

**Inmarsat Update & I-4 'The Next Generation'**

**Digital Ship Norshipping 2005**



**Robert Johnson**  
Director Strategic Marketing



**USCGC SHEARWATER & HURRICANE ISOBEL**

**"With VHF & HF sites down & spotty (at best) cell coverage, Inmarsat was the only way to go!"**

**- Master Chief William 'Bill' James**




**Inmarsat**




**"Today we are the leader in the provision of mobile satellite communications"**

**"We are focused on increasing the range and the capabilities of our service offerings to drive demand and open new markets"**




**Broadband Global Area Network**

- 1<sup>st</sup> new service to be launched on the I-4's is BGAN
- The world's 1<sup>st</sup> mobile service to deliver broadband data and voice, simultaneously through one device, to almost anywhere on the planet
- Based on IP technology, BGAN will deliver data rates of up to 432kbit/s
- The service is accessed via a small, lightweight satellite terminal which is easy to carry, quick to set up and simple to use
- BGAN will enable users to remote access corporate networks to send emails, transfer files and access the Internet, whilst making a phone call at the same time



**Broadband for a Mobile Planet™**


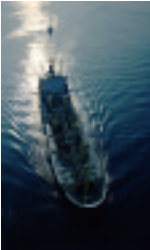


**Maritime Customers**

- Extended spot beam coverage provides **global** benefits from the new I-4's to form up to 19 wide and 228 narrow spot beams (compared with 7 wide spots on the current I-3 satellites)
- **Mini-M Fleet F33 and F55** users go **global** to use their terminal in voice, fax and data modes
- Fleet F77 128K users will benefit from access to higher data rates within the I-4 enhanced coverage areas
- Maritime customers will also be able to upgrade to broadband services as they become available





**Inmarsat Fleet Service Enhancements To Date**

- Over 5,800 Fleet terminals now active globally
- Fleet F33 integrated modem compression\*
- Fleet F33 MPDS – introduced March 2004
- Call Waiting\* – Network Enhancements complete, awaiting LESO rollout
- Fleet F77/F55 G3 Fax\* – Now widely available
- Fleet SIM Card functionality\* – Rollout through specified vendors

\* Optional feature only, requires participating hardware and airline vendors



## Fleet F77 128Kbit/s

- Announced SMM, Sept 2004
- Commercially Available Now

### Main specification elements:

- Dedicated 128K channel  
(not 2X64K bonded)
- Uses existing F77 hardware
- 128K ISDN applications will function
- Spot-beam only service until I-4:  
Under I-4 wide spots will be used



## Fleet F77 128kbit/s

### F77 128K Features:

- Full ISDN functionality
- Compatible with standard 128K applications
- Upgrades available from F77 manufacturers
  - Either software, or software plus hardware upgrade required - See manufacturer for further details

### Advantages / Benefits:

- Reduces cost of vessel's fixed datacomms requirements
- Increases performance
- Increases availability of terminal, less time on air



## F77 128K Installations



USS Swift



Paul Allen's Otopus



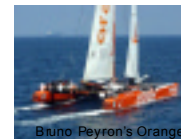
## F77 128K Installations



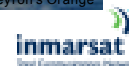
Bege Stahl



Esperanza del Mar



Bruno Peyron's Orange



## Inmarsat Service Revisions

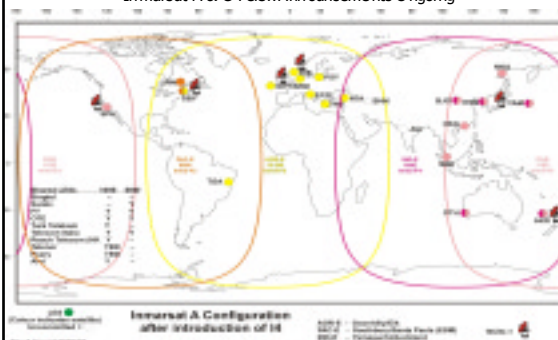
- Inmarsat A closure date remains 31 December 2007
- Inmarsat E retirement announced
  - L-band EPIRB Service to be halted end 2006
  - Inmarsat E users will be offered provision of alternative EPIRB, free of charge during 2006
  - Inmarsat E+ project halted

