Overview

- The Company
- Services
- Markets
- The System: Terminals/Satellites
- Future
The Company
Inmarsat Ltd

- Owns and operates a global network of nine geostationary satellites
- Extensive distribution network
  - 260 distributors and other service providers
  - across 80 countries
- Headquarters in London
- 4 regional offices
  - Dubai, Singapore, Washington and Miami
- Established in 1979
- Previously an inter-government organization
- A privatised UK company since 15 April 1999
Global Service Reach

- Inmarsat: 98% of the world’s landmass and all ocean regions
- GSM: 10% of the world’s landmass
Service Evolution

1999 **Inmarsat GAN** - voice, fax, data,
   64 kb/s ISDN (S0 interface providing 1B+S),
   64 kb/s Mobile Packet Data Service (IP based)
mini-M voice
   • Operation over Inmarsat-3

2002 **Inmarsat Regional Broadband GAN (R-BGAN)** -
   Personal multimedia communicator, Laptop size,
   144Kb/s over shared bearer.
   • Operation over Thuraya

2005 **Global services over the Inmarsat-4 satellite**
   Briefcase, Laptop, Palmtop size
   Up to 432kb/s over shared bearer
   • Operation over Inmarsat-4
Service Portfolio-1

- Regional BGAN: Access speeds of 144 Kbps; cost-effective connectivity virtually anywhere within coverage area where licensed; Compatible with GPRS; Bluetooth, Ethernet and USB connectivity; Battery life comparable to a notebook PC; ‘always on’ solution; notebook-sized IP satellite unit;

- GAN: Voice, fax, e-mail, Internet/intranet access, file transfer, remote LAN access, image transfer, video communications; Mobile ISDN or MPDS, both up to 64kbit/s

- Fleet F77: Maritime service with global voice, fax, data (MPDS/ISDN); new, enhanced GMDSS compliance; speeds up to 64kbit/s

- Swift64: Aeronautical sector high-speed data for Internet and e-mail, with speeds up to 64kbit/s
Service Portfolio-2

- mini-M
  Voice, fax, e-mail, digital photo transmission; up to 9.6kbit/s; a portable, cost-effective phone unit

- Inmarsat C
  Two-way data messaging system; lightweight low cost terminals; hand carried or fitted to any vessel, vehicle or aircraft; Global Maritime Distress and Safety System (GMDSS)

- Aero C
  Aero version of Inmarsat C; low cost messaging and data reporting, ideal for regions with difficult radio communications

- Aero H/H+
  Multi-channel voice, fax and data; fitted to most long-range passenger aircraft

- Aero I
  Passenger and cockpit voice, fax and data for short haul and regional passenger aircraft
Service Portfolio-3

- **mini-C**
  Combines a receiver and antenna in one light, compact unit; e-mail, position reporting and polling, fax, telex short-code addressing and mobile to mobile messaging; low power consumption

- **Inmarsat D+**
  Cost-effective, bi-directional global asset tracking, monitoring and SMS; pocket-sized unit with integrated GPS; supervisory control and data acquisition (SCADA)

- **Inmarsat E**
  Global automatic distress position alerting; small emergency position-indicating radio beacon (EPIRB)

- **Aero L**
  Low-speed data for real-time, two-way, air-to-ground data exchange; complies with International Civil Aviation Organization (ICAO) requirements for air traffic control safety and helicopter applications
Markets
Maritime Markets

- Merchant trading - fleet & ship management, crew calling
- Fishing - messaging, position reporting
- Offshore - large data transfers, differential positioning
- Government - data transfers, encrypted services
- Passenger / cruise - ship management, social calling, broadcast services
- Yachts / pleasure craft - social calling, messaging, position reporting
- Other - SCADA, environmental monitoring
- Safety Services - IMO - GMDSS, EPRIB
Land Mobile Markets

• **International Travellers** - business calling from remote locations
• **Survey & Expedition** - file transfers, business calling
• **News & Broadcast** - reporting & information services
• **Disaster & Relief** - natural and technological disasters, peace keeping, aid agencies
• **Rural & Remote** - business & social calling
• **Transport** - fleet management systems, vehicle monitoring
• **Remote Monitoring & Control (SCADA)** - resource management, distribution monitoring
Aeronautical Markets

- **Commercial services** - passenger business & social calling, entertainment services

- **Airline services** - flight and cabin crew operations, aircraft maintenance & performance monitoring

- **Future Aeronautical Navigation System (FANS)** - air traffic control, automatic dependent surveillance

