

**United Nations International Conference on
Space-based Technologies for Disaster Management
"Disaster risk identification, assessment and monitoring"
23-25 October 2013, Beijing, China.**

**Satellite technology to prevent and
respond in cases of maritime accidents**

Captain Esteban Pacha
Director General
International Mobile Satellite Organization

STRUCTURE

- What is IMSO?
- Satellite communications for maritime safety and emergencies response
 - Global Maritime Distress and Safety System (GMDSS)
 - Long-Range Identification and Tracking system (LRIT)
- Evolution of the maritime mobile satellite services

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ORIGINS

- IMO adopted Inmarsat Convention in 1972
- Inmarsat Convention and Operating Agreement entered into force 16 July 1979.
- Purpose: providing space segment to improve maritime communications particularly safety of life at sea - Global Maritime Distress and Safety Services (GMDSS)
- Subsequently extended to land mobile and aeronautical communications.

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RESTRUCTURING

Restructured from 15 April 1999 to privatized corporate structure (Inmarsat Ltd.) retaining intergovernmental oversight of public services obligations via IMSO:

- Global Maritime Distress and Safety System (GMDSS)
- Peaceful uses
- Non discrimination
- Services to all geographical regions, where there is a need
- Fair competition

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LEGAL INSTRUMENTS

- CONVENTION ON THE INTERNATIONAL MOBILE SATELLITE ORGANIZATION. Entered into force on 16 July 1979. Amendments adopted on 3 October 2008, provisionally in force since 6 October 2008.
- HEADQUARTERS AGREEMENT BETWEEN IMSO AND THE UK GOVERNMENT dated 15 April 1999.
- PROTOCOL ON THE PRIVILEGES AND IMMUNITIES OF IMSO, Entered into Force on 30 July 1983 and Revised on 15 April 1999
- PUBLIC SERVICES AGREEMENT BETWEEN IMSO AND INMARSAT LTD. dated 15 April 1999
- INTERNATIONAL AGREEMENT ON THE USE OF INMARSAT SHIP EARTH STATIONS WITHIN THE TERRITORIAL SEA AND PORTS, Approved on 16 October 1985, Entered into force on 12 September 1993
- RULES OF PROCEDURE FOR THE ASSEMBLY



PRIMARY PURPOSE

Article 3 – IMSO Convention

- The Primary Purpose of IMSO is to ensure the provision of maritime mobile satellite communications services for the Global Maritime Safety and Distress System (GMDSS) as established by IMO.
- IMSO oversees and assesses the performance of all components of the GMDSS and the availability of mobile satellite communications for the GMDSS.
- These services include:
 - distress alerting communications
 - search and rescue (SAR) co-ordinating communications
 - maritime safety information (MSI) broadcasts
 - general communications

PUBLIC SERVICES AGREEMENT

- Between IMSO and Inmarsat Ltd. whereby IMSO oversees and enforces public service obligations, particularly GMDSS
- Public Services Committee meets regularly
- Daily interaction with Inmarsat's management
- “*Golden Share*” gives IMSO possibility to block any decision which may adversely affect provision of Public Services Obligations
- New Reference Public Service Agreement approved by IMSO Assembly (A-20, October 2008) for other possible providers

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OTHER FUNCTIONS

Article 4 – IMSO Convention:

- IMSO appointed by IMO as LRIT Coordinator
(Resolution MSC.275(85) of 5 Dec 2008)
- These functions include both administrative and operational tasks such as:
 - Assisting in the establishment of the LRIT components
 - Testing and integration of LRIT Data Centres into the production environment
 - Annual review and audit of performance of the components of the LRIT system;
 - Investigation of operational and technical disputes
 - Reporting to IMO on the performance of the LRIT system
 - Making recommendations to improve the efficiency, effectiveness and security of the LRIT system.

FACILITATION

Article 6 – IMSO Convention

- IMSO seeks to assist Providers to ensure that all areas where there is a need are provided with mobile satellite communication systems, giving due consideration to the rural and remote areas.



FINANCING

- IMSO's annual budget is divided appropriately between GMDSS and LRIT activities, and agreed annually by IMSO membership.
- IMSO's GMDSS budget is funded by GMDSS providers. (Presently financed by Inmarsat Ltd. as the only GMDSS provider. Apportionment between different GMDSS providers will apply in the future)
- IMSO's LRIT budget is funded by LRIT Data Centres participating in the LRIT system, via audit fees established annually
- Legal Fund (£100k) – relating to Inmarsat
- Contingency Fund as appropriate for future liabilities

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IMSO TODAY

- **97 Member States**
- **Assembly** of Parties meets every two years
- **Advisory Committee** appointed by Assembly meets around twice a year; currently 33 Member States
- **Directorate** headed by the Director General
- **Headquarters:**
99 City Road, London (UK)



IMO

- Agreement of Cooperation with IMO: IMSO ensures appropriate implementation of IMO Requirements in respect of GMDSS by satellite communication providers
- IMSO reports on performance of LRIT system
- Full reciprocal Observer Status



ICAO

- Agreement of Cooperation with ICAO whereby IMSO ensures Inmarsat takes into account application of ICAO Standards and Recommended Practices (SARPs)



ITU

- Observer Status giving IMSO active role in development of international telecommunications policies for maritime communications
- IMSO Director General appointed member of the UN Broadband Commission for Digital Development



OTHER IGOs

Observer Status and MoUs with:

- United Nations
- UNCOPUOS
- COSPAS-SARSAT
- Commonwealth Telecommunications Organization (CTO)
- International Hydrographic Organization (IHO)
- International Telecommunications Satellite Organization (ITSO)
- European Telecommunications Satellite Organization (EUTELSAT-IGO)
- The European Commission (EC)
- World Meteorological Organization (WMO)
- International Organization of Space Communications (INTERSPUTNIK)

