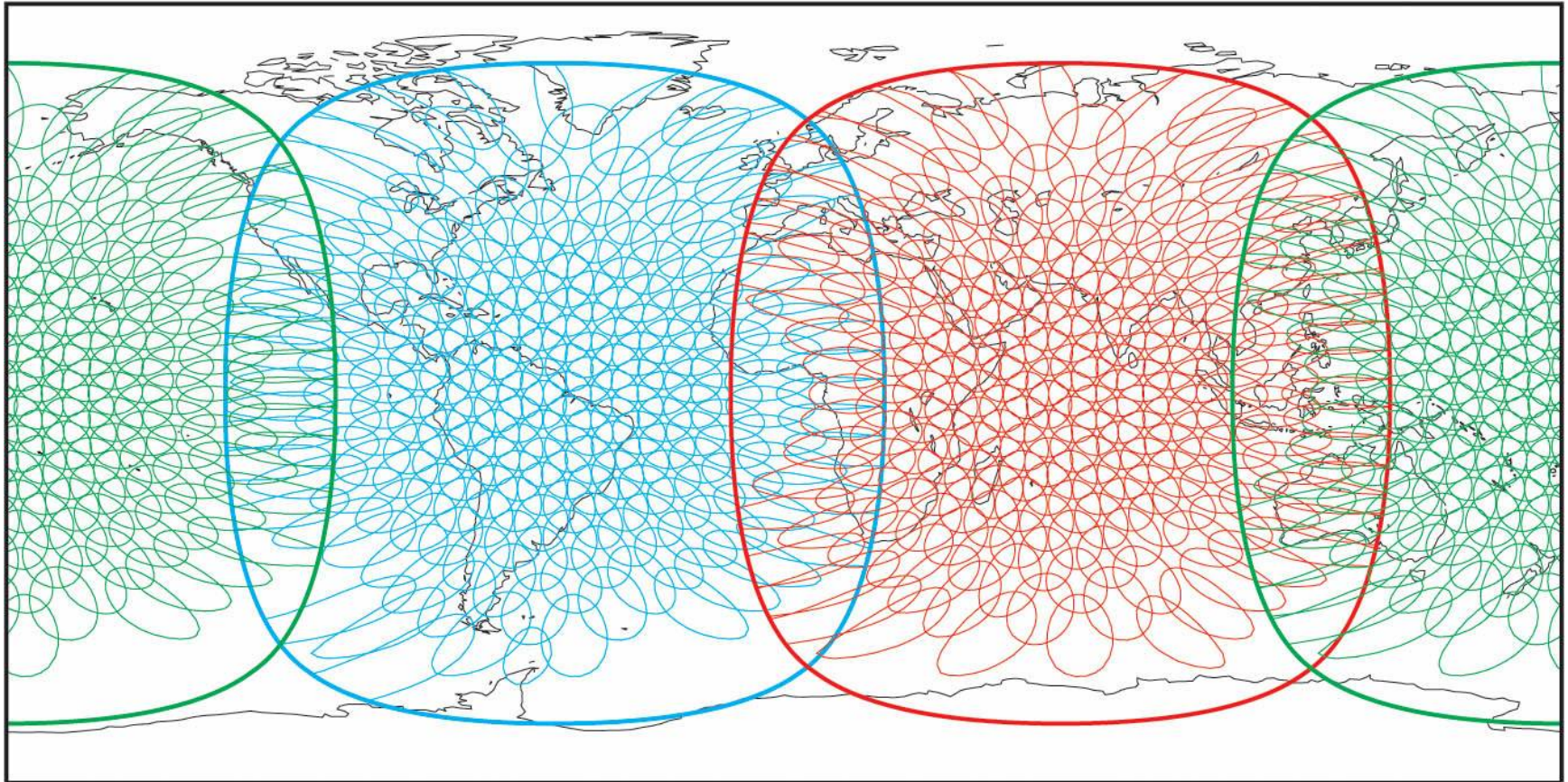
- Inmarsat is part of the Galileo Operating Company (GOC) which is negotiating with the EC to develop and operate Galileo.
- Inmarsat's role within the GOC is to take overall management leadership of the Galileo Operations Company (OpCo):
 - Look after global network operations.

