

Iridium for Narrowband Data



Don Thoma
Digital Ship Europort
November 2005



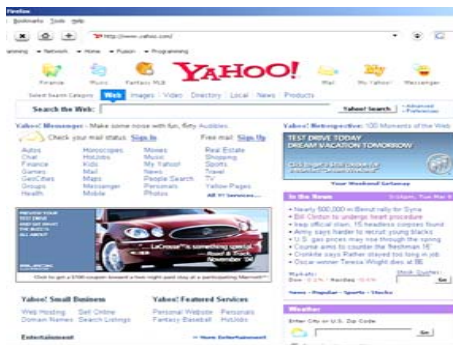


Outline

- Applications driving bandwidth requirements
- Narrowband applications and data communications needs
- Iridium narrowband data services
- Iridium update

The Internet on Land

- Consumer and corporate Internet applications
 - graphic web pages, business presentations and video
- Requires lots of bandwidth
- Homes and offices increasingly depend on broadband



Web Page: 127kb



Video Clip: 1.3mb



Flash Movie: 359kb

The Value of Narrowband



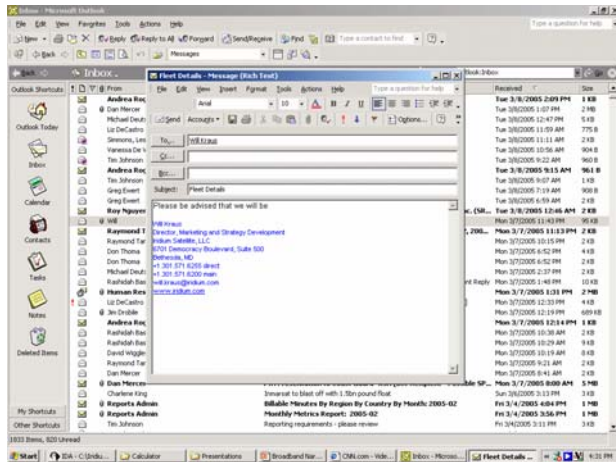
Iridium Sales, Marketing and Business Development

IRIDIUM

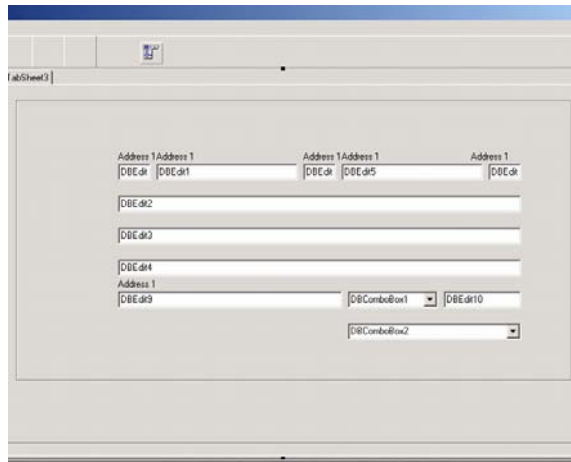
PowerPoint: 2.6mb

The Internet at Sea

- Many shipping companies rely on text-based applications
- Requires much lower bandwidth