COLLABORATION WITH INDUSTRY

MoUs with different industry associations were signed in 2008:

- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA)
- International Chamber of Shipping (ICS)
- *Comité International Radio-Maritime* (CIRM)
- International Organization for Standardization (ISO)

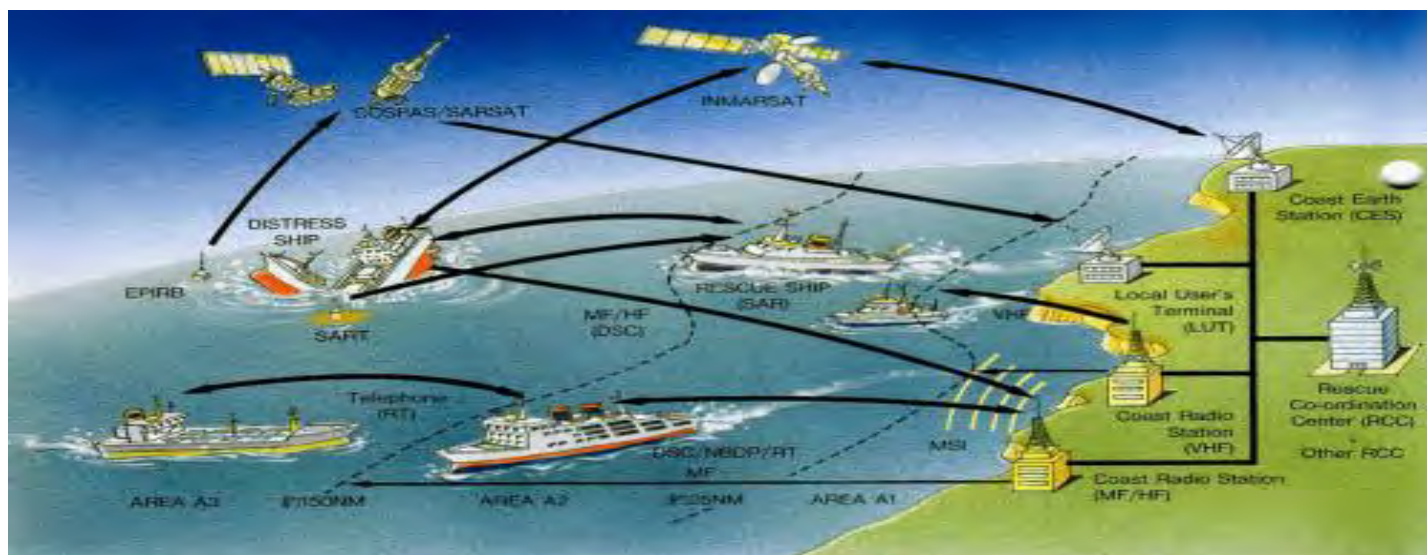
These MoUs promote co-operation and an exchange of information on matters of common interest between IMSO and the representative industry.



SATELLITE COMMUNICATIONS



GMDSS

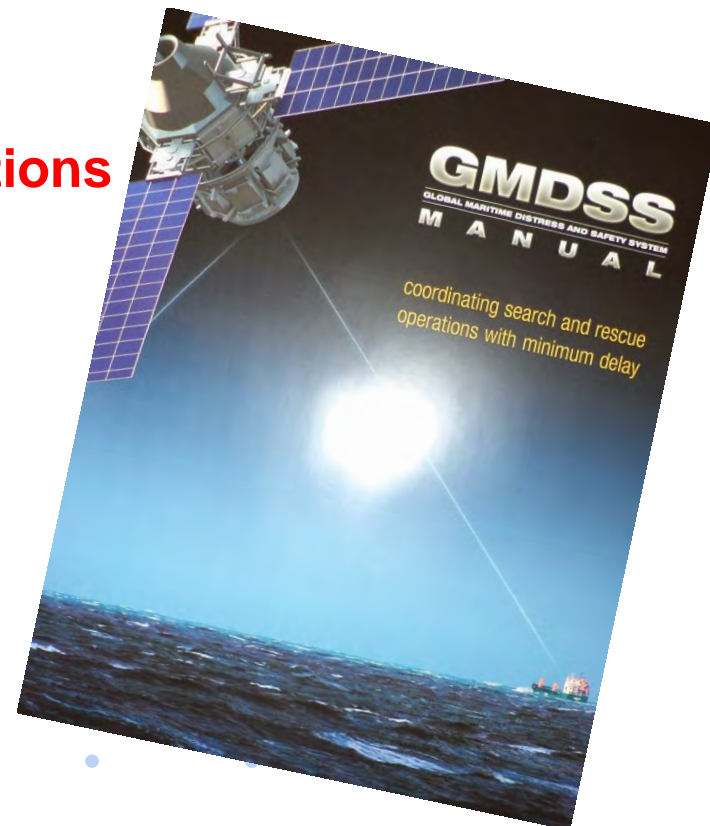


The GMDSS is an international system which uses terrestrial and satellite technology and ship-board radio-systems to ensure rapid, automated, alerting of shore based communication and rescue authorities and to ships in the immediate vicinity, in the event of a marine distress.

