



Iridium Application to Provide Mobile Satellite GMDSS Services

Presented: 19 August 2014



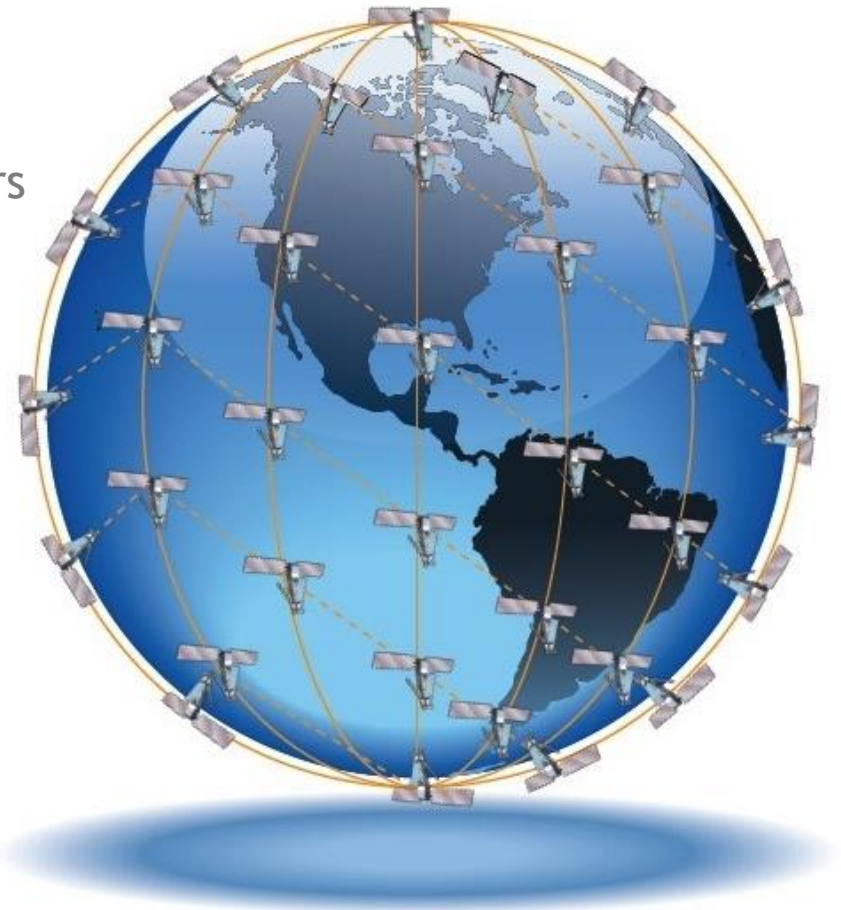
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Everywhere

Who is Iridium: Corporate Overview

A vital, global communications provider of mobile satellite voice and data services

- Serving more than 700,000 subscribers across the land mobile, maritime, aviation and government markets
- Fastest growing MSS operator supported by strong subscriber, revenue and OEBITDA growth
- 2013 net income of \$63 million, revenue of \$383 million and Operational EBITDA \$201 million
- Launching second generation satellite constellation starting Q2/2015 to extend the network operation beyond 2030