Email: 2.1kb



Form Data: 1.9kb

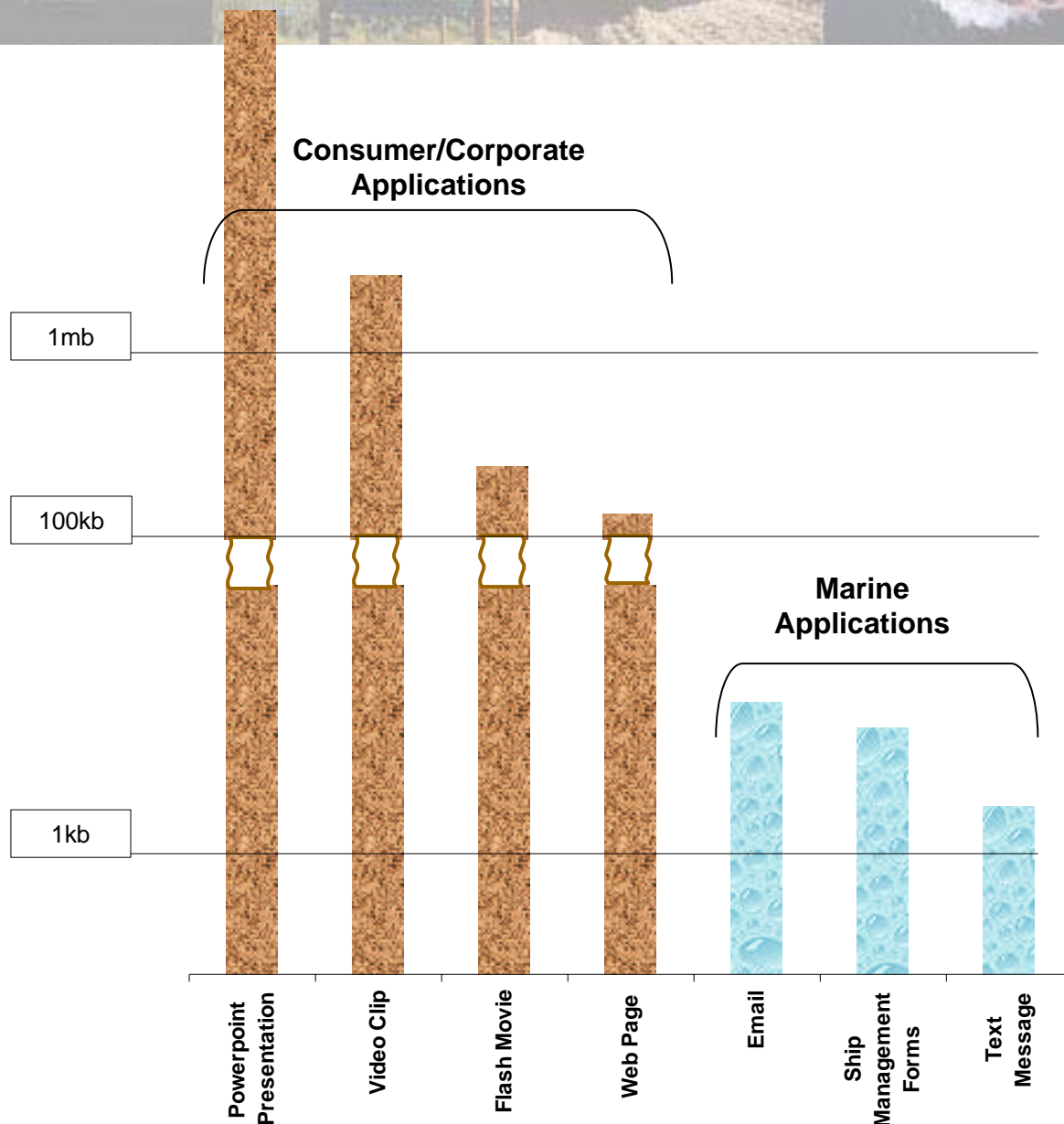


Text Message: 1.3kb

One Internet, Many Applications

The difference in these applications leads to vastly different bandwidth demands on land versus at sea.

Consumers and corporate offices download 25kb-3mb on every click. In comparison, ships average 1-3kb per click.



