Inmarsat Update

architectures, technologies, users

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Inmarsat Government Services

19 July 2011

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Agenda

- Who are we?
- Who are our customers?
- What services do we provide?
  - Space segment, ground segment, terminals
- What do we do to meet government requirements?
- What's coming next?

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Who are we?

the leading mobile satellite services provider

- 11 geostationary satellites
- Delivering range of voice & data services worldwide, on land, at sea, and in the air
  - Highly secure and reliable communications
  - Three generations in L-band; Commercial life into 2020's
- Financially strong with solid asset base
  - Publicly traded (LSE:ISAT); Strong revenue growth:
    - Group revenues 2010 $1.171B; MSS revenues $727 M (up 6.5%)
- Commitment to continued innovation
  - L-band position reinforced with new satellite/services
  - Move into Ka-band with Global Xpress

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Who are our customers?

- Over 450,000 registered Inmarsat terminals
- U.S. federal Government is our largest single user
- U.S. federal, state, local agencies rely on us for :
  - VIP Communications – USAF 89th Airlift Wing
  - Command and control – DOJ, operational units in Afghanistan
  - Air safety – USAF, DHS, UAVs
  - Coalition interoperability – NATO, UN peacekeeping
  - Situational Awareness – INSCOM, NASA Ames, US Fish & Wildlife; CBP
  - Backup communications – State Department, NYPD, LAFD
  - HA/DR – FEMA, Florida National Guard,

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What services do we provide?

- Voice
  - PSTN-quality satellite voice
    - ISATPHONE PRO
  - VOIP
- Data
  - Legacy services (Inmarsat C, Inmarsat M family, aero)
    - Data rates from 10s of kbps to 64kbps
  - BGAN Family
    - On demand data rates up to ½ MB
    - Streaming services up to 384+kbps
- Services tailored and optimized for land (portable and on-the-move), maritime and aero users
- Redundancy, reliability, information assurance integrated into architecture/operations

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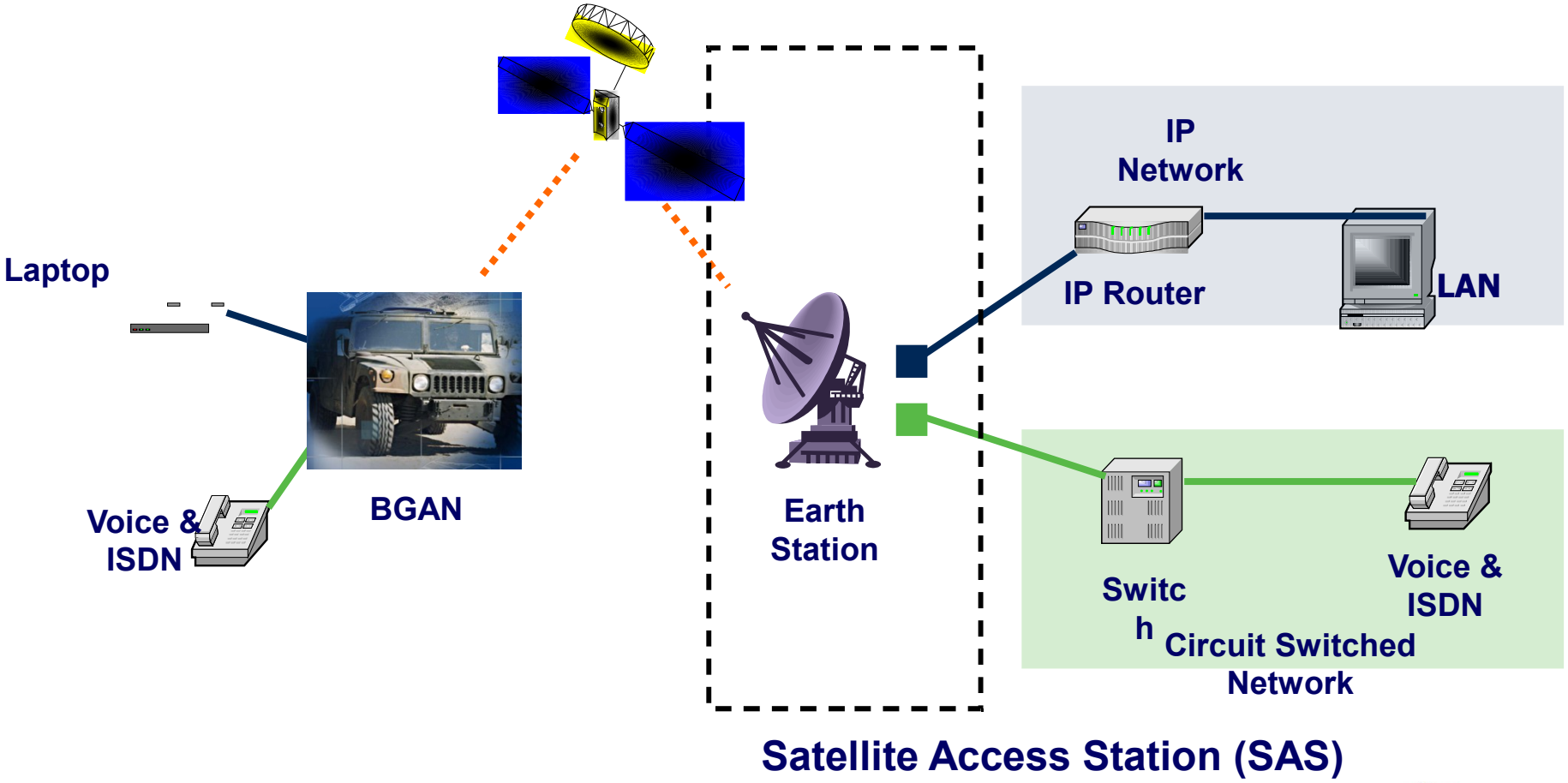
Architecture: services over I4 constellation