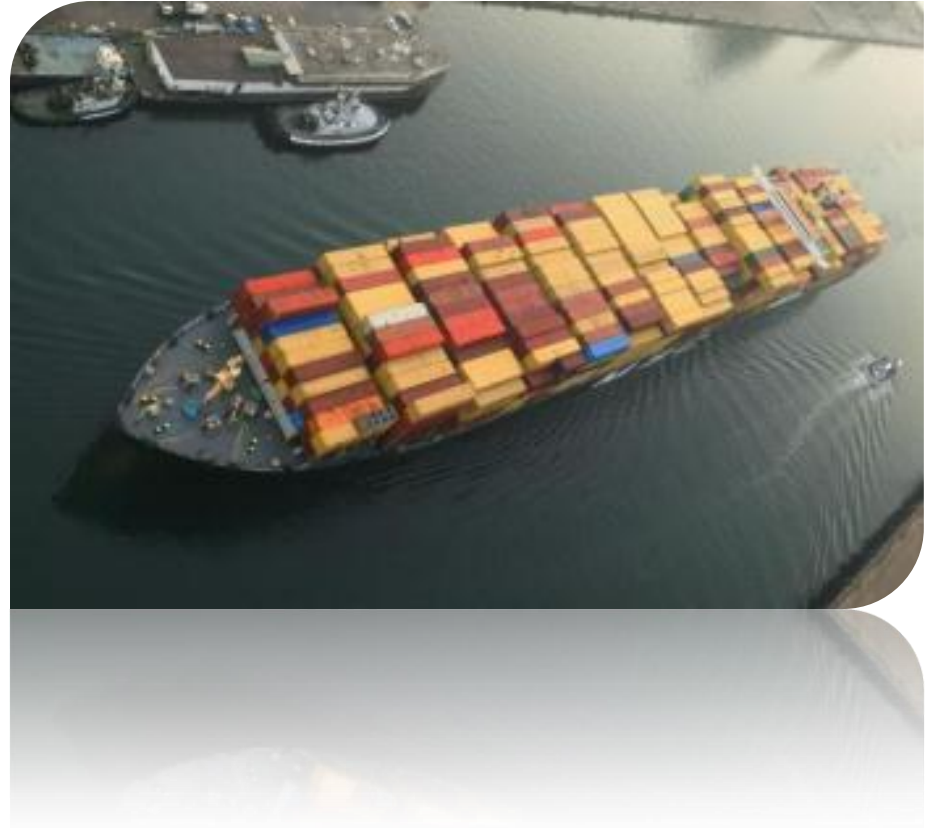
Iridium Maritime Business

- IRDM is the #2 provider of maritime mobile satellite communications
 - More than 50,000 maritime subscribers, approximately 10,000 SOLAS vessels
 - Fast growing business
 - More than 40 maritime distributors
- Current Service Provider for Maritime Safety Communications
 - Long Range Identification & Tracking
 - Ship Security Alert System
 - Anti-Piracy Solutions



Iridium GMDSS Recognition Application

- Iridium is seeking IMO recognition to be a mobile satellite GMDSS service provider under the process defined in Res. A. 1001 and additional guidance provided in Circ. 1414
- A proposal was submitted to MSC92 as the first step in the process to seek GMDSS recognition
- A detailed application was reviewed at the Navigation, Communication, Search and Rescue (NCSR-1) sub-committee meeting in June 2014





Resolution A.1001(25) Broadcast Requirements

IMO Res.A.1001(25) Broadcast Requirements

- 4.9 Facilities for broadcasting MSI
- 4.9.1 Satellite systems forming part of the GMDSS should technically be capable of offering facilities for broadcasting Maritime Safety Information (MSI) from MRCCs and authorized providers of MSI, such as Hydrographic Offices and Meteorological Offices, to ships at sea.
- 4.9.2 Such facilities for broadcast of MSI should provide for automatic, continuous and reliable reception on board...
- 4.9.3 Support four levels of priority

IMO Res.A.1001(25) Broadcast Requirements

- 4.9.4 It should be possible to address the broadcast of MSI to all properly equipped ships within a specified area for at least the following types of areas:
 - 4.9.4.1 the entire region covered by the satellite or system over which the transmission is made;
 - 4.9.4.2 the NAVAREAs/METAREAs as established by the IMO, IHO and the WMO respectively; and
 - 4.9.4.3 a temporary area chosen and specified by the originator of the MSI message including circular or rectangular user-specified areas appropriate for broadcast of distress alert relays and SAR co-ordinating communications.

IMO Res.A.1001(25) Broadcast Requirements

- 4.9.5 Types of MSI:
 - 4.9.5.1 SAR coordination, including distress relays
 - 4.9.5.2 Navigational warnings
 - 4.9.5.3 Meteorological warnings and forecasts
- 4.9.6 The facilities for broadcast of navigational and meteorological warnings should include possibilities for:
 - 4.9.6.1 scheduling the broadcast at fixed times or transmitting messages as unscheduled broadcast transmissions; and
 - 4.9.6.2 automatic repetition of the broadcast with time intervals and number of broadcast transmissions as specified by the MSI provider, or until cancelled by the MSI provider.