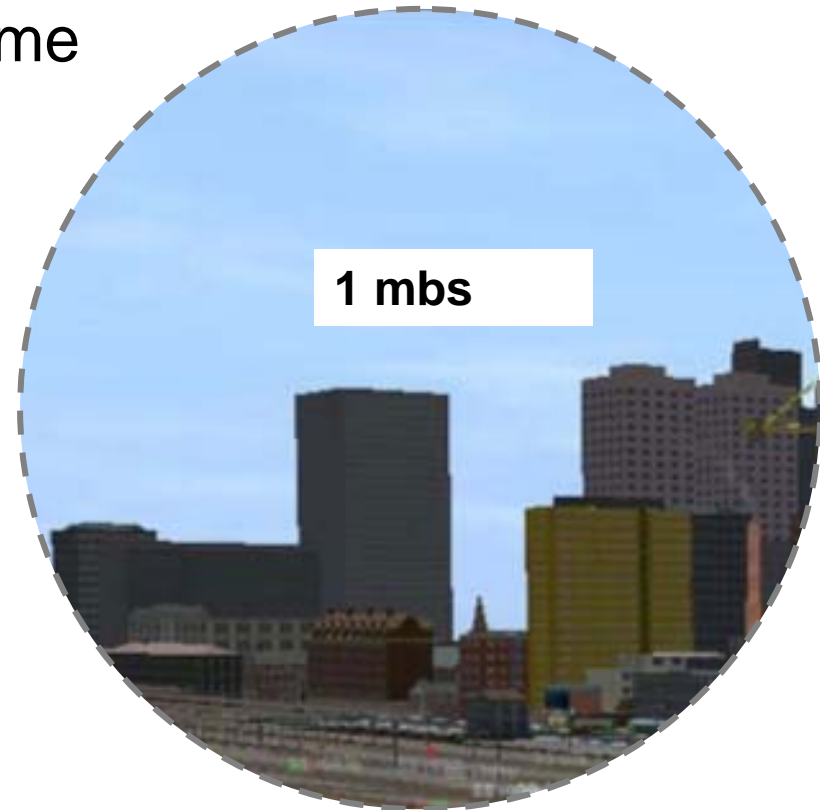
Distinct Solutions for Different Markets

As a result, while corporate markets require broadband access, the maritime sector can meet its needs for ship's business while benefiting from lower cost narrowband solutions.



Marine Applications

Bandwidth Required:
10 kbs
500 Euros/month



Consumer/Corporate Applications

Bandwidth Required:
1.5 mbs
60 Euros/month

Narrowband Meets Customer Needs

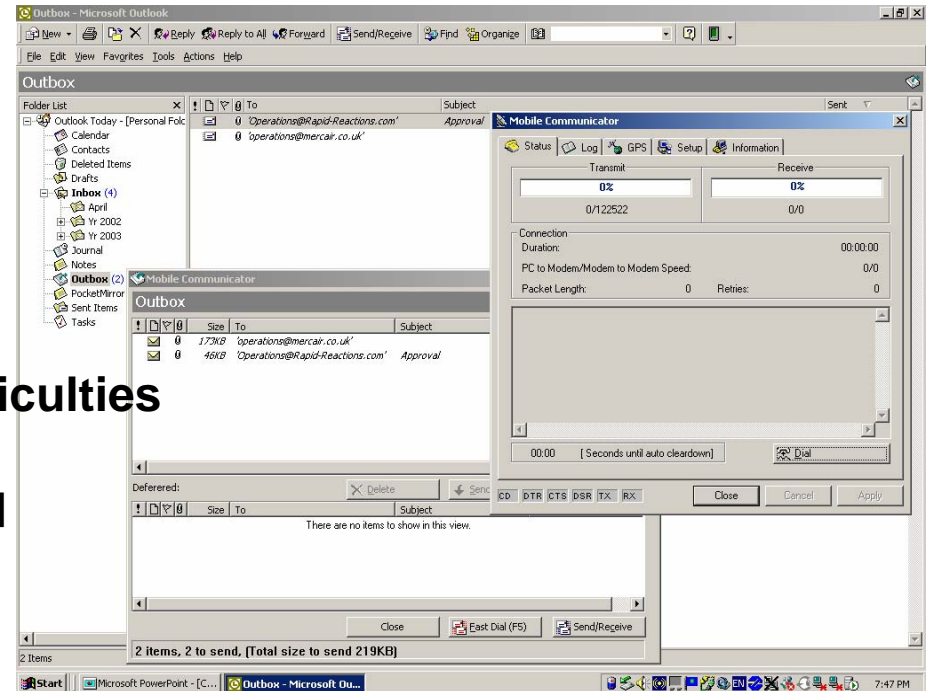
- Recent poll at Digital Ship Cyprus showed 50% of shipping companies asked use between 1 and 5 megabytes of data per month per vessel – just 30-150 kbytes per day!
- By efficiently combining data in a single compressed file a narrowband solution reducing the initial outlay
- Significant crossover savings accrue from other uses of single box solutions:
 - Ship to shore voice
 - Crew Calling
 - SSAS compliance
- All which leads to a significantly faster ROI.