one user device, two networks



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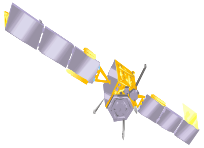
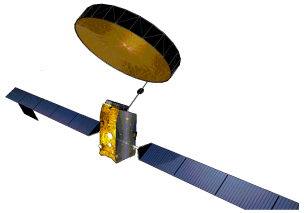
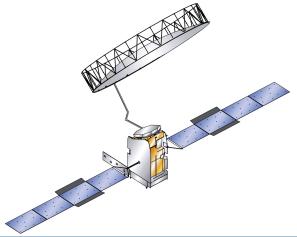
L-band space segment

	Inmarsat-2	Inmarsat-3	Inmarsat-4	Alphasat
				
No. Satellites	4	5	3	1 + 2 options
Coverage	1 Global Beam	7 Wide Spots 1 Global Beam	≈ 200 Narrow Spots 19 Wide Spots 1 Global Beam	~400 Narrow Spots, 19 Wide Spots & 1 Global Beam
Mobile Link EIRP	39 dBW	49 dBW	67 dBW	70 dBW
Channelisation	4 channels (4.5 to 7.3 MHz)	46 channels (0.9 to 2.2 MHz)	588 channels (200 kHz)	750 channels (200 kHz)
S/C Dry Mass	700 kg	1000 kg	3310 kg	3520 kg
Solar Array Span	14.5m	20.7m	45m	40m
Voice (4.8kbps)	250 (Inm B)	1000 (mini M)	16000 (BGAN)	32000 (BGAN)
GAN (64 kbps)	N/A	200	2250	3750
BGAN	N/A	N/A	~500 x 400 kbps	~750 x 500 kbps
	Available today			From 2014

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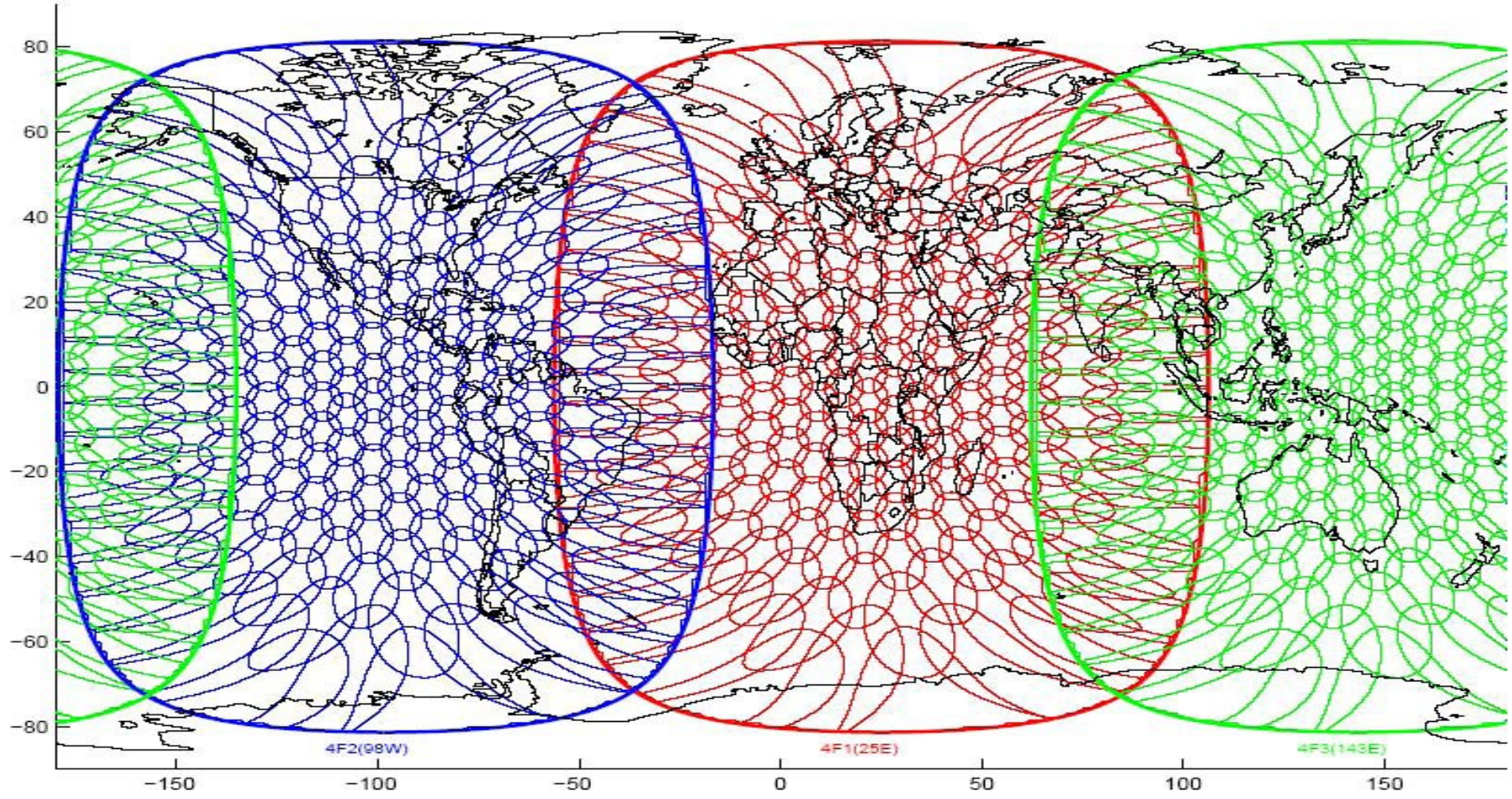
Inmarsat I-4 Satellites (Narrow Spot)