GMDSS

A common communications regime for all ships

- Distress Alerts
- **SAR Co-ordinating communications**
- On-scene communications
- Maritime Safety Information (MSI)
- General radio-communications



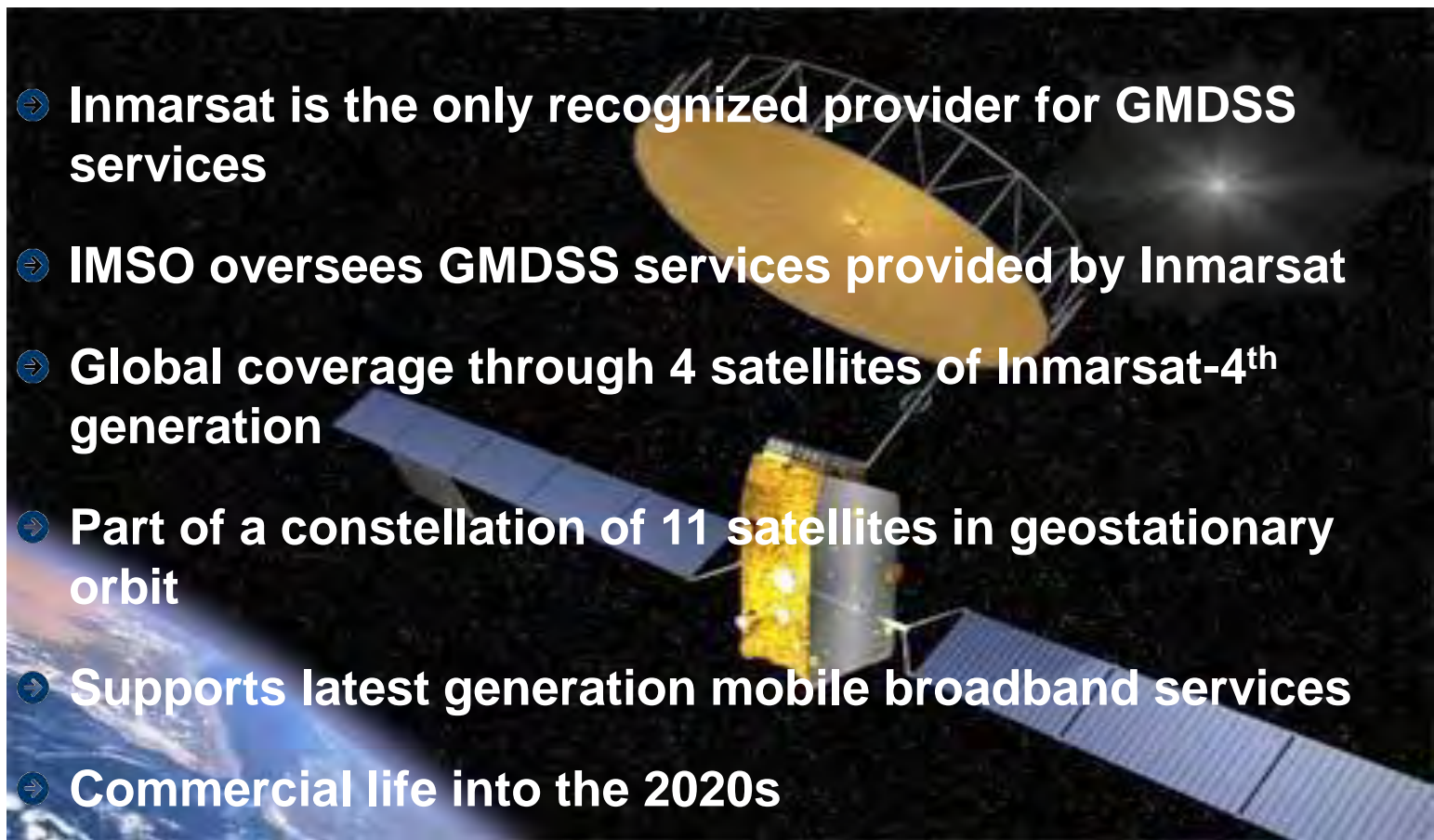
GMDSS PUBLIC OBLIGATIONS

- (a) transmission and reception of distress and safety communications, initiation and reception of distress priority calls, transmissions of shore-to-ship/ship-to-shore/ship-to-ship distress alerts, and transmission and reception of general radio-communications.
- (b) transmission of maritime safety information
- (c) transmission by satellite of emergency position-indicating radio beacons (*satellite EPIRBs*) alerts.

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GMDSS TODAY

- Inmarsat is the only recognized provider for GMDSS services
- IMSO oversees GMDSS services provided by Inmarsat
- Global coverage through 4 satellites of Inmarsat-4th generation
- Part of a constellation of 11 satellites in geostationary orbit
- Supports latest generation mobile broadband services
- ➤ Commercial life into the 2020s



GMDSS NUMBERS

Infrastructure

- 180 Land Earth Stations for GMDSS related comms.
- 170,000 GMDSS-capable active terminals (maritime)
- 11,000 active terminals for other uses (aviation, government)
- 74,000 active land terminals

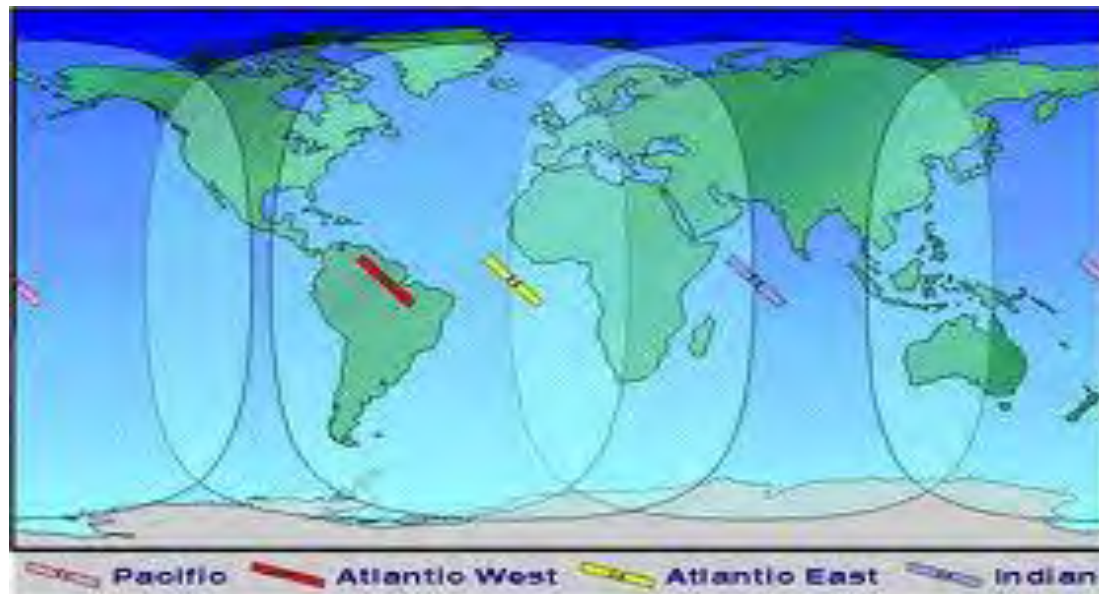
Usage (2011)