Making Email More Efficient

A number of systems exists to optimise email transfer over narrowband networks. Their features cut costs and allow ships to use more cost-effective narrowband services:

- **Designed to overcome the unique difficulties on a satellite circuit**
- **Automatic combination of all data and compress “Off line”**
- **Full duplex transmission**
- **Restart from point of interruption**
- **Variable batch size to improve data throughput**
- **Automatic alert facility to inform remote PC (or phone) via SMS of new mail**
- **Configurable incoming message size filters to stop unsolicited e-mails / spam filters**



Is Baud Rate Alone the Most Important Factor?

Optimised narrowband solutions can be more efficient and cost-effective than broadband alternatives.

- Bandwidth/Throughput = Time to Transmit
 - Need to understand price per megabyte v price per minute (at specific baud rates)
- What about unusable time?
 - Efficient use of 'paid for' airtime
 - Modem synchronization & call set up time
 - Ringing & holding time
 - Short message transfers & minimum call times
 - Important to evaluate effects
 - across the entire user group (fleet)
 - over appropriate time period



What Are The Other Considerations ?

Beyond bandwidth, below are additional issues which must be taken into account for a satellite data solution.

- Cradle to Grave assessment of costs v feature & tx/rx duration
- Correct balance of investment / ROI v operational drivers
- Software
 - Required features and EDI requirements
 - Upgrades
- Hardware
 - Initial outlay
 - Installation, maintenance, upgrades
 - Antenna requirements
- Service
 - Transmission costs
 - Per minute / per megabyte / per message
- Understanding the volume of data transmitted required to operate the vessel /fleet
- Timing of data delivery to destination
 - Real time
 - Near Real Time (+10 mins / +30 mins etc)
 - User experience of bandwidth (Crew Email)



Introducing Iridium RUDICS IP Service

- Most efficient narrowband transfer of data over low cost multifunction terminals
 - Digital end-to-end connection
 - Connect time not billable
 - Transferred after space segment via IP to application server
 - Lowest costs in both tx directions
 - Ability to initiate file transfer via free sms / email delivery to vessel
 - No Modem Sync Time
 - Up to 50% improved throughput experienced in the field
- Cost savings maximized when viewed at fleet level and for extended periods

Email via Iridium RUDICS



Global Technology
Mail4Crew

Several leading email service providers have adopted RUDICS to deliver their service



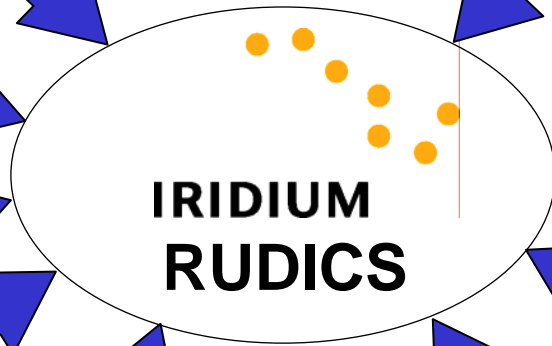
telenor
Email Advanced



HMCmail



@SEA(mail)



**IRIDIUM
RUDICS**



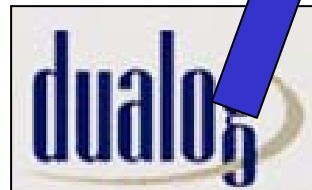
ZAP email



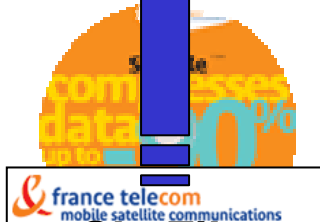
Amos Connect



se@comm



Communicator



SkyFile



**SingTel
Mail65**



Integration Underway

The Advantage of Narrowband

- Data solutions for a fraction of the installed cost of larger broadband systems
- Competitive data transfer costs
- Significant crossover savings for voice traffic
- Low bandwidth of maritime makes the Iridium solution ideal for ship's business