IMO Res.A.1001(25) Broadcast Requirements

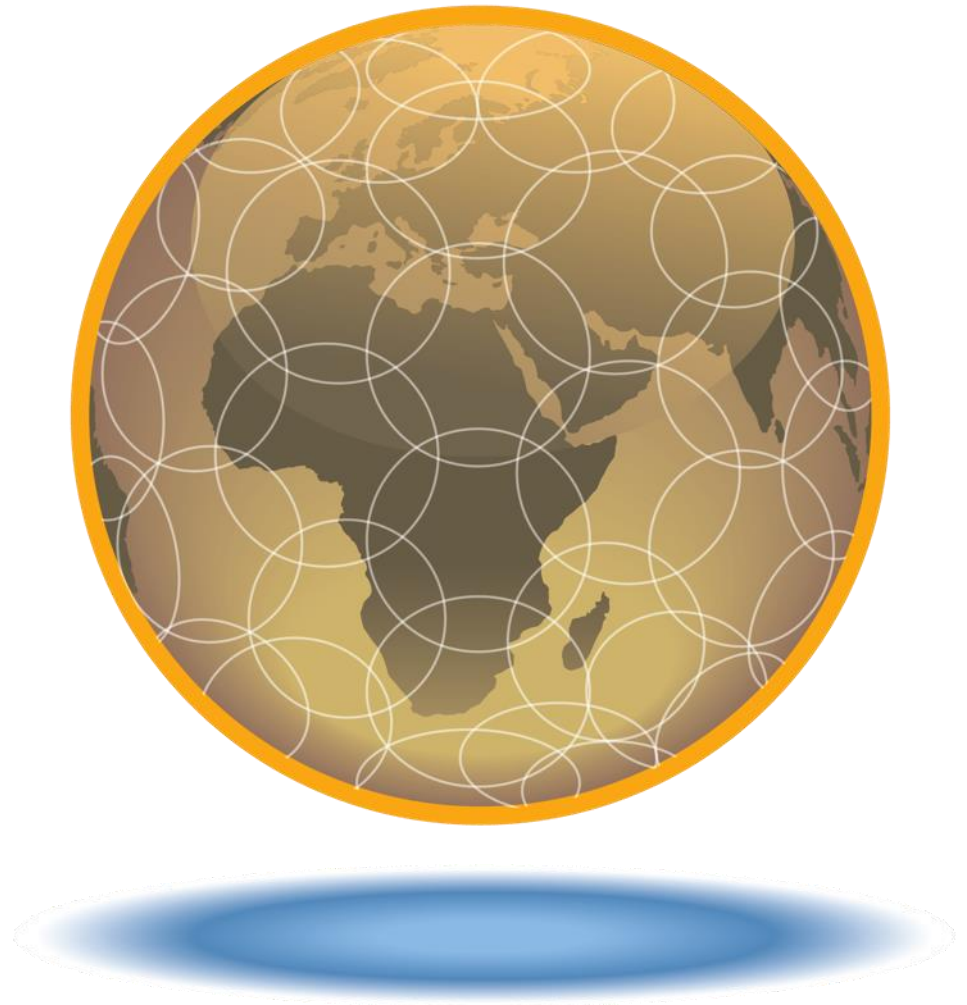
- 4.9.7 Message has unique identifier, terminal can ignore messages already received
- 4.9.8 The broadcasting service should in addition provide facilities for broadcasts similar to NAVTEX for coastal areas not covered by the International NAVTEX Service...