- 1,132 ship-to-shore distress alerts
- 970 ship-to-shore priority calls
- 1,717 shore-to ship distress alerts
- 235 shore-to-ship priority calls



GMDSS AVAILABILITY OF SERVICE

	AOR-E	IOR	POR	AOR-W
SPACE SEGMENT	100.0000%	99.9992%	99.8191%	100.0000%
INMARSAT-B/F77	100.0000%	100.0000%	99.8301%	100.0000%
INMARSAT-C	100.0000%	100.0000%	99.9172%	100.0000%



Assessment of Inmarsat's performance for the provision GMDSS services is carried by IMSO and reported to IMO.

Last report COMSAR 16/5/1 dated 6/1/2012.

FUTURE OF GMDSS

New satellite providers

- New regulations adopted to open the GMDSS services to all satellite communication service providers.
(IMO Resolution A.1001(25) on criteria for the provision of mobile satellite communication systems in the GMDSS, adopted on 27 November 2007)
- Amendments to the IMSO Convention to extend oversight to any satellite operator recognized for GMDSS services.
(applied since 6 October 2008)
- MSC.1/Circ.1414 – Guidance to prospective GMDSS satellite service providers. Evaluation/Recognition.
- **Iridium to be recognized as new GMDSS provider?**
(document MSC 92/9/2 dated 9/4/2013 submitted by United States)

FUTURE OF GMDSS: m-GMDSS

Plan for the modernization of GMDSS

(approved by IMO in May 2012)

- 2009-2012: Scoping exercise
- 2013-2015: Full review of GMDSS requirements (SOLAS Chapter IV)
- 2015-2017: GMDSS Modernization Plan
- 2017 onwards: implementation phase, development of performance standards and other legal instruments.

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FUTURE OF GMDSS: m-GMDSS

Plan for the modernization of GMDSS

(approved by IMO in May 2012)

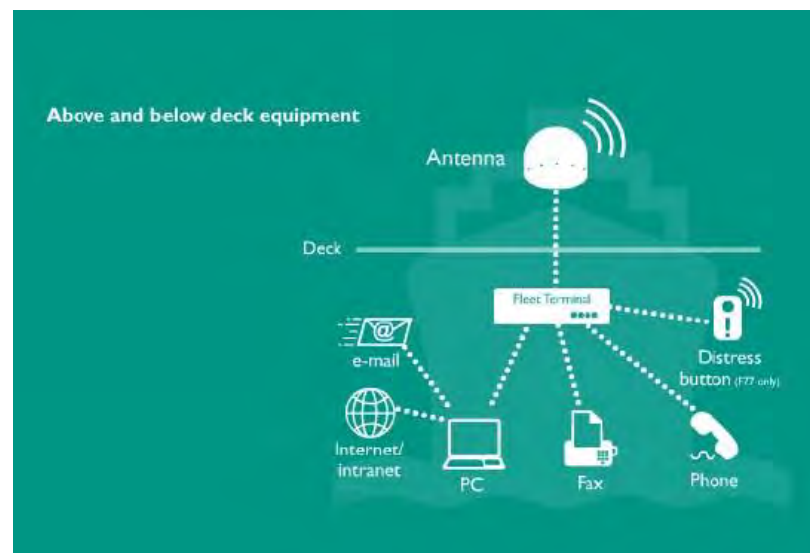
- New definitions for General Communications
- Security related requirements in MSI
- New set of functional requirements for radiocommunications systems
- New technologies which might be included in the m-GMDSS
- Broadcast of information using one single type of communication
- Application to non-SOLAS ships
- High-level review of the GMDSS document to identify other issues
- IMO COMSAR Correspondence Group on GMDSS Review

(Latest reference document: COMSAR 17/17 dated 13/2/2013)

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EVOLUTION OF SATELLITE SERVICES

- ✓ FleetBroadband: simultaneous mobile voice & data
- ✓ FB500 for GMDSS ??
- ✓ FB non-GMDSS launched in August-2011
- ✓ Priority calls “red button”
- ✓ Improved availability & efficiency of maritime communications
- ✓ New needs of maritime communications



EVOLUTION OF INMARSAT SERVICES

New Alphasat

- last of the I-4 generation
- to be launched next 25/07/2013
- enhanced capacity for multimedia mobile services in L-Band