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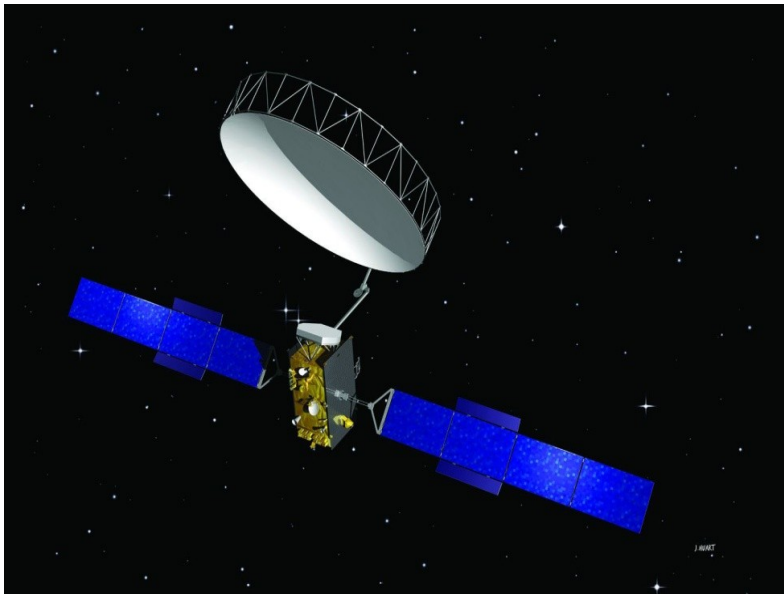
Our Next Launch, 2012 - 2013

- Alphasat
- Enhanced capacity over EMEA
- Backed by the European Space Agency (ESA)
- Advanced L-band satellite to supplement the Inmarsat I-4 constellation
  - Accesses additional spectrum
  - 50% improvement in EIRP/G/T
  - Supports 750 x 200 KHz channels
  - Optimizes frequency re-use



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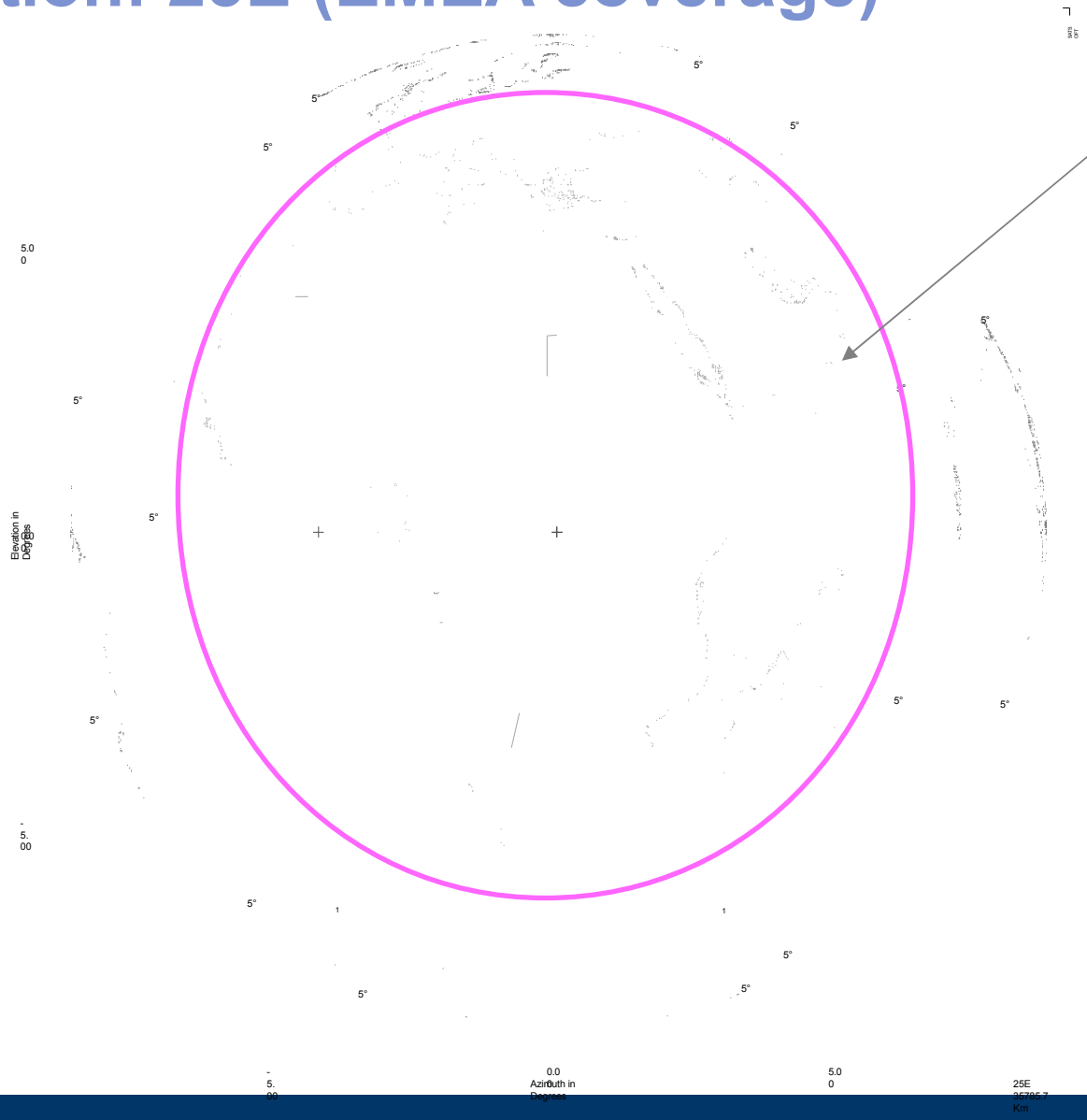
Alphasat