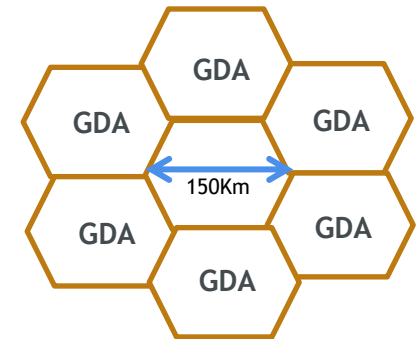
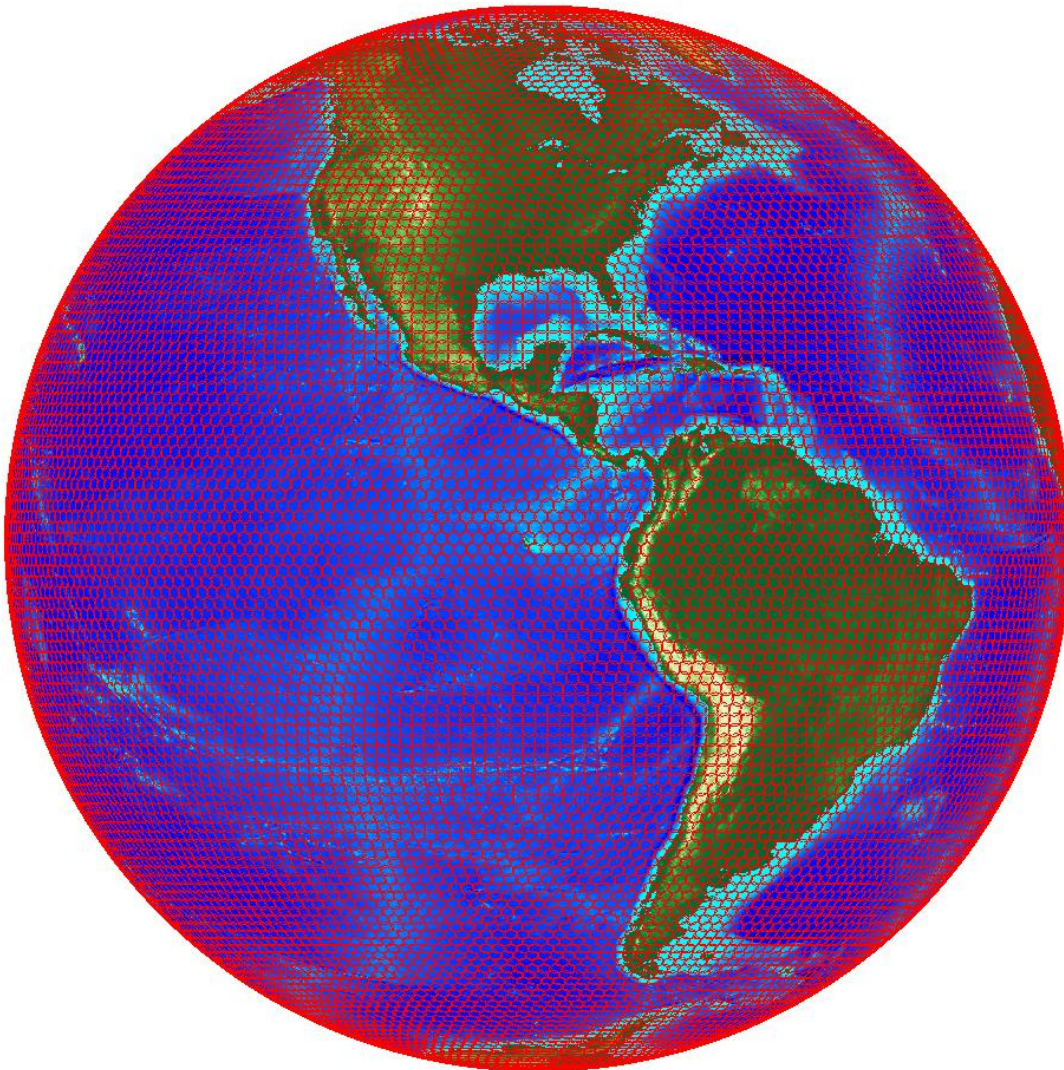
Proposed Iridium GMDSS Broadcast Solution

Iridium MSI Broadcast Solution

- Iridium has proposed to use its network of 66 interconnected cross-linked satellites in a low-earth (LEO) orbit for the transmission of MSI information
- The Iridium solution will support fully global distribution including polar regions (Sea Area A4)
- TDMA network architecture helps ensure timely delivery of messages to all regions