The Product



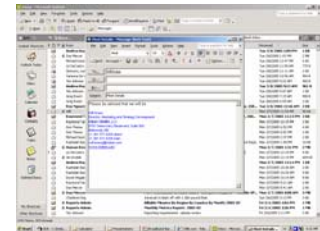
The Features

- Data throughput up to 10kbps using end-to-end compression
- Minimal setup and low overhead provided by Iridium RUDICS are perfect for text transfers, email, and database queries.
- Self-repairing link continues data transfer if connection is lost during transmission.
- Iridium equipment includes data and voice service with reduced priced Iridium-to-Iridium calling.
- Hardware costs which are a fraction of high bandwidth alternatives

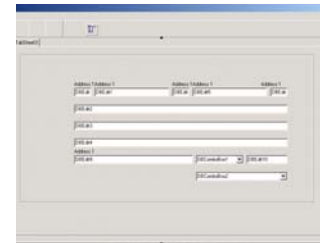
The Results

Download times for text applications with end-to-end compression over the Iridium network.

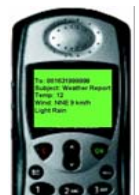
**Email: 2.1kb
1.8 Seconds**



**Forms: 1.9kb
1.6 Seconds**



**Message: 1.9kb
1.1 Seconds**



The Value of Narrowband

- Choosing a lower speed data solution can lead to big savings
- Despite reduced throughput, modest bandwidth requirements for ship's business mean comparable download times
- Yet, equipment costs can be over 80% lower



Iridium

2.4 kbps (9.6 kbps with end to end compression)

Data: \$1.30/minute

Voice: \$1.30/minute

\$3,300 Equipment



Broadband alternative: Fleet 77

64 kbps (128kbs available)

Data: \$7.00/minute

MPDS: \$4.00/MBIT

Voice: \$1.75-\$2.65

\$20,000 Equipment

Additional Benefits

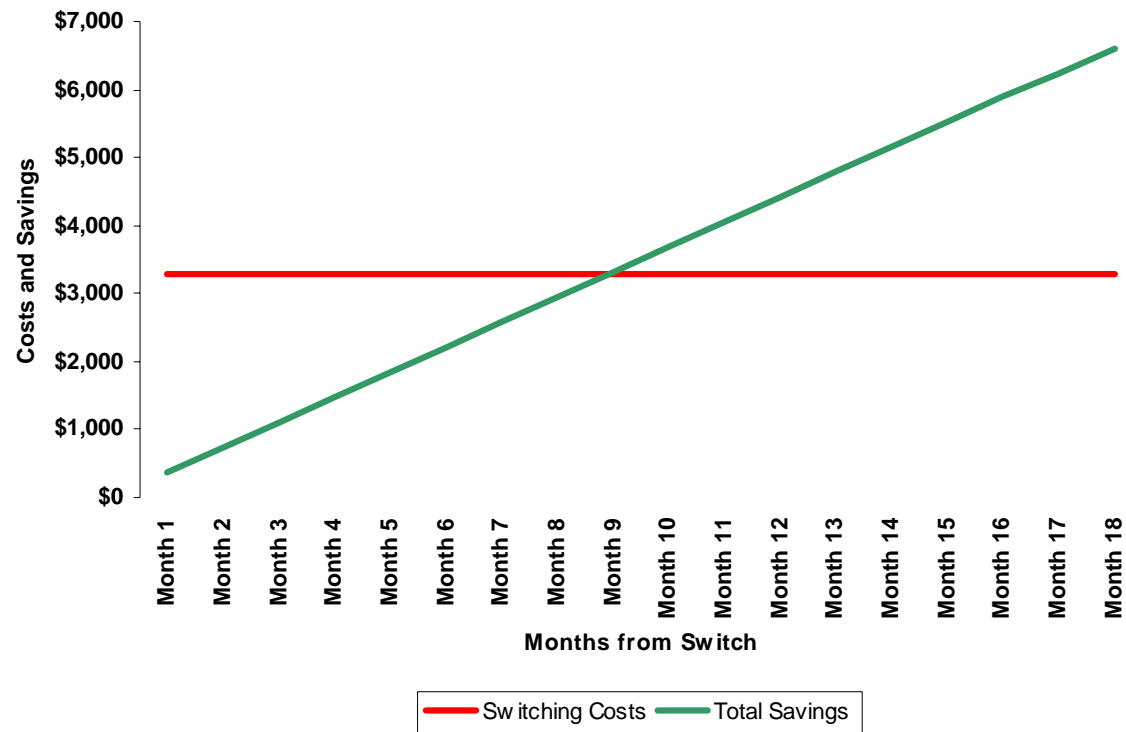
- Iridium offers crossover benefits through discounted voice pricing
- Iridium In-Network calling priced at under \$1/min for calls between HQ & ships
- Less than half the voice cost for inbound calls from ship to shore and a fraction of the cost from shore to ship
- With the assumptions shown, savings on voice calls ramp up quickly against the broadband systems
- In this example, switching to Iridium pays for itself in under nine months