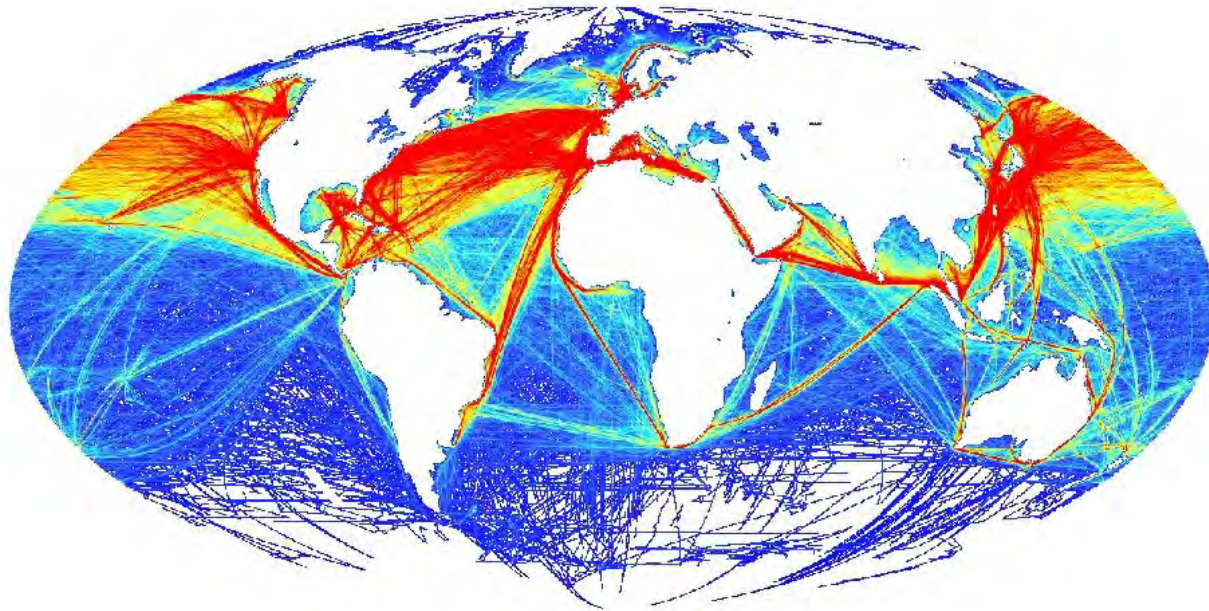


3 new I-5 satellites for GlobalXpress to be launched later in 2013 and 2014

- broadband downlink speeds up to 50Mbps
- VSAT easy-to-use broadband in Ka-Band for remote and mobile platforms on land, at sea and in the skies.



TRACKING OF SHIPS



LRIT



To improve maritime security, safety and environment protection, IMO established the LONG RANGE IDENTIFICATION AND TRACKING of ships (LRIT) system by which ships automatically report their identity and position using terrestrial and satellite technology and ship-board radio-systems.

(SOLAS Regulation V/19-1 entered into force 1-1-2008)

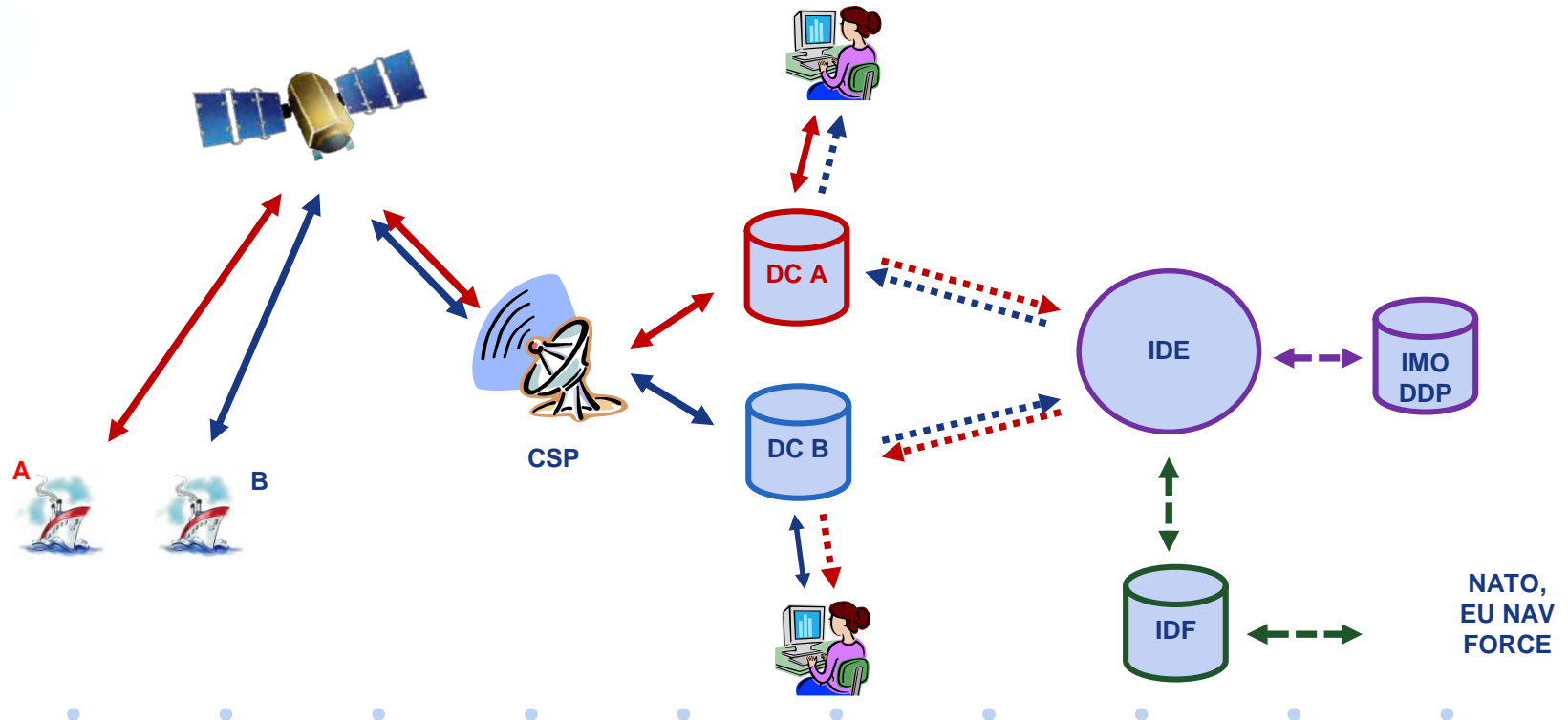


LRIT

- LRIT has been implemented since 31-12-2008
- IMO appointed IMSO as Co-ordinator of the LRIT system to audit the performance of all components of the system and ensure the uniform implementation of the system worldwide (resolution MSC.275(85))
- Functions of IMSO also include administrative, technical and operational responsibilities.
- IMSO Convention amended in 2008 for this purpose; amendments provisionally applied from 6 October 2008.