Location: 25E (EMEA coverage)



Ground Network

state-of-the art control centers

- Two satellite control centers (SCC) and two network operations centers (NCC)
  - The main SCC and NCC are in Inmarsat headquarters in central London
  - Highly secure facilities; redundant communications

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Ground Infrastructure

land earth stations

- Channel partners operate land earth stations for legacy services
- For I-4s, SAS's located in Hawaii, the Netherlands and Italy
- SCC, NCC and SAS facilities linked by fiber network to provide full backup support
- Discussions underway on direct interconnect with DOD networks

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Terminals/services Maritime

FleetBroadband (FB)

The latest generation in Inmarsat Maritime Services

- Launched November 2007
- Unprecedented industry acceptance
  - APM-Maersk refit with FB-500, largest communications refit in maritime history
- New QoS options for FB
  - Expanded streaming increments
    - 1kbps up to 64kbps; 8kbps above 64kbps
  - New 8kbps and 16kbps services required to support GSM at sea.
  - More than 500 vessels equipped with GSM Picocells over Inmarsat.
- Safety Services
  - Full SOLAS (incorporating I-3 backup) applicable to FB-500 only; planned by end 2014

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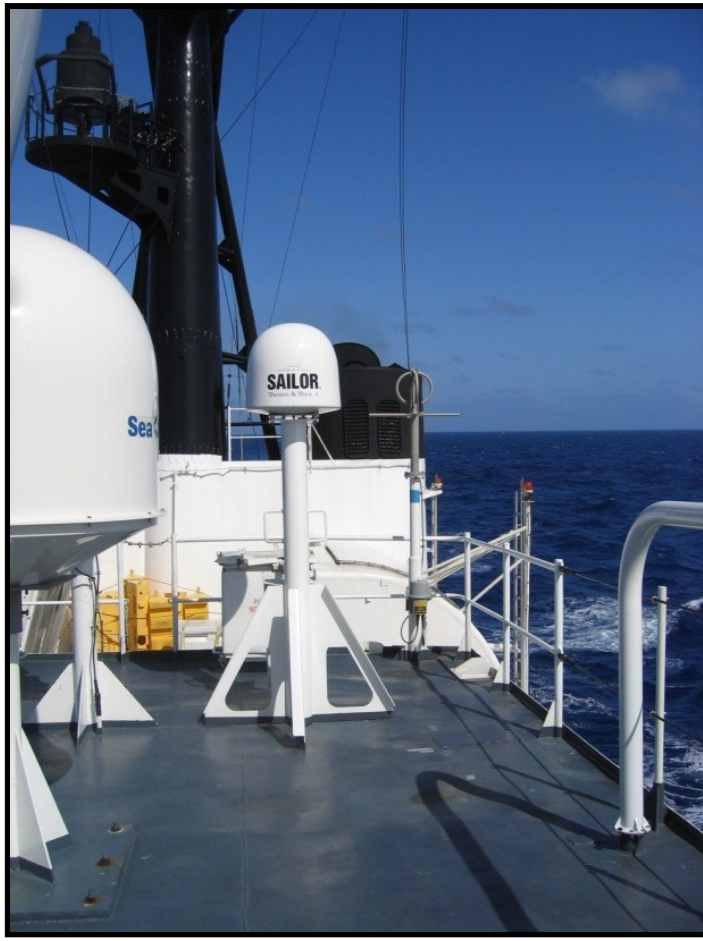
FleetBroadband (FB) Terminals

- Thrane & Thrane
  - FB-500
  - FB-250
  - FB-150
- Furuno
  - FB-500
  - FB-250
- Satlink
  - FB-250
- JRC
  - FB-500
  - FB-250
  - Add Value
  - FB-150