Iridium Broadcast Methodology

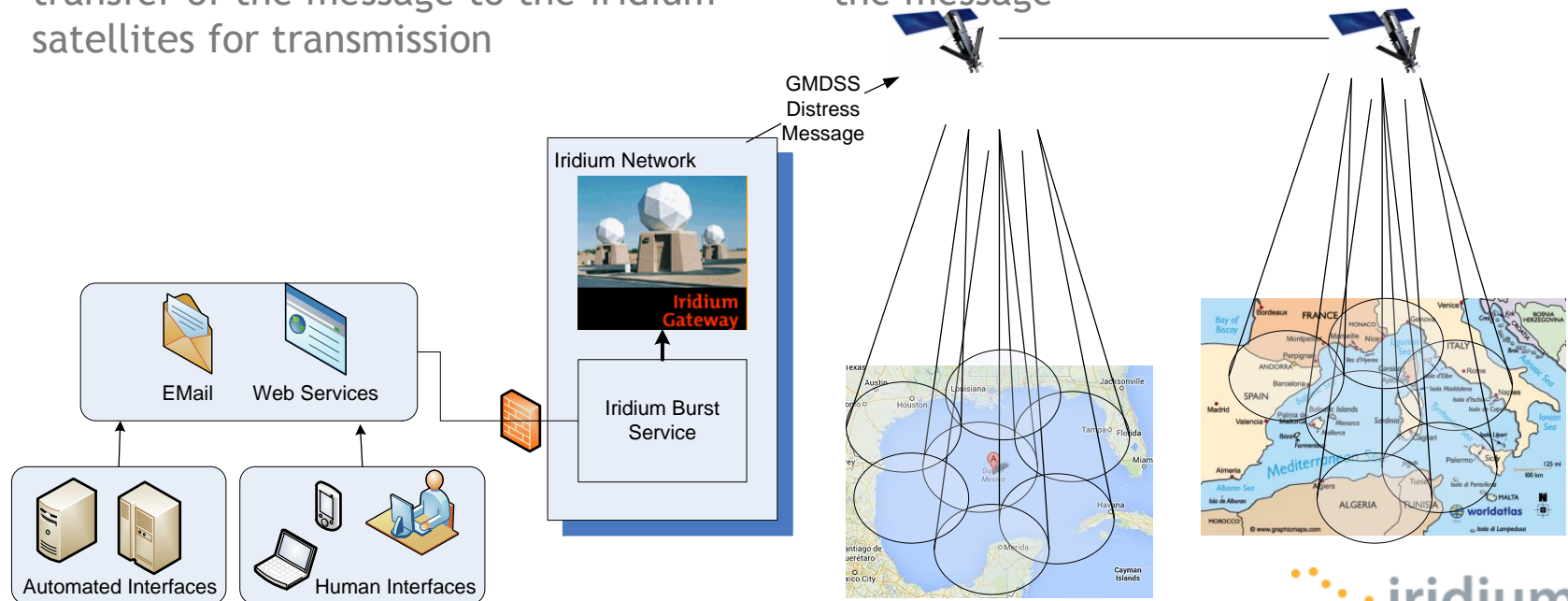


Delivery areas for Iridium broadcast messages are defined on the earth's surface using predefined coverage areas or by defining a point and radius for a circle of coverage.

Broadcast transmissions are then mapped to Global Delivery Areas (GDA), 150 Km wide hexagons mapped onto the earth's surface for transmission.