Assumptions:

1. Traffic between HQ and vessel: 100 min/month
2. All other ship to shore traffic: 100 min/month
3. Ship to ship traffic: 50 min/month

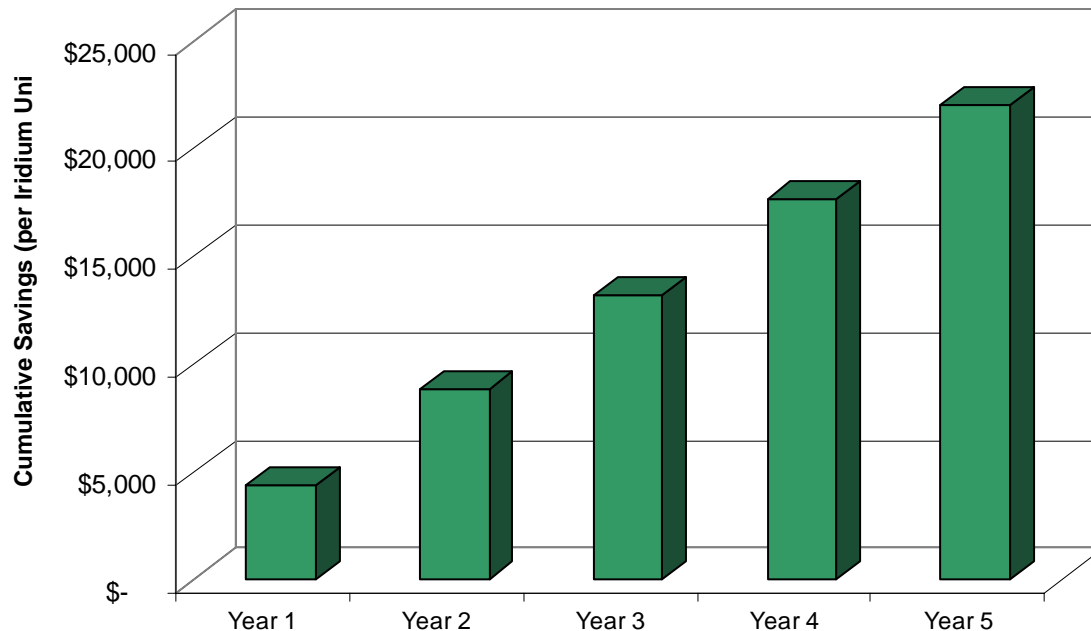
Time Until Payback After Switching to Iridium