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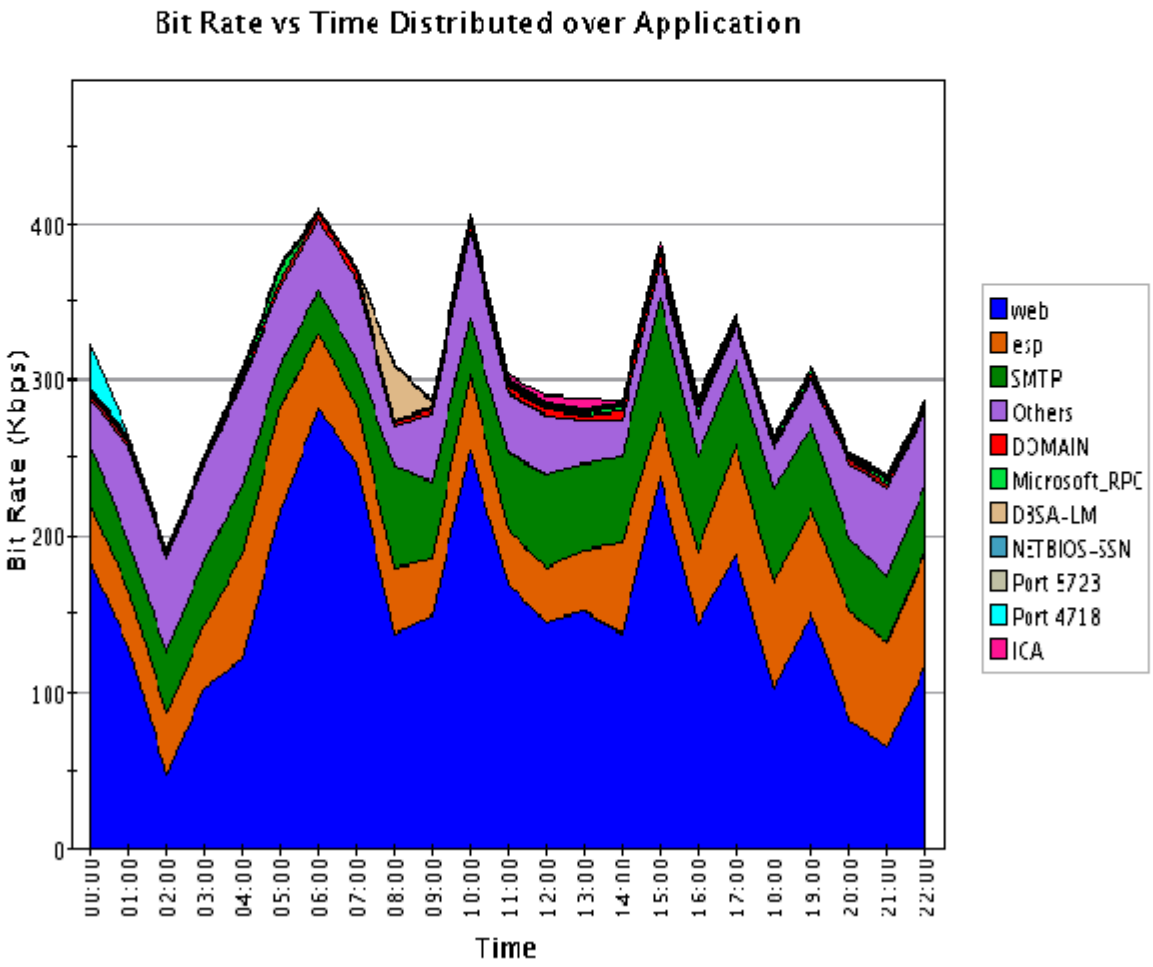
USCG Cutter Dallas (WHEC-716)

FB-500 Maritime Field Evaluation (MFE)

- MFE during operational deployment (Atlantic Ocean – Mediterranean Sea)
  - April – October 2008
- Equipment: Thrane & Thrane FB-500
  - Two day installation
    - Planned five day installation accomplished in two days
- Operational experience
  - Up to 470 kbps
  - Average 400 kbps
  - Applications: SIPRNET, NIPRNET, Internet and Voice

"…flawless operations, phone clarity is very good, download speed is good, the crew is really liking this!"
8 June 2008

DALLAS FB
MFE 2 Sept 2008



Terminals/services
Land Mobile

BGAN: Mobile office for mobile teams

- HA/DR "first-in" teams can have voice and Internet connectivity from start of response
- BGAN+ Wi-Fi router creates instant "hot spot"
- Battery powered (36 hours standby), or remote recharging with solar panels or 12 volt car batteries
- Improved on-site call security

Deepwater Horizon Response May/June 2009

Field data reported in near-real time over BGAN

BGAN X-Stream Update

- Global service availability since mid-2009
- Class 1 terminals only (Hughes 9201 and Thrane E700)
- Minimum guaranteed 384kbps upload
- Verification testing in Europe, Africa and Far East; in practice found to be on average 420kbps

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IsatPhone Pro

First Inmarsat satphone

- Satellite telephony
  - Voice, fax, 2.4 data, SMS, GPS
  - Water and dust resistant to IP44
  - Emergency voice calling
  - Voicemail
  - Text and email messaging
- Location data – look-up and text
- Bluetooth for hands-free use
- Designed an optimized for I-4 network

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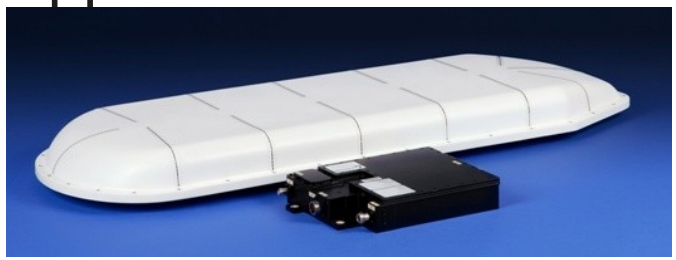
Terminals/services: aeronautical

SwiftBroadband (SB)

- Several manufacturers now have type-approved SwiftBroadband terminals
  - Class 6 High gain



  - Class 7 Intermediate Gain
- Development of Services for SB Users
  - Lower streaming rates available
  - Dedicated channel Project Underway (SB X-Stream)
- Rapidly developing sales for SB in smaller aircraft
  - SBB 200
- Opportunities in helicopter market for SB-based system
  - Development to combat rotor effects nearing conclusion

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Safety Services on SwiftBroadband

- Inmarsat is upgrading SwiftBroadband to get certification for safety service
- Oceanic Air Space Safety Services from 2014
  - Meet or exceed current Classic Aero performance
  - Addressing technical and institutional requirements
  - Supporting existing safety apps with minimal change to avionics
- Also pursuing more demanding certification for Continental Airspace:
  - More stringent latency and reliability requirements
  - Regular banking and turning
  - Small, low-cost avionics and antenna systems required in short-haul and general aviation

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Meeting Government Requirements