Transmitting an Iridium Broadcast Message

- **Step 1 - Formatting:** The sender (person or machine) formats the transmission, specifying recipient group, target area(s), message priority, and additional optional information.
 - **Step 2 - Processing:** The Iridium broadcast server receives the transmission, validates the format, and schedules the transmission(s) prior to transfer of the message to the Iridium satellites for transmission
 - **Step 3 - Delivery:** The Iridium network elements receive the transmission request and sends the data to the appropriate satellite(s). The satellite network receives the transmission and relays the data to the appropriate satellite beam(s).
 - **Step 4 - Receiving:** Devices in the delivery region, receive the transmission and authenticate themselves to process the message
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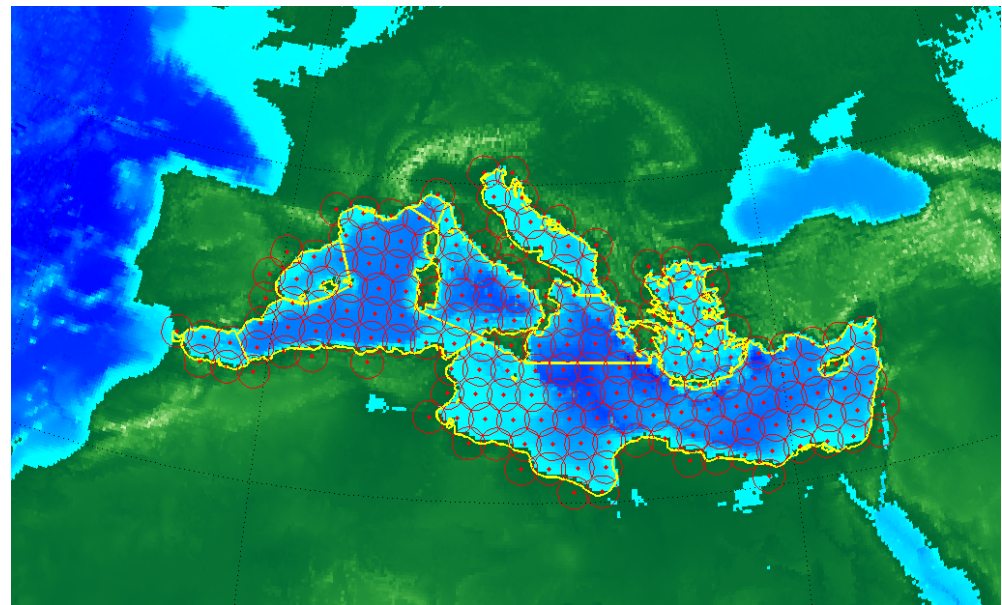
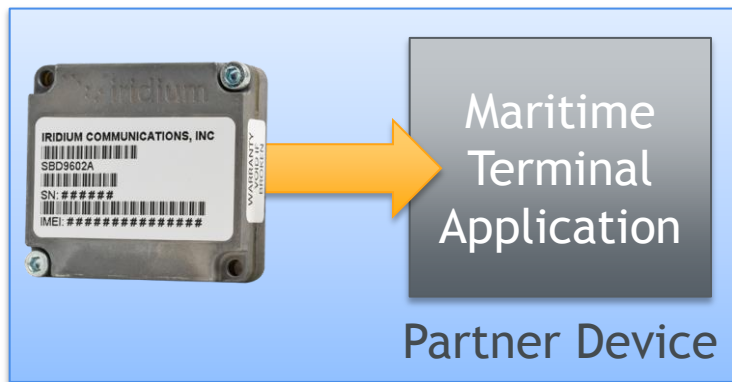


Receiving a Broadcast Message

Step 1: Transmissions are received by all broadcast-enabled devices in the targeted geographic area.

Step 2: Device interrogates the message and only those devices belonging to the specified recipient group process the message.

Step 3: The maritime terminal receives the message and delivers it to shipboard equipment for display/print.



Broadcast Priority Delivery

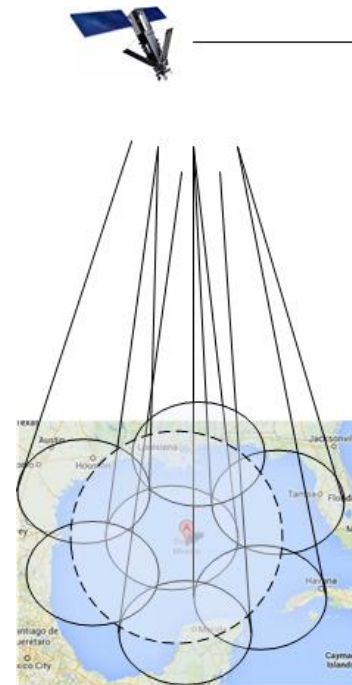
- Iridium supports four levels of priority in support of GMDSS calling, alerting and broadcasts
- The Iridium network will postpone lower priority broadcast messages, if necessary, to ensure timely delivery of distress communications
- The Iridium gateway retains and transfers the message priority to the vessel
- GMDSS users will be provided priority access to network resources at all times