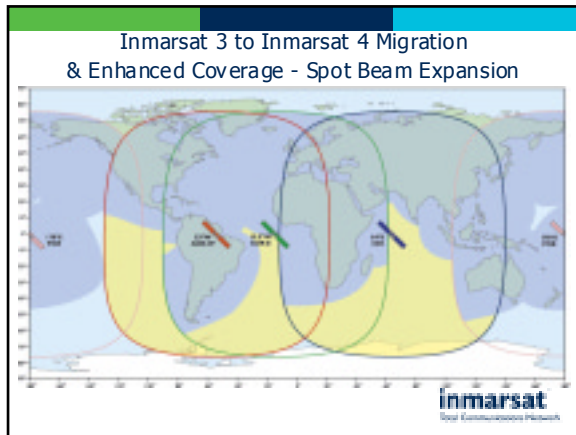


See: [www.inmarsat.com](http://www.inmarsat.com)





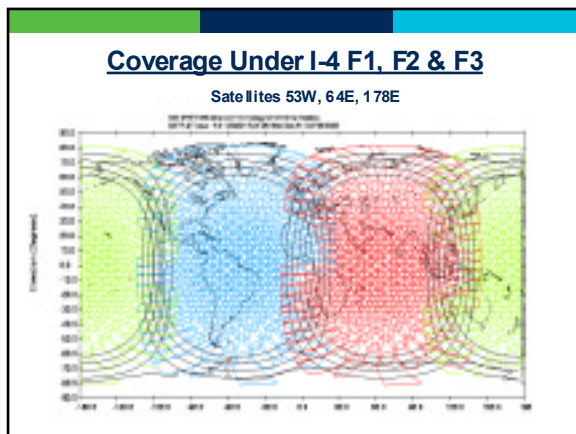
February 19th 2005 At 20:00 UTC  
Inmarsat A Services Via 64E (IOR) Transitioned To 109E (IND-E)  
Inmarsat A & C Tele x Announcements Ongoing








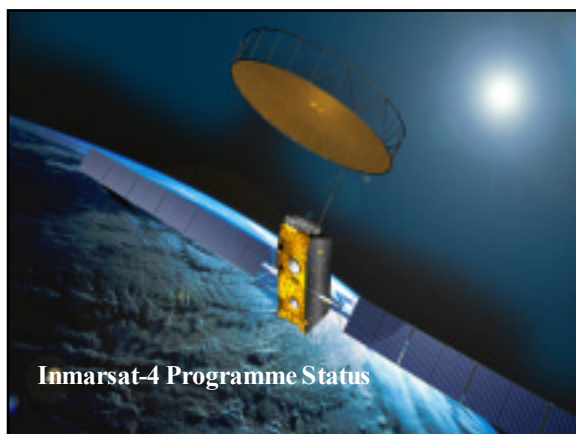
### I-4 Enhanced Coverage Available End Q2 (IOR) & End Q4 (AOR-W) 2005

- **Strengthens Inmarsat Competitive position for maritime services**
- Applies to Spot-Beam Services:
  - Mini-M
  - F33 Fax and Data
  - F55 Fax and Data
  - F77 128Kbps ISDN
- Addresses key coverage requirements, e.g.:
  - Significant maritime IOR service improvement
  - Coverage "gap" off Equator resolved
- Automated: no user actions required at the terminal


### Directional Maritime BGAN Proposed Services

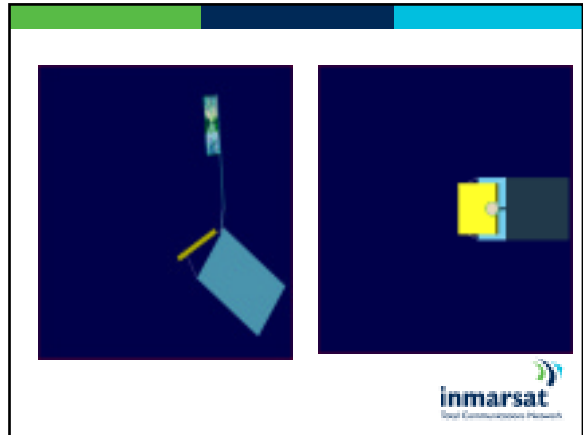
- Voice
- Fax
- 64Kbps ISDN SCPC data
- Up to 432Kbps Packet data
- Simultaneous Voice & IP Data
- Multicast Expansion Potential
- Potential BDU upgrade for existing Fleet users