- Adopting commercial solutions
  - Low data rate solutions (ISATDATA PRO)
  - BGAN X-stream
  - Transition to IP and I-4s
- Sponsored partnerships/ SB-Sat & SDR
- Real world/real time demands: Haiti
- Development activities to meet stated requirements
  - Information Assurance
  - Assured Access
- Higher capacity
  - L-Band
  - Ka-Band

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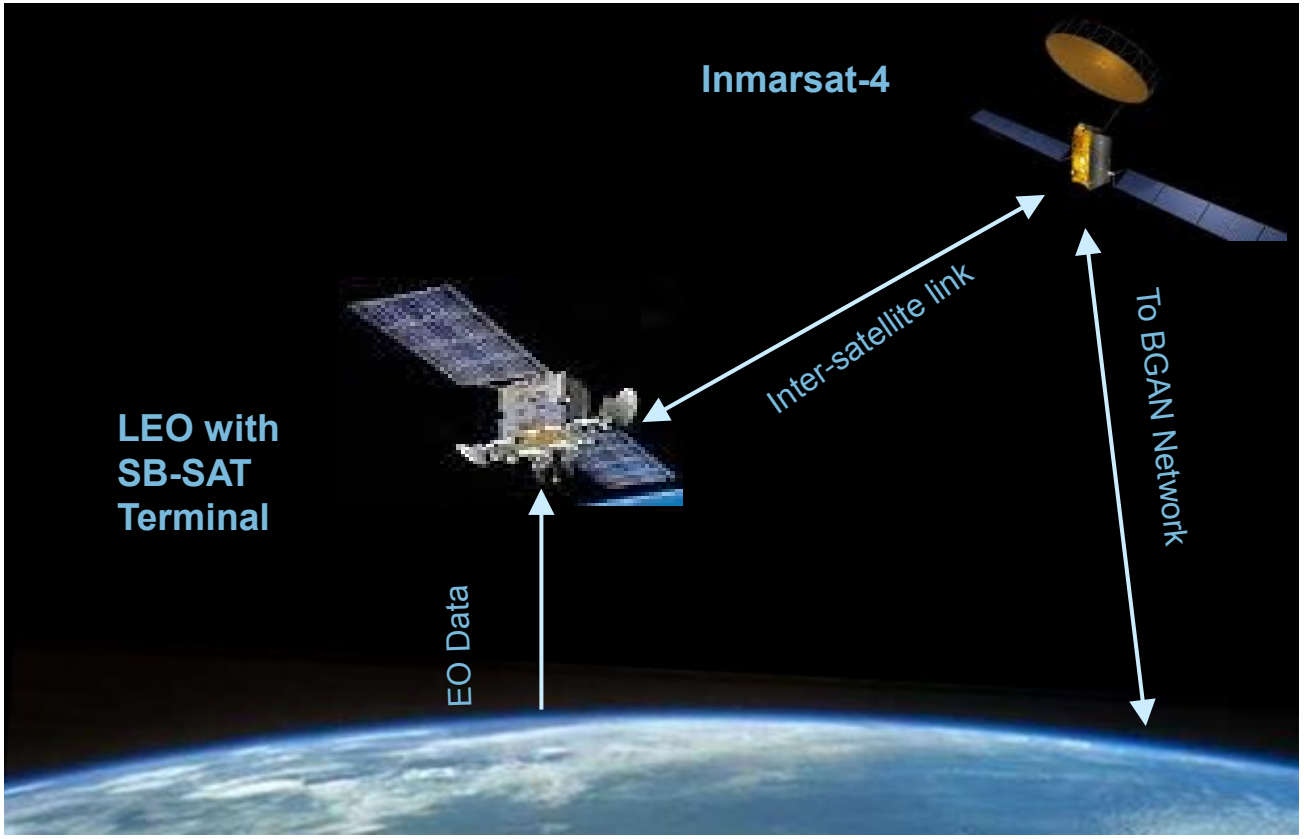
SwiftBroadband –Satellite (SB-Sat)



An unique solution to deliver real-time Telemetry, Tracking and Control (TT&C) and Mission Data from Low Earth Orbiting (LEO) satellites

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SwiftBroadband –Satellite (SB-Sat)

concepts

- Real-time delivery of LEO satellite data
- Develop space-qualified SwiftBroadband terminals
- SB-Sat fitted to a LEO Spacecraft links to an I-4
- I-4 Satellites provide worldwide coverage
- SB-Sat leverages BGAN ground infrastructure and interconnect for processing and delivering real-time data
- Always-on, on demand, real-time background IP and streaming IP services
- No new spectrum required; uses existing spectrum allocated to Inmarsat services.

