



# **Inmarsat Maritime Safety Services today and tomorrow. Status of EGC SafetyNET**

**WWNWS-7**

**Monaco**

**24-28 August 2015**

**Vladimir Maksimov**

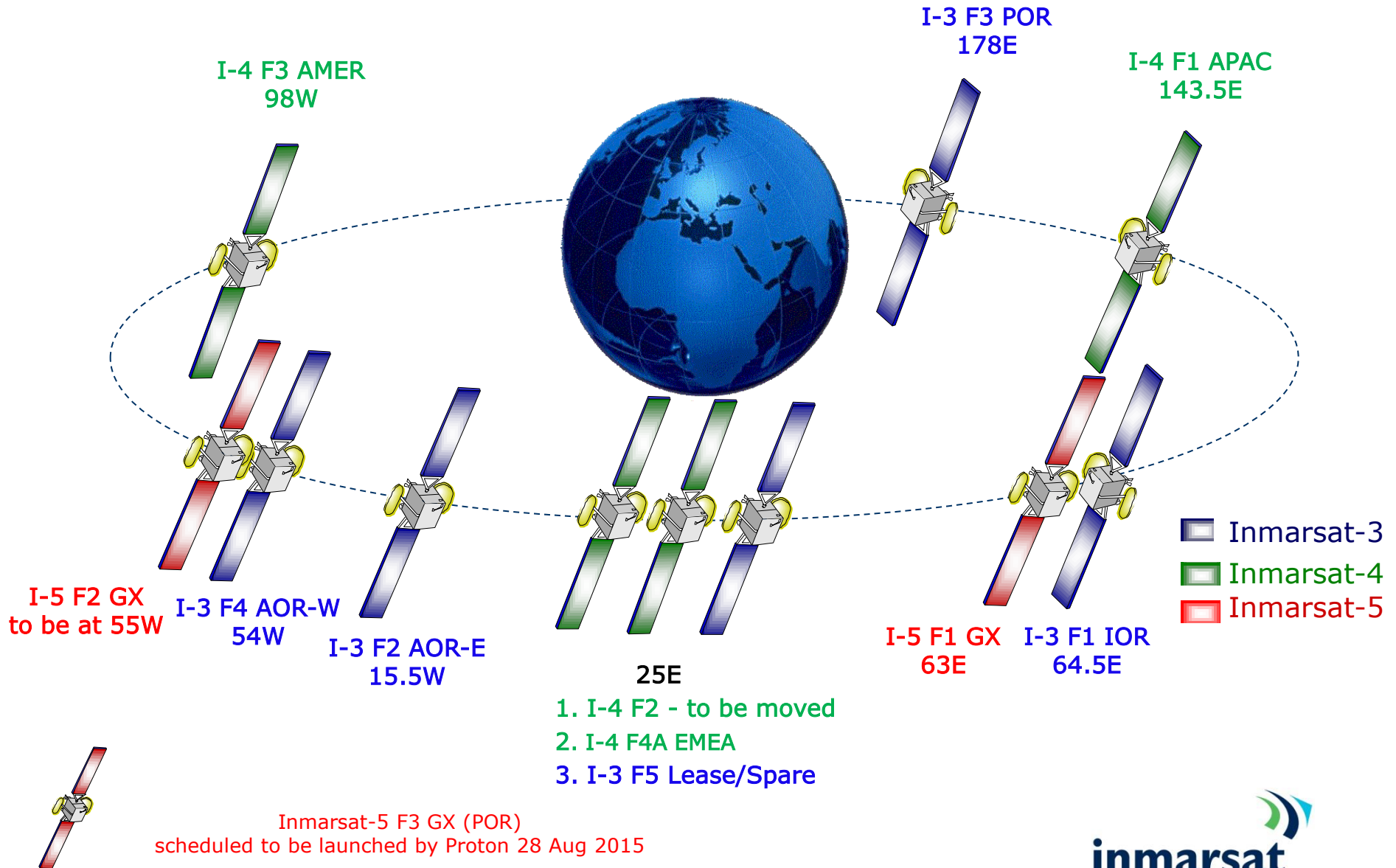
**Director, SOLAS Services  
Maritime**

# The Core Maritime Safety Portfolio

- ➔ More than 269,000 maritime terminals in use
- ➔ Nearly 157,000 Inmarsat C/mini-C MESs
- ➔ “505” emergency service on all FleetBroadband terminals
- ➔ Distress and Urgency voice calls on Cobham and JRC FB terminals