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LRIT



LRIT REPORTING

- Automated ship report system
- Sent via *any* means of communication
- Often via Inmarsat C
- Includes:
 - Ship ID
 - Current Position (GPS)
 - Date/Time of Position
- No intervention by crew



LRIT DATA ACCESS

- **FLAG** State
 - ❖ ALL ships in its register
- **COASTAL** State
 - ❖ Any ship within 1000NM of its coast
- **PORT** State
 - ❖ Any ship intending to visit that Port
- **SAR** Authorities
 - ❖ For SAR ops only
- **SECURITY** Forces
 - ❖ Antipiracy Facility – NAVFORCE, ATALANTA

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LRIT – IMSO's role

- Participates in the testing of new DCs
- Investigates disputes
- Audits Data Centres on an annual basis following a schedule prepared by IMSO
- 122 audits have been completed and submitted to IMO so far
- Audits helped many DCs to change and amend their implementations
- A bespoke software is being used for the audits



LRIT DOCUMENTATION

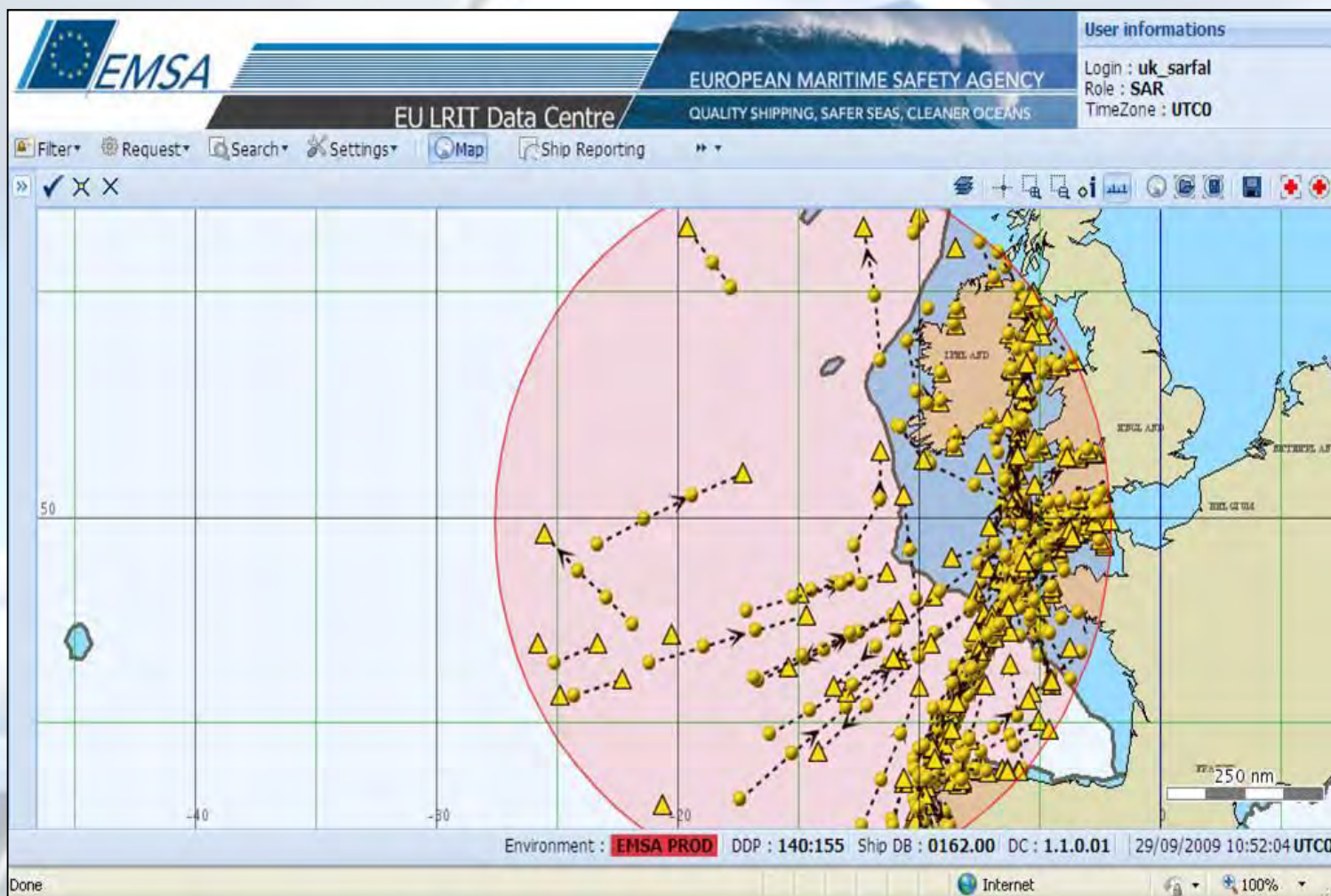
- IMSO's LRIT Business Plan
- LRIT Service Agreement/Contractual arrangements to be signed by LRIT Data Centres operators
- IMSO's LRIT Goals and Objectives
- Letter of Authorization for integration of LRIT Data Centres into the production system.
- IMSO's LRIT Audit Procedures
- Data Handling and Security policies
- IMSO's LRIT Circulars
- LRIT audit reports