Breakeven at point where lines cross

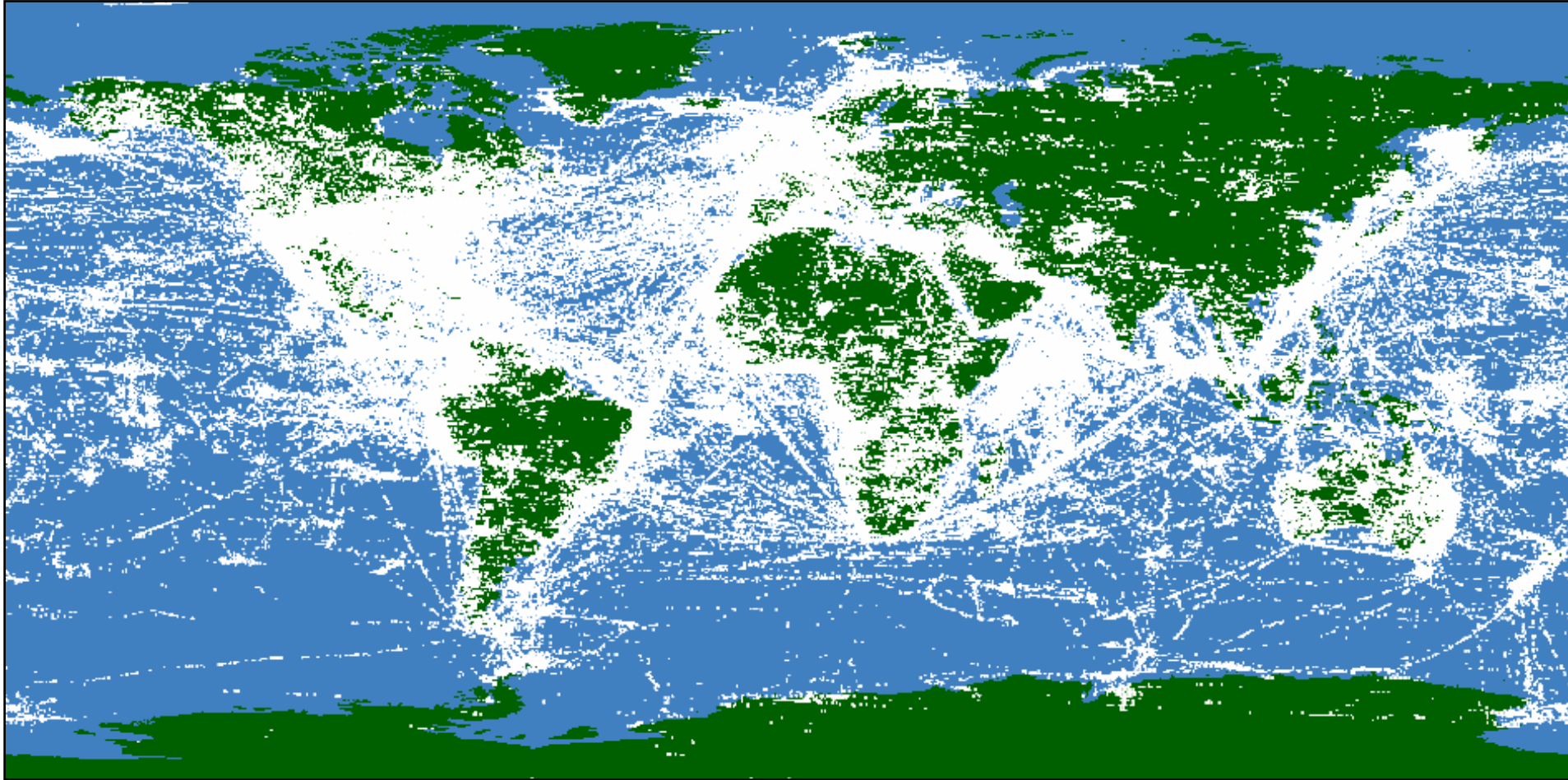


A Clear Return on Investment...

- Low installed cost and additional savings from discounted voice calling
- Iridium meets data requirements of today's fleets
- Sharply reduced costs compared with higher bandwidth alternatives
- Over five years, Iridium can save over \$20,000 for a single vessel (assumptions from previous slide) or \$1m for a fleet of 50 ships



...and a World of Satisfied Customers...



Snapshot of August 2005....

...Delivering Real Results

- Significant growth
 - 137,000+ subscribers
 - 2,000-3,000 new subscribers/month
 - 11% increase in subscribers 1st half of '05
 - Commercial subscriber base 4X defense
- In 2005:
 - 27% increase in revenue over 1st half of '04
 - 20% subscriber growth over mid-year '04
 - Data services grew 49% in '04 over '03
- Profitable since Q1 '05 (2 quarters)
- Cash positive for 8 quarters
- Satellite network healthy, replenishment not necessary until beyond 2014