Priority	Level
Distress	1
Urgency	2
Safety	3
Routine	4

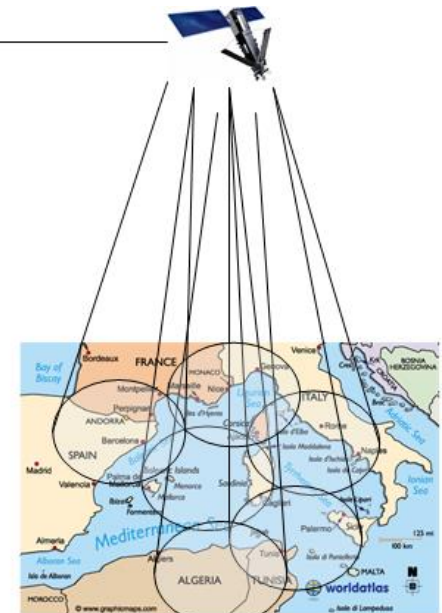
Service Delivery Areas

There are two methods of identifying the destination delivery area for an Iridium broadcast transmission:

- Point and Radius
 - Defined using latitude/longitude and radius in kilometers
- Broadcast Coverage Areas (BCAs)
 - Defined by Iridium
 - Have a unique identifier
 - Fixed geographic coordinates