- ➔ *MSDS project for MSI providers and MRCCs is under development and trial*
- ➔ **GMDSS compliance**
  - Inmarsat-C is the only conventional satellite system required by IMO SOLAS Convention, Chapter IV. No EOL decision
  - Inmarsat-B to be closed on the 30 Dec. 2016
  - Inmarsat Fleet F77 – EOL is likely to be reported at the IMO NCSR3 next year
  - Plans to have FB Distress voice (and data safety) services to be GMDSS approved



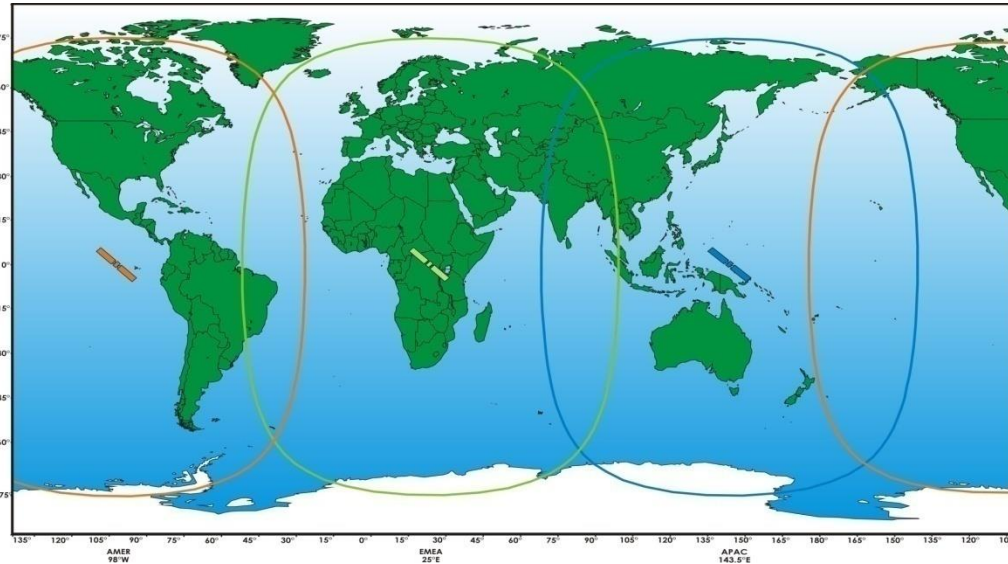
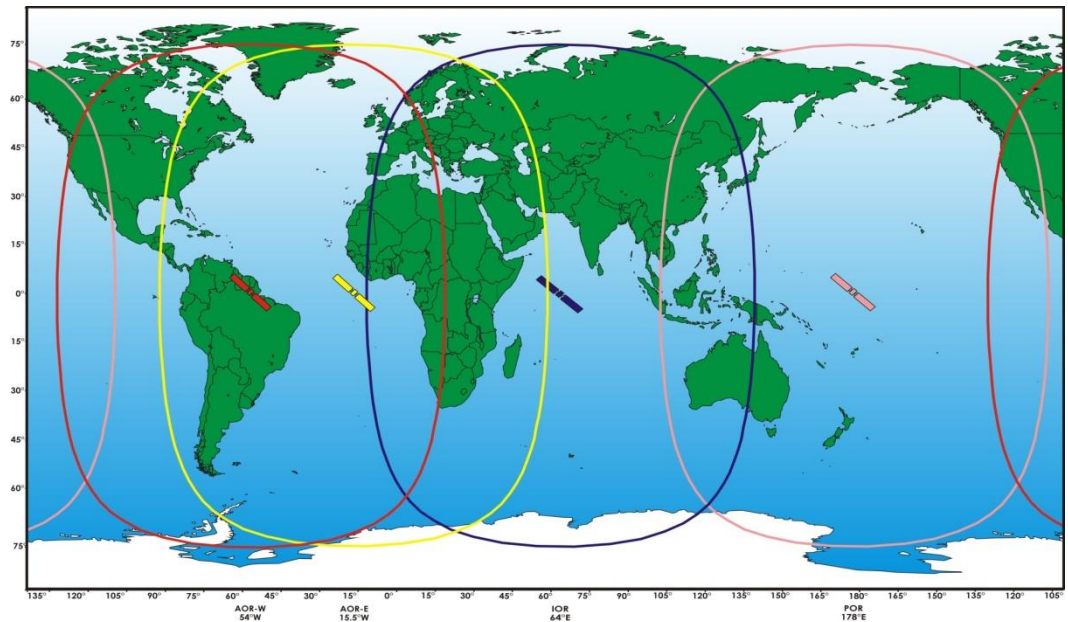
# Inmarsat's Satellite Constellation