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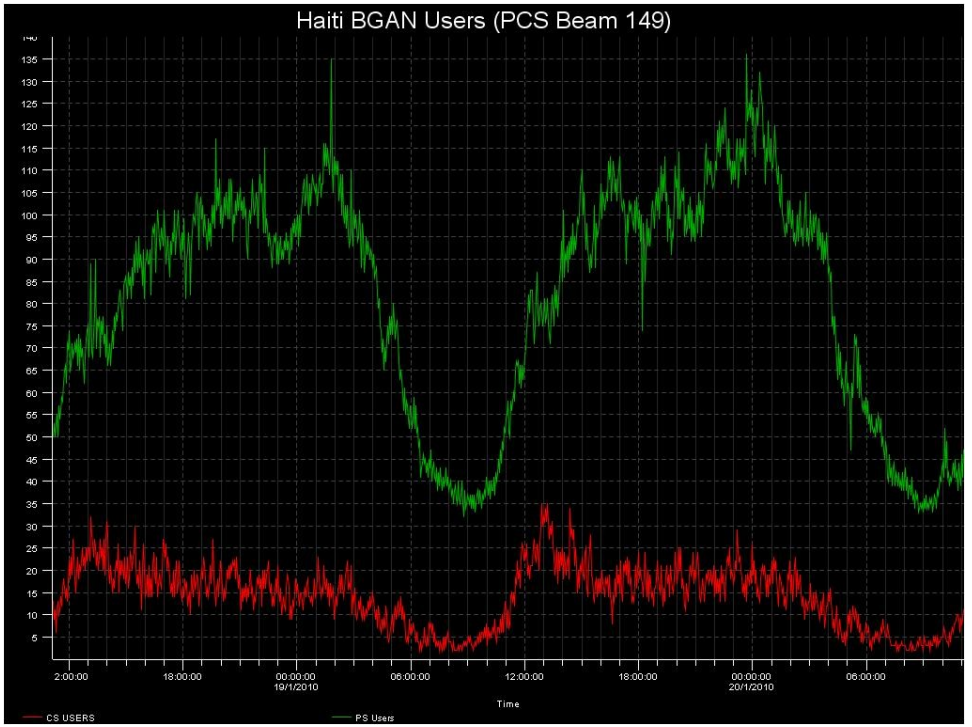
Managing a Traffic Surge

Haiti earthquake, Jan. 2010

- Commercial traffic was approximately 55%
- Government and NGO traffic was approximately 45%



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Inmarsat-5 *(Global Xpress)* overview

- **Who:** *Inmarsat* – the trusted leader in global connectivity for 30 years
- **What:** The only global commercial wideband Ka–band satellite system
- **Why:** To meet the growing demands of:
  - Maritime
  - Government
  - Energy
  - Aeronautical
  - Enterprise
- **How:** Cost effective Ka-band – each I-5 has 20x the capacity of an Inmarsat-4
- **When:** Regional in 2013, global in 2014

Boeing 702 Spacecraft

Affordable and Trusted Coverage, Speed & Capacity

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Global Xpress – going beyond Ku-band

- Higher throughput - 5M up/50M down to 60cm terminal
- Smaller, better, less expensive terminals
- Lower cost service
- Uniform global coverage, flexible capacity allocation
- Seamless mobility through a robust ground network
- Access to L-band for utmost network reliability
- Regional operation in 2013, Global in 2014
- Supports a range of access technologies

The new standard for remote satellite communications

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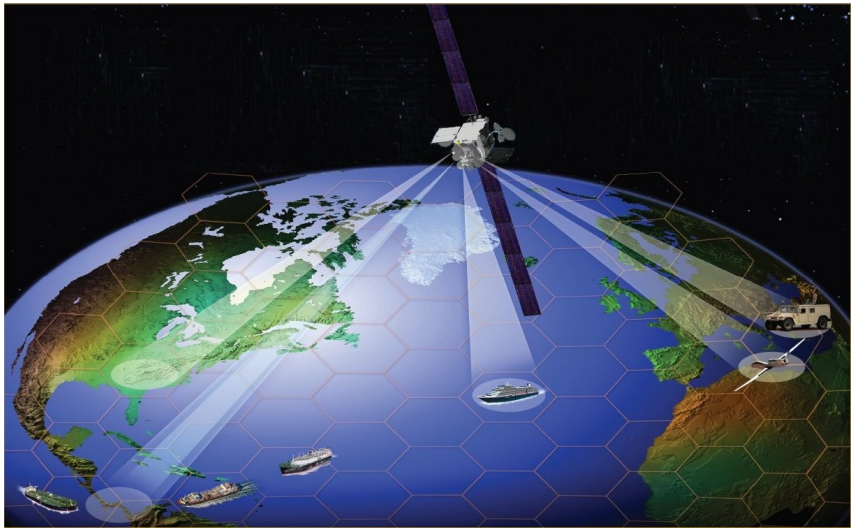
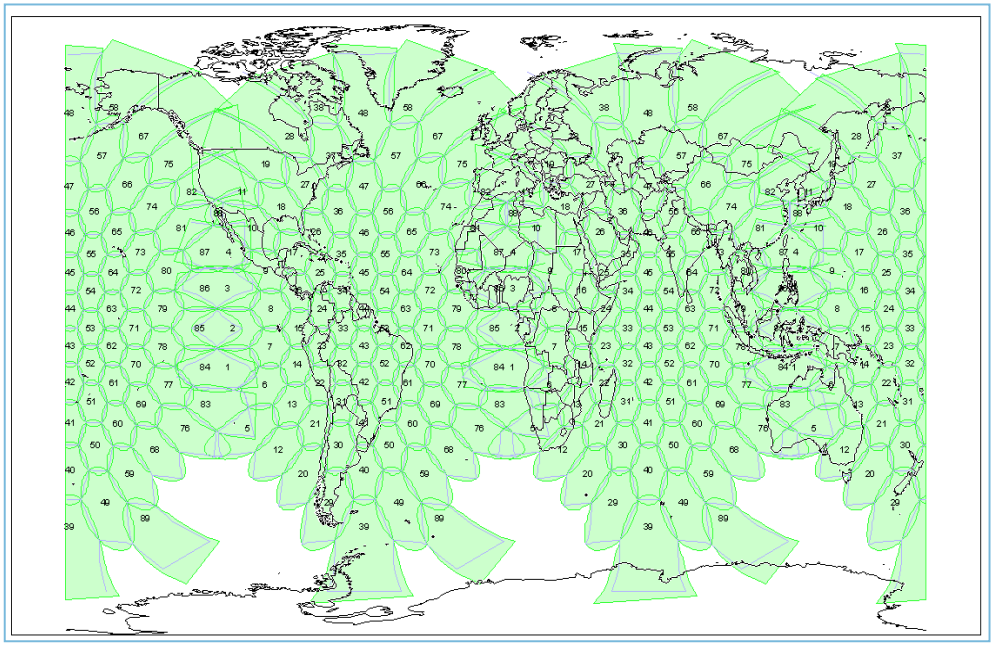
Flexibility in Space