LRIT POLYGONS



LRIT in practice

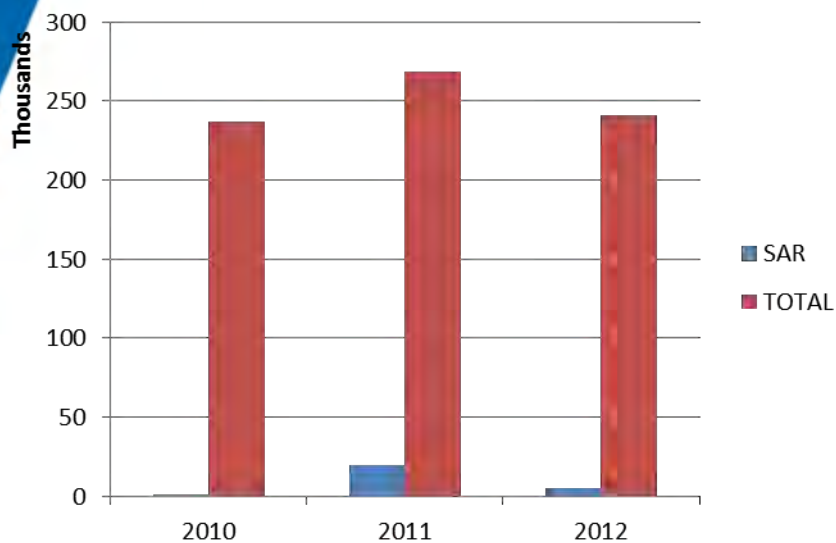


Victoria, Seychelles
12-16 October 2009

IMO Sub-Regional Meeting
to progress implementation of
the Djibouti Code of Conduct

LRIT FOR SAR

INDIVIDUAL SHIP POSITION REQUESTS



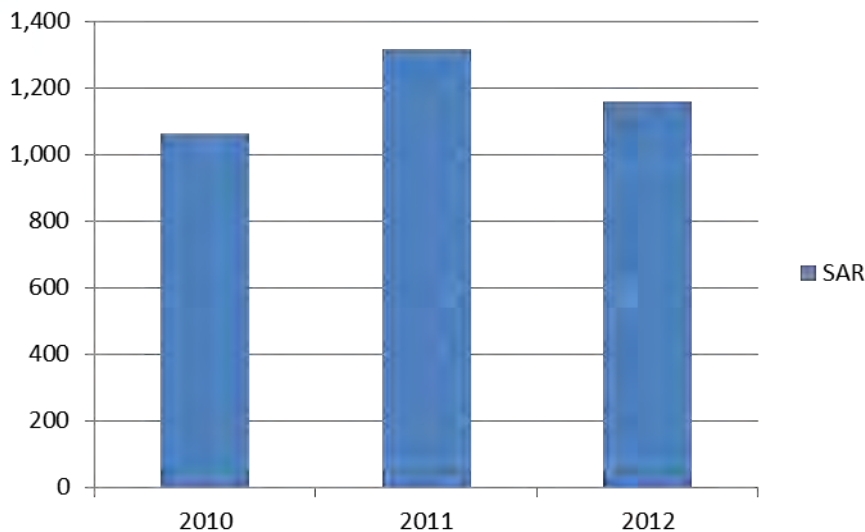
Individual Ship Position Request		
Year	SAR	TOTAL
2010	1,042	236,958
2011	19,478	268,232
2012	4,713	241,264
TOP 5 Requestors (in 3 years)		
	EU	US
	Australia	Canada
	Republic of Korea	EU
	Canada	Australia
	South Africa	Republic of Korea

LRIT FOR SAR

MSC.1/Circ.1338 of 1 March 2011

**GUIDANCE TO SEARCH AND RESCUE SERVICES IN
RELATION TO REQUESTING AND RECEIVING LRIT
INFORMATION**

SAR SURPIC REQUESTS



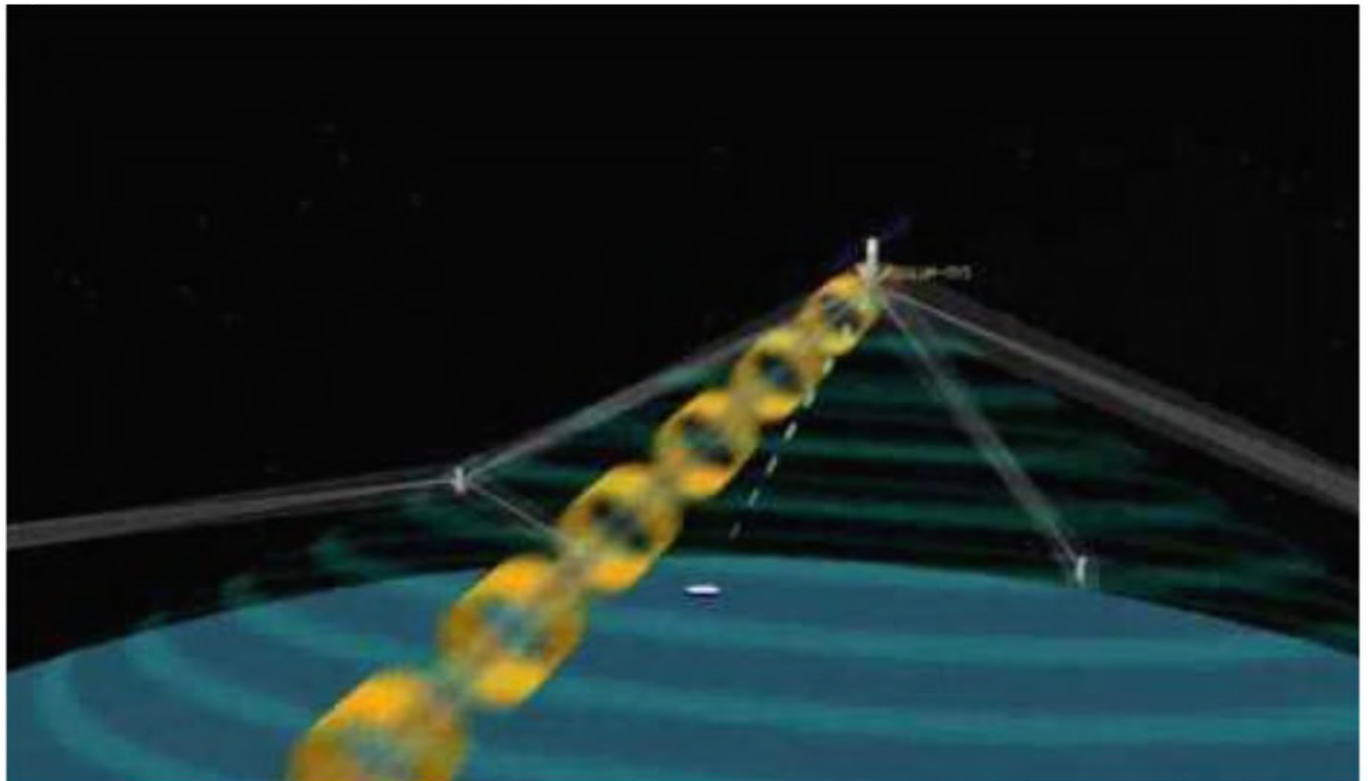
Year	SAR
2010	1,063
2011	1,315
2012	1,160
TOP 5 Requestors (in 3 years)	
EU	
Canada	
Australia	
Republic of Korea	
Japan	