# Inmarsat's I-3 Primary Satellite Constellation

Four ocean regions for Existing and Evolved services incl. GMDSS

AOR-E  
AOR-W  
IOR  
POR



## Inmarsat's I-4 Satellite Constellation

Three ocean regions for all Broadband services:

AMER  
EMEA  
APAC

4<sup>th</sup> "Indian" ocean region to come in October



# Inmarsat I6 satellites

- ➔ ESA Makes Research Investment in Next-generation Inmarsat System - see more on: <http://spacenews.com/esa-makes-research-investment-in-next-generation-inmarsat-system/>
  - The European Space Agency, continuing in its relatively new role as pollinator of near-term satellite telecommunications technology, on July 16 contracted with Inmarsat to conduct research on a next-generation Inmarsat mobile communications system. London-based Inmarsat said the work would include a broad overview of what would be an Inmarsat-6 generation of services, including low-orbiting satellite constellations, inter-satellite laser-optical communications and laser communications between satellites and platforms.
  - 1<sup>st</sup> launch is targeted end of the decade?
  - Inmarsat has no intention of abandoning L-band for its core service.
  - I-6 satellites would be able to support safety services.

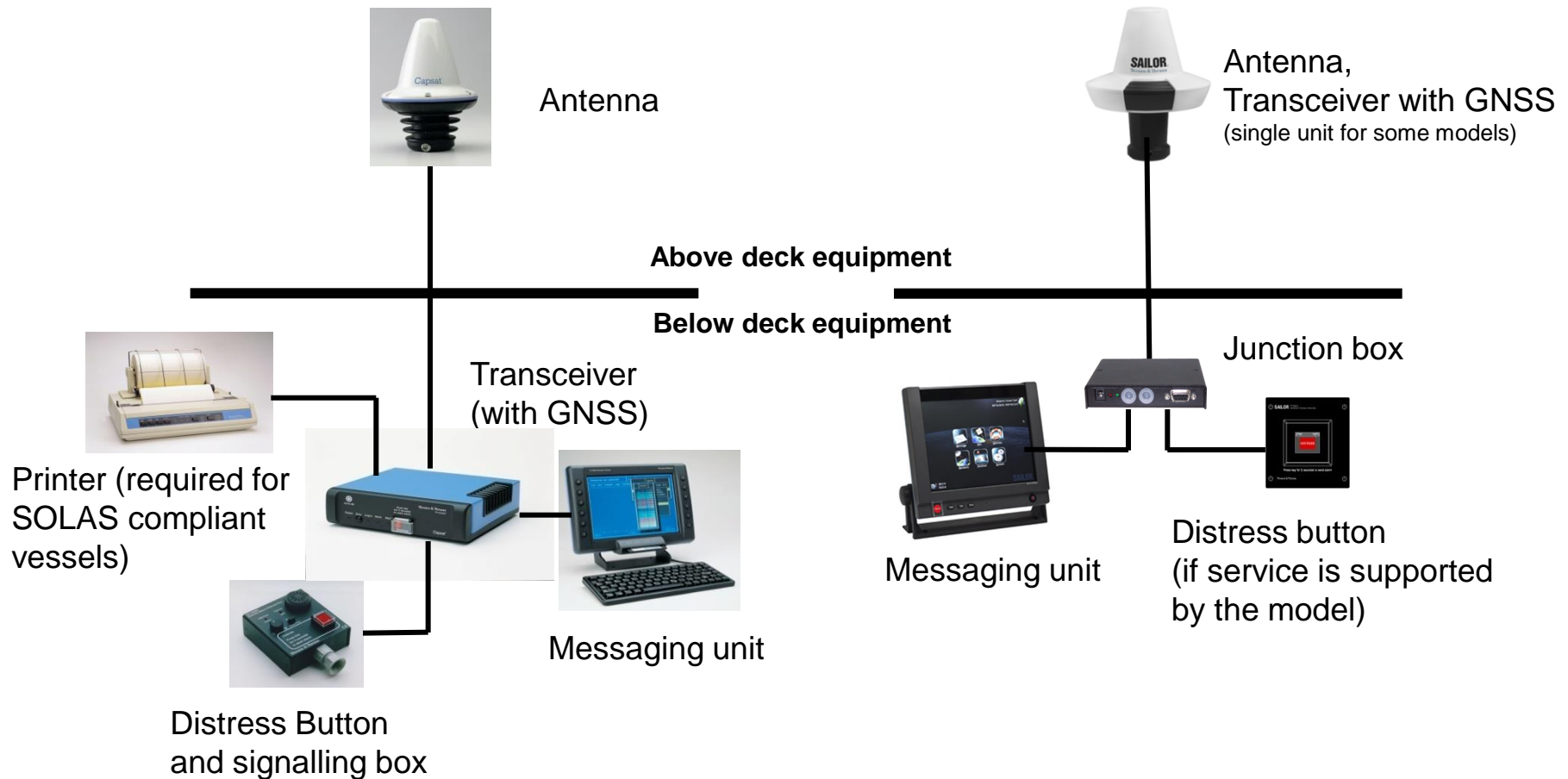
# Inmarsat C/Mini-C characteristics and services



## Inmarsat C and mini C models of different manufacturers

- ➔ Global coverage (between 76° North and 76° South under 5° and above antenna elevation angle)