- Designed for global coverage with surge capability
- Unified roaming solution – a single terminal from one provider



18 steerable High Capacity beams satisfy both long-term needs and event-driven requirements



267 Global Beams provide worldwide coverage for uninterrupted service

"Inmarsat really knows how to deliver a global service"

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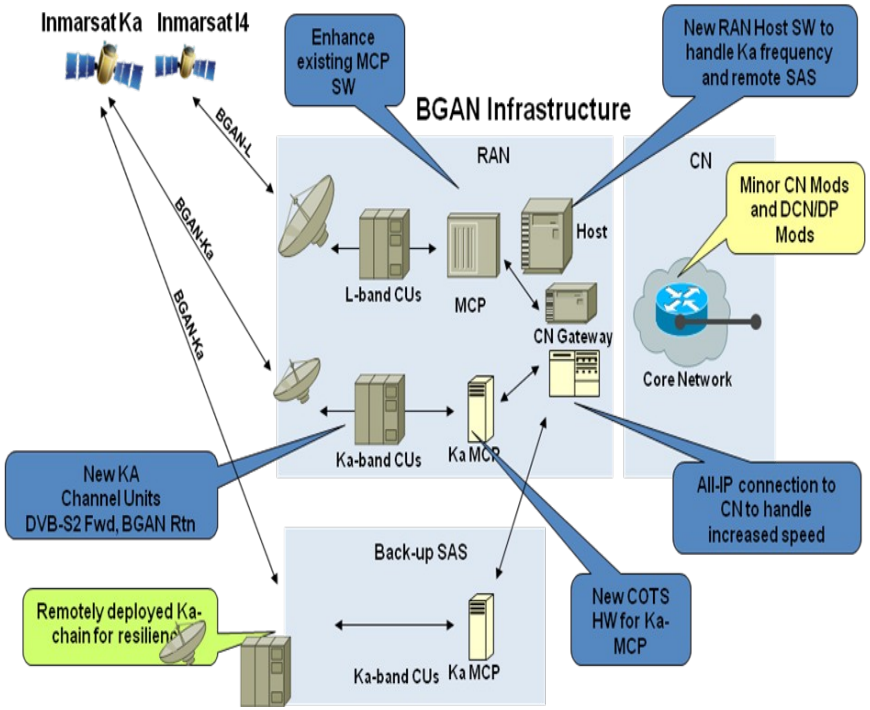
Reliability on the ground

- Leverages existing Inmarsat 3G network
- Ka-band or L/Ka-band hybrid services
- Uniform and assured global service with diverse gateways
- Supports a variety of service business models and inter-connections with customers and channel partners
- Carries on Inmarsat's reputation for QoS and reliability



"Inmarsat really knows how to deliver robust solutions"

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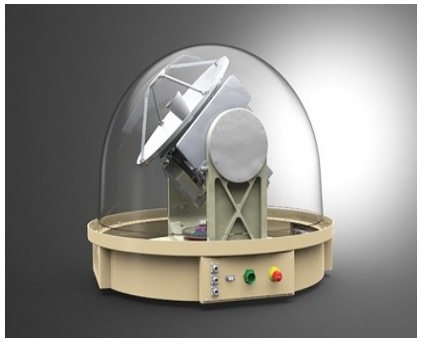
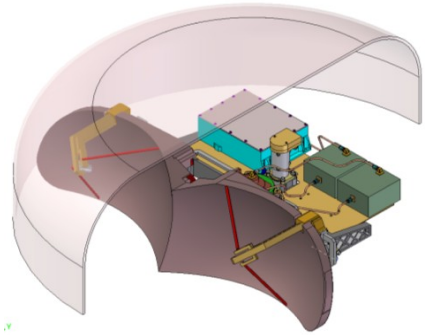
Affordability at the Terminal

- Lower cost service than Ku-band
- iDirect Core for consistent interface and roaming across a multi-vendor terminal ecosystem
- A new standard for affordability: volume delivery of stabilized antenna terminals
  - Ruggedized 60-100cm maritime units
  - 30-60cm aeronautical terminals
  - Range of COTM & COTP terminals
- Support to existing government Ka-band terminals and modems
- Seamless handover to L-band
- Rich terminal distribution and global network servicing & support





"Inmarsat really knows what users want in a terminal"

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GXp summary . . .

- Global Xpress will provide cost-effective, high bandwidth services whenever & wherever needed
- Unique inter-operability of I5's and I4's provides:
  - Robust worldwide coverage with hot-spot capability
  - Economical delivery of services while in transit and on-station
  - Ensured communication operations even in adverse environments
- Highly flexible ground and network infrastructure including:
  - Robust, diverse network architecture
  - Highly secure gateway segment
  - Support to standard and user-defined waveforms and terminals

Now is the time to plan for GX in your future network

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Summary: what's ahead

- Enhanced capacity/throughputs with Alphasat
- Enhanced data throughputs on BGAN family
- Continued commitment to safety services: SBB safety oceanic safety services starting 2014
- SBB helicopter waveform
- New low data rate products
- Transition to IP-based BGAN family
- Transition of services to I-4 constellation with life into 2020s
- Continued commitment to L-band services
- New Ka-band constellation

Inmarsat – a commitment to innovation to meet the evolving needs of the government customer

Thank you!

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