- **Safety Services** - IATA, ICAO
The System

Inmarsat-3

Terrestrial infrastructure

LES (SBS)

NCS

MES

Link/Network Logic, Channel-Units

Signalling + Traffic

L-Band

C-Band

Inmarsat Terrestrial infrastructure

OR mgmt + control Facility:
Txponder frequency management,
Call monitor/control

Global Freq Planing,
Satellite monitoring/ control

Numbering, accounting, billing,
Global mob-man, circuit switching
packet (MPDS)

Global Freq Planing,
Satellite monitoring/ control

Inmarsat Terrestrial infrastructure

Signalling + Traffic

Signalling + Traffic

Link/Network Logic, Channel-Units
Terminals
Inmarsat-A
Inmarsat-B
Inmarsat-C
Inmarsat Phone (mini-M)
Global Area Network
Regional BGAN Terminal

User terminal looks and feels like a laptop, costs about $1100, receives and transmits at 144 kbps with end-user airtime charge around $10/ MByte
Space Segment

1st generation (1979 - 1980’s)
- 4 leased satellites
- Marisat, Intelsat MCS, ESA Marecs

2nd generation (launched 1990 - 1992)
- 4 procured satellites
- manufacturer: British Aerospace / Hughes

3rd generation (launched 1996 - 1997)
- 5 procured satellites
- manufacturer: Lockheed Martin / Matra Marconi Space
<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>INMARSAT-2</th>
<th>INMARSAT-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>BAe/Hughes</td>
<td>Lockheed-Martin / Matra Marconi</td>
</tr>
<tr>
<td>Spacecraft Bus</td>
<td>Eurostar</td>
<td>Series 4000</td>
</tr>
<tr>
<td>Design Life</td>
<td>10 years</td>
<td>13 years</td>
</tr>
<tr>
<td>EOL Dry Mass</td>
<td>630 kg</td>
<td>860 kg</td>
</tr>
<tr>
<td>EOL Power</td>
<td>1040 W</td>
<td>2800 W</td>
</tr>
<tr>
<td>L-Band EIRP</td>
<td>39 dBW</td>
<td>48 dBW</td>
</tr>
<tr>
<td>Features</td>
<td>Global coverage</td>
<td>Global &amp; spot; Frequency re-use, Navigation transponder</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>18/23 MHz</td>
<td>34/34 MHz</td>
</tr>
</tbody>
</table>
Inmarsat-3 Coverage
Regional BGAN Coverage Map

Up to 99 countries*

Europe; the Middle East; the Indian Subcontinent;
North, Central and West Africa
Future
Market Opportunity

- Business dependence on IT
- Workforce Mobility
- Bandwidth-hungry applications
- 3G coverage
- Fibre limitations

The Inmarsat Opportunity

Integration of Satellite
BGAN Services

- Basic Services – Inherently IP-based
  - Regular PSTN, ISDN and IP services
  - Internet access (including web browsing)
  - Intranet access (including virtual private networks)
  - Video Conferencing
  - Internet streaming (audio/video)
  - Data file transfer
  - E-mail and messaging (including GPRS/UMTS 2.5/3G SMS)
  - IP Facsimile
Inmarsat-4

- Orbital Positions
  - F1 : IOR
  - F2 : AOR-W
- Prime Contractor: Astrium
- 10 year lifetime (minimum)
- Up to 200 spot beams
- Bandwidth: 34/34 MHz
- Eirp: t
I4 Wide-beam coverage
Inmarsat-4 Narrow-beam Baseline Coverage
Inmarsat-4 Narrow-beam: Enhanced Coverage
BGAN Ground Network Overview

I4 Satellite (F2 ~ 54W)
I4 Satellite (F1 ~ 65E)
L-Band User Links

Satellite Orbital Data; TT&C

Inmarsat SCC
Inmarsat NOC
Inmarsat BOC

Resource & Network Management
Billing Data, Fault Management, Customer care

PoP

PDN
PSTN
ISDN

Other PLMNs

Inmarsat

BGAN SAS 1
BGAN SAS 2

RF/IF
RF/IF
RF/IF
RF/IF

CN
CN

L-Band User Links

RAN 1
RAN 1
RAN 2
RAN 2

L-Band
User Links

User Links

User Links

User Links
Inmarsat Air Interface 2 on I4
A wide range of terminal types is under development:

- **Handheld**: 72 kbps/16 kbps
- **Pocket**: 216 kbps/72 kbps
- **Notebook**: 432 kbps/144 kbps
- **Briefcase**: 432 kbps/432 kbps