- ➔ Store and Forward communication system (ship-to-shore, shore-to-ship and ship-to-ship)
  - messages delivered to e-mail, telex, fax (text, one way only), another mobile, SAC
- ➔ Non-stabilised omnidirectional antenna, small size and weight
- ➔ Low power consumption, compatible with national alphabets
- ➔ Some mini-C models are approved for GMDSS and support Distress Calling and EGC functions
- ➔ More than 87,000 Maritime Inmarsat C and 69,000 Inmarsat mini-C SESs
- ➔ Main part of the GMDSS satellite equipment – required by SOLAS Convention, Chapter IV
  - Distress Calling - distress alerting and distress priority messaging
  - Enhanced Group Calling (EGC) EGC SafetyNET and EGC FleetNET
  - Ship Security Alerting service (SSAS)
  - Data reporting and polling service (position monitoring, tracking, LRIT)

# Inmarsat C and Inmarsat mini-C maritime terminals (with Distress capability)



***Note: No power supply is shown for both configurations***

# GMDSS Communication Functions via Satellite

**No single piece of equipment can do all functions!!!**

**But... where does Inmarsat equipment fit?**

GMDSS Functions	Inm-B*	Inm-F77**	Inm-C
1. Distress Alerting ship-to-shore	Yes (voice)	Yes (voice)	Yes
2. Distress Alerting shore-to-ship		Yes (voice)	Yes
3. Distress Alerting ship-to-ship			
4. SAR Communications	Yes	Yes	Yes
5. On-scene communications			
6. Tx/Rx of MSI	Yes (Tx)	Yes (Tx)	Yes
7. Locating signals			
8. General communications	Yes	Yes	Yes
9. Bridge-to-Bridge communic.			