LRIT FOR SECURITY

RESOLUTION MSC.298(87) OF 21 May 2010
ESTABLISHMENT OF A DISTRIBUTION FACILITY FOR THE
PROVISION OF LRIT INFORMATION TO SECURITY FORCES
OPERATING IN WATERS OF THE GULF OF ADEN AND THE
ESTERN INDIAN OCEAN TO AID THEIR WORK IN THE
REPRESSION OF PIRACY AND ARMED ROBBERY AGAINST
SHIPS

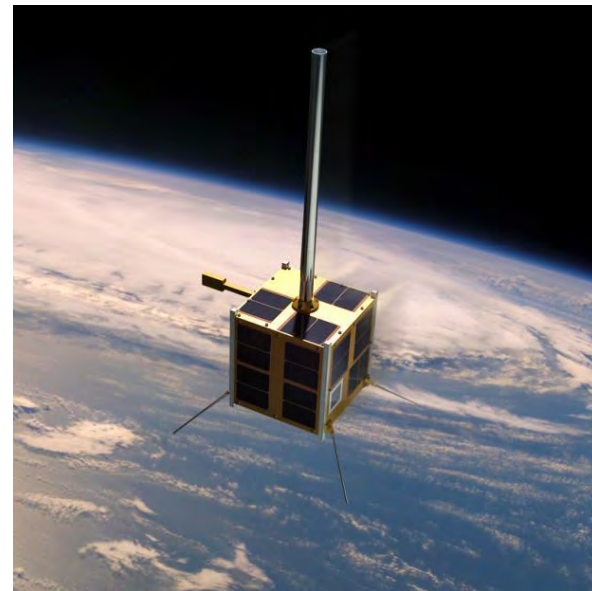


NEW TECH, NEW APPS, NEW NEEDS



Satellite AIS

- Space-based AIS service
 - LEO satellites detect Class A and B AIS signals
 - Data is passed onto earth stations
 - Processed and forwarded to interested parties
- Available on a commercial basis
- **Not recognized by IMO**

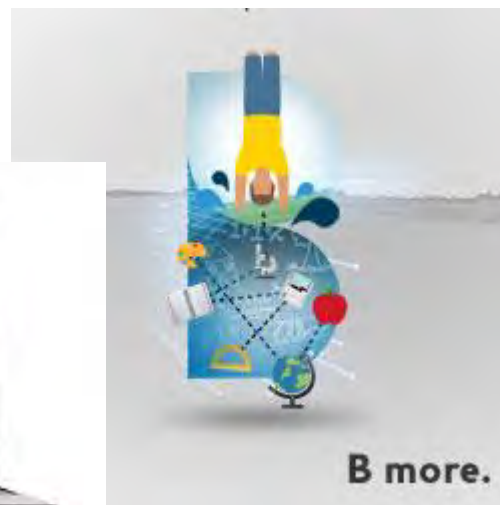
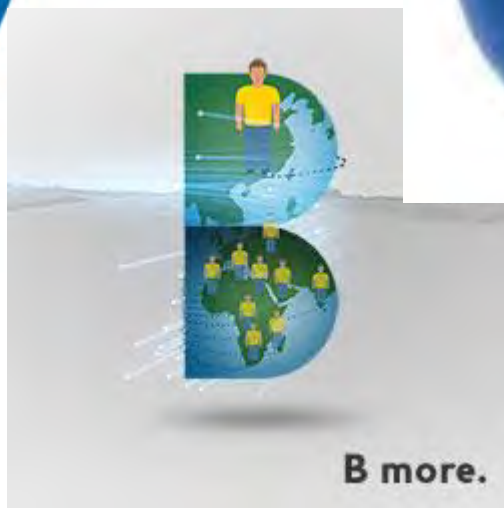


Satellite AIS

	S-AIS
Global coverage	✓
Real time tracking	90 - 120 min delays
Data security / confidentiality	?
Ship identification and position data	✓
Static and dynamic data (i.e: position, ship type, speed, course, heading, etc)	✓
Internationally regulated	X

Satellite Broadband

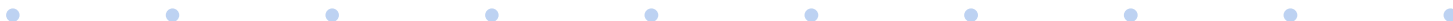
» Broadband lets us **B**
where we need to **B**



Next steps



- Promoting a future based on broadband.
- Availability of broadband through mobile satellite infrastructure at sea.
- Should it be part of the m-GMDSS?



THANK YOU FOR YOUR ATTENTION

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