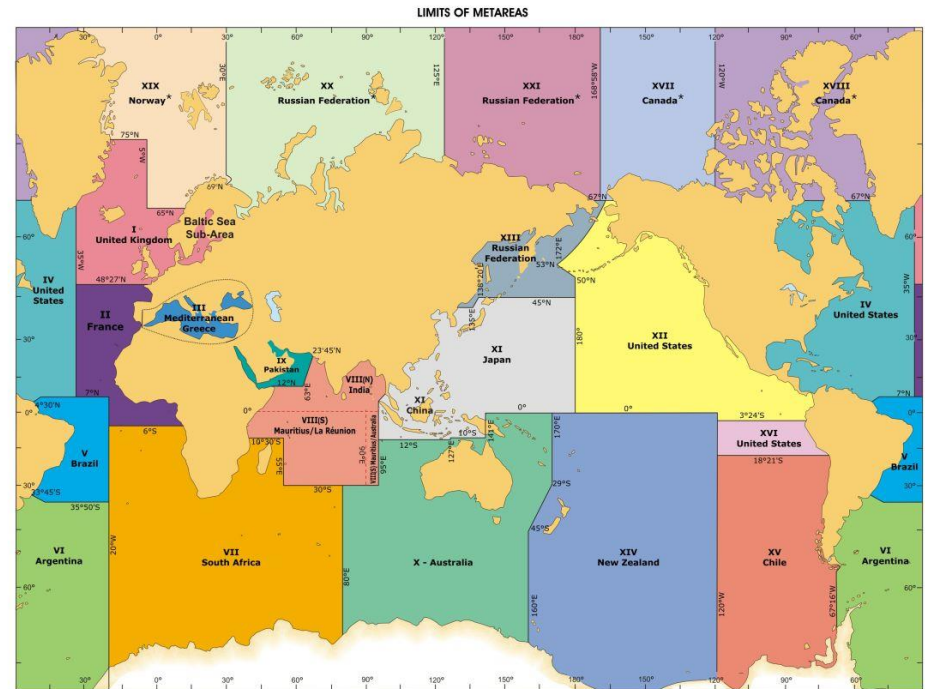
Point and Radius



Broadcast Coverage Area

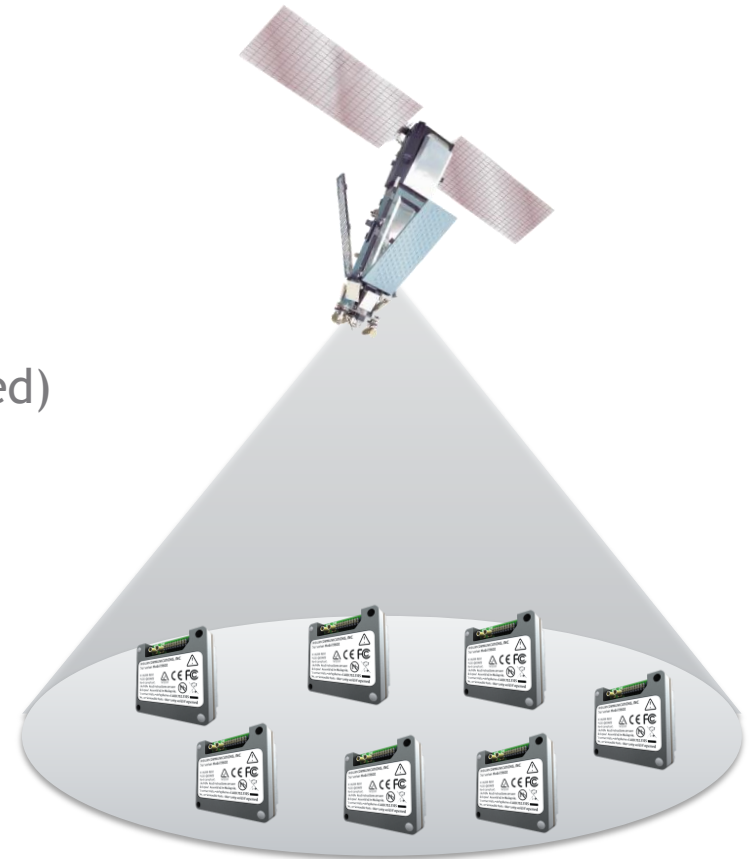
Proposed NAVAREA/METAREA Broadcast Implementation

- Iridium has proposed to implement BCAs for all NAVAREAS for the delivery of routine MSI broadcasts
- Each BCA will include the NAVAREA coordinates, plus 100 nautical miles to ensure comprehensive coverage
- MSI providers will be able to specify which BCA (NAVAREA) they wish to have messages delivered
- Additional BCAs can be configured as desired



Iridium Broadcast Message Parameters

- The Iridium broadcast service will support several input parameters to support MSI broadcasts
 - Delivery Area (Predefined or Dynamic)
 - User Group (Optional)
 - Message Priority (1 - 4)
 - Delivery Method (Immediate or Scheduled)
 - Echo (Up to 2)
 - Repeat (Number of Instances)
- Scheduled transmissions may be cancelled by notifying the system



User Interface

- The Iridium broadcast service supports two types of interfaces for input of messages
 - Web Services (SOAP) Interface
 - Iridium Web portal
- MSI providers may use existing proprietary systems for the generation and submission of MSI broadcasts to Iridium for delivery
- Additionally, Iridium is developing a secure web portal to support the generation and submission of MSI broadcast messages
 - Can be adopted as a primary interface or as a redundant platform for MSI providers

Broadcast Transmission Costs

- IMO Res.A.1001(25) requires that “the charging policies and provisions of resolution A.707(17), as amended, on *Charges for distress, urgency and safety messages through the Inmarsat system* are complied with.”
 - Shore-to-ship: Meteorological forecasts, meteorological warnings and navigational warnings incur no charge to the addressee and the “Standard SafetyNET™ charge” to the originator.
- Iridium has proposed to adopt a policy where each MSI provider will pay a fixed annual fee for use of the Iridium broadcast system
 - No incremental costs for volume of messages or message size
 - No charges to the vessel for receipt of MSI broadcasts



Iridium GMDSS Implementation Roadmap

Iridium MSI Broadcast Implementation

- The commercial Iridium broadcast service is now in operation
 - More than 500 BCAs have been established and are in use by devices around the globe
- Iridium plans to start beta testing of MSI broadcasts in Q1/2015 in support of the technical and operational evaluation of Iridium's application to the IMO
- Development of certified maritime terminals is being coordinated with experienced manufacturers
 - Prototype terminals expected in mid-2015
 - Commercial availability expected in mid-2016



Iridium as a Mobile Satellite GMDSS Service Provider



- Provides expanded satellite coverage to include the polar regions and sea area A4
- Provides redundancy to the current MSI broadcast and NAVTEX systems
- Leverages current technology, enabling a myriad of product solutions for ships of all sizes and budgets
- Will drive innovation to support of GMDSS modernization and shipboard terminals
- Will strive to improve the overall performance of maritime safety communications