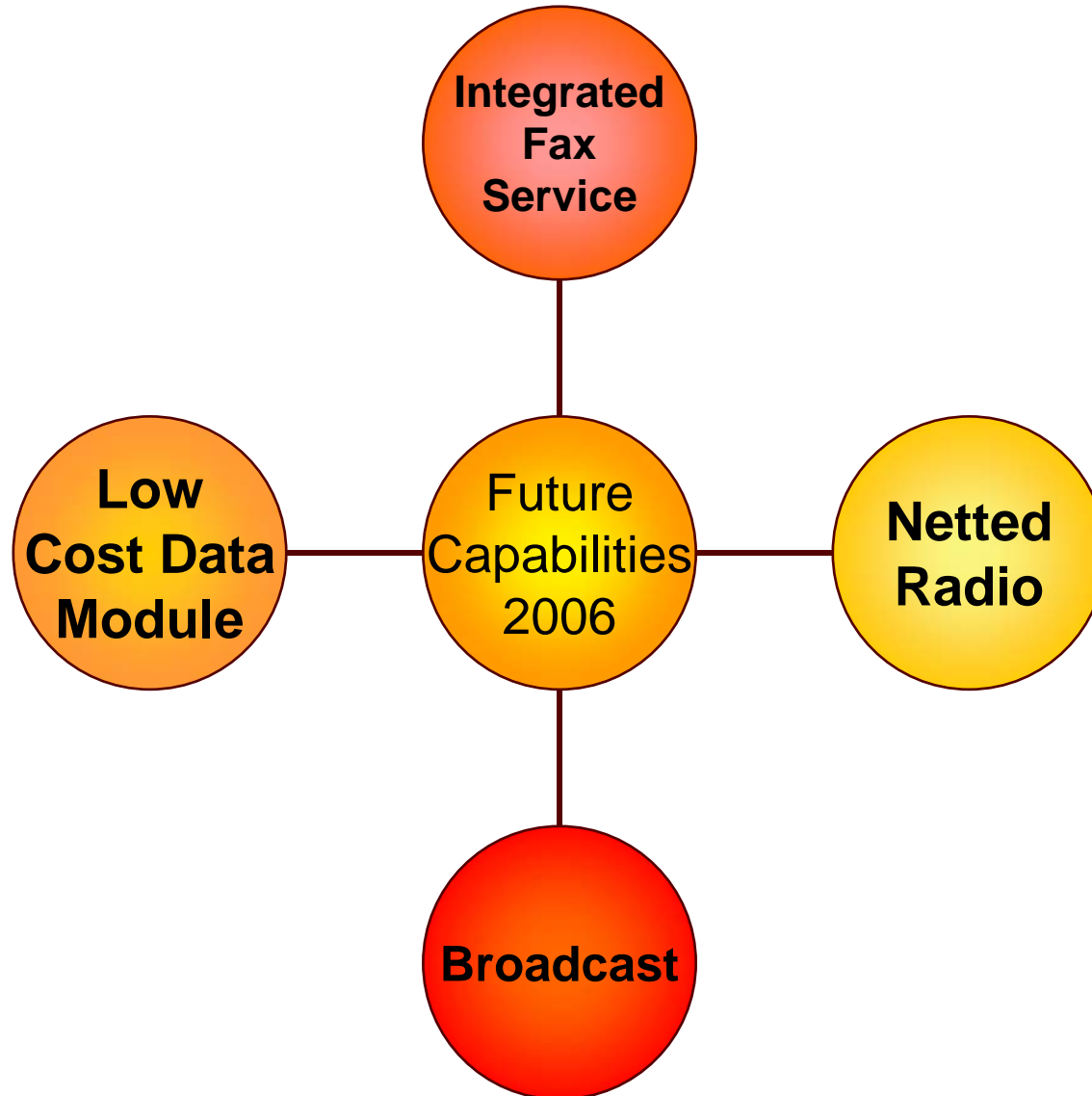
Iridium Distribution Network

- Network of leaders in satellite communications
- Partners offer value-added products and services
 - E-mail applications
 - Crew calling admin
 - Split billing

For additional details and partners please see our website -- www.iridium.com



Future Capabilities...



Iridium: A One-Stop Solution for Maritime

- **Narrowband data services still fill an important need for many maritime users**
- **Iridium offers full solution for maritime voice and data needs**

- **True global coverage**
- **Simple pricing**
- **Wide array of cost-effective solutions make communications accessible**
 - **Cost effective ships business communications**
 - **E-mail and data transfer capabilities**
 - **Crew morale calling**
 - **SSAS**



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