What is Inmarsat's Next Generation of Aeronautical SATCOM?

- Enhanced capabilities using the new Inmarsat-4 Satellites and new terrestrial infrastructure
- Referred to as SwiftBroadband
 - Operates on the Inmarsat BGAN (Broadband Global Area Network) infrastructure.
 - Designed to operate in conjunction with existing safety services (voice and data) and Swift 64.
 - Provides enhanced data rates.
 - Provides both 'Circuit Switched' and "Always on" TCP/IP data.
 - Supported through High and Intermediate gain antennas.
 - Also provides the opportunity for development of significantly smaller terminals.

Inmarsat-4 Proposed Coverage Map

SwiftBroadband Coverage – 3 Ocean Regions



The 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 fluctuate depending upon a variety of conditions. The launch of the 4F-3 satellite will be determined in due course.

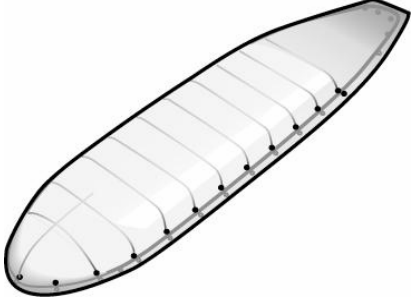
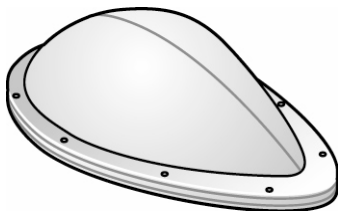

Packet Services - IP Data Service

- Data rates up to 432kbit/s
- High Speed internet access available globally from small terminals for all mobiles
 - Performance enhanced by TCP/IP accelerator to compensate for satellite delay
 - DSL-class internet access
 - Radio Resource Management (RRM) to maintain minimum data rates as required

Circuit Services – Voice and Data

- Direct Dial Voice Service
 - Optimised 4 kb/s “AMBE+2” codec
 - global access and mobility (+870 77...)
- Voicemail Services
- Standard UMTS Supplementary Services
- ISDN Bearer Services (same as Swift64)
 - 64 kb/s UDI Service to terrestrial ISDN networks
 - 3.1kHz Audio Service for PCM voice, fax, and V-series modem support
- Text Messaging
 - send to or receive from any SMS-capable device

Terminal Types

| Existing mode | | SwiftBroadband |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Swift 64 - regional</p> <ul style="list-style-type: none"> • 64kbit/s ISDN & MPDS • Aero H/H+ - global • Voice, fax, PM data • Safety services |  | <p>High gain (Class 6 UT)</p> <ul style="list-style-type: none"> • 232 – 492 kbit/s rx • 225 – 492 kbit/s tx • Voice, fax, PM data • Potential for Safety services |
| <p>Aero I - regional</p> <ul style="list-style-type: none"> • 2.4 kbit/s fax and data • 4.8 kbit/s X.25 • Safety services |  | <p>Int. gain (Class 7 UT)</p> <ul style="list-style-type: none"> • 200 – 344 kbit/s rx • 192 – 332 kbit/s tx • Voice, fax, PM data • Potential for Safety services |
| <p>Aero L - global</p> <ul style="list-style-type: none"> • 1.2 kbit/s PMD • Safety services |  | <p>Low gain (Class 4 UT)*</p> <ul style="list-style-type: none"> • 36 - 50 kbit/s rx • 21 - 55 kbit/s tx • Voice, PM data • Potential for Safety services |

* Low gain (Class 4 UT) is a possible future service. It is being studied as part of Anastasia project

Broadband for a mobile Planet™



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