### What the I-4 Programme Represents

- I-4 represents a new era for Inmarsat
- Largest, most powerful commercial satellites ever built
  - Weight 6 tons at lift-off
  - Solar arrays spanning 45m
  - Provide 60 times more power than their I-3 predecessors
- Reinforces Inmarsat's commitment and its position as a world leading satellite communications provider
- I-4 enables Inmarsat to offer more affordable satellite communications than ever before
- Opens up access to broadband to new geographical and industry markets
- The I-4 satellites will propel a whole new generation of broadband mobile satellite services into the market



### Inmarsat 4F1 Orbit Sequence

1. Satellite is injected into super-synchronous transfer orbit
- First apogee firing raises perigee
- Second apogee firing further raises perigee.
- First perigee firing lowers apogee
- Second perigee firing lowers apogee to geosynchronous

### 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) (2.00 KHz)
S/C Dry Mass	70.0 kg	10.00 kg	33.40 kg
Solar Array Span	14.5 m	20.7 m	45 m
Voice (4.8 kbps)	25.0	10.00	18.00.0
M4 (64 kbps)	N/A	20.0	22.50
PMC (384 kbps)	N/A	N/A	58.8

### Inmarsat Fleet Relocation Plan

The risks God, it's over ... maybe ... waiting for 4F3

### Current Status

- I-4 F1 spacecraft successfully launched 11<sup>th</sup> March 2005 @ 21:42 Hrs GMT
- The F2 spacecraft is currently planned for delivery to the launch site by **Q3 2005**
- Inmarsat 4 has been designed and tested for compatibility with four launch vehicles: Atlas V, Sea Launch 6000, Ariane 5 and Proton MBM
- Launch services have been contracted from International Launch Services (ILS) for Atlas V and Boeing Launch Services for Sea Launch 6000

Inmarsat Ltd  
Satellite Control  
London

Just Arrived - Space Shuttle Landing Facility

Spacecraft Being Extracted From The Antonov  
(Does Anyone Have A Shoe Hom?)

Spacecraft + Container = 20 Tonnes

The Final  
Check !

Moving The Spacecraft To The Air Force Base


Watch Out, Don't Bang It !



Finally !  
I-4 F1 On Top Of  
Atlas V Second Stage



Atlas V Before Solid Rocket Boosters Installation  
(Height With Fairing Installed Is 59.2 Metres)



Two (of Three) Solid Rocket Boosters After  
Installation Onto The Main Core Booster



Noise Suppression System  
(You Can't Hear Under Water !)



The Atlas V Launch Pad & Hanger





### The Journey To The Launch Pad




### I-4 F1 Interesting Facts

- All as V rocket lift-off weight 480 tonnes
- Nominal Lift-off time 10 March @21:42z
- Flight time to separation 32 minutes
- The Super-Synchronous Transfer Orbit
  - First apogee height 90,000 Km is a quarter of the way to the Moon
  - Perigee height 400 Km
- High altitude orbits mean a long mission (11 days)
- 4F1 satellite launch mass is 5959 kg
- After 2 x AEF and 2 x BEF LAE burns, the aim is to use 2200 kg of fuel leaving 250 kg available for station keeping
- GEO Orbit - 2 Apogee and 2 Perigee burns (1Kg of Fuel Every 7 Seconds)
  - Burns 1 + 2 - 78 and 93 minutes
  - Burns 3 + 4 - 40 and 44 minutes
- Nominal lifetime is expected to be approx 18 years

### 300 Tonnes Of Liquid Propellant Loaded In Few Hours

It would take approximately 15 days, of continuous pumping, to load the same amount of propellant at your local petrol station !