\* Inmarsat-B to be closed down in December 2016

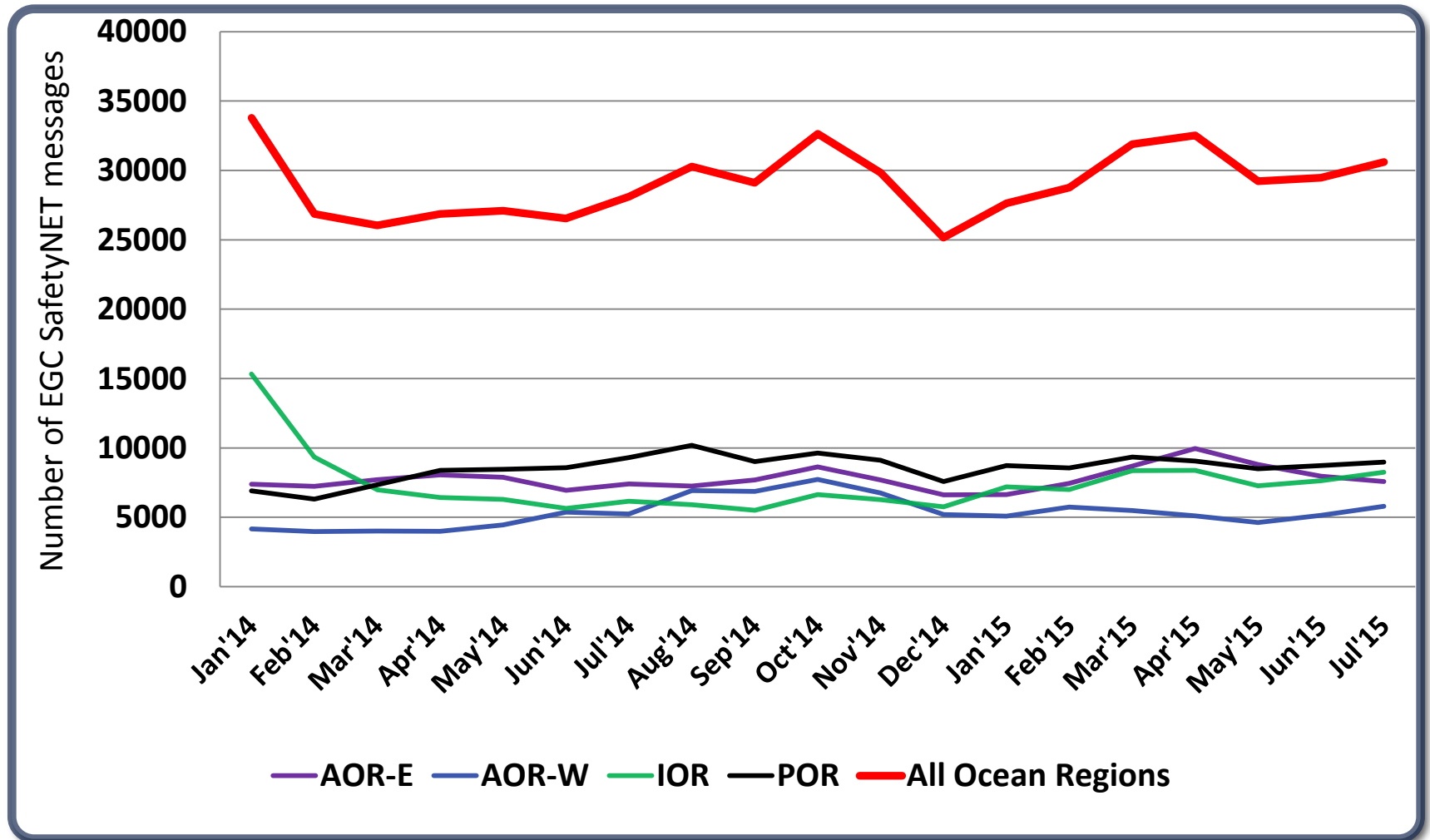
\*\* Inmarsat F77 EOL may be announced at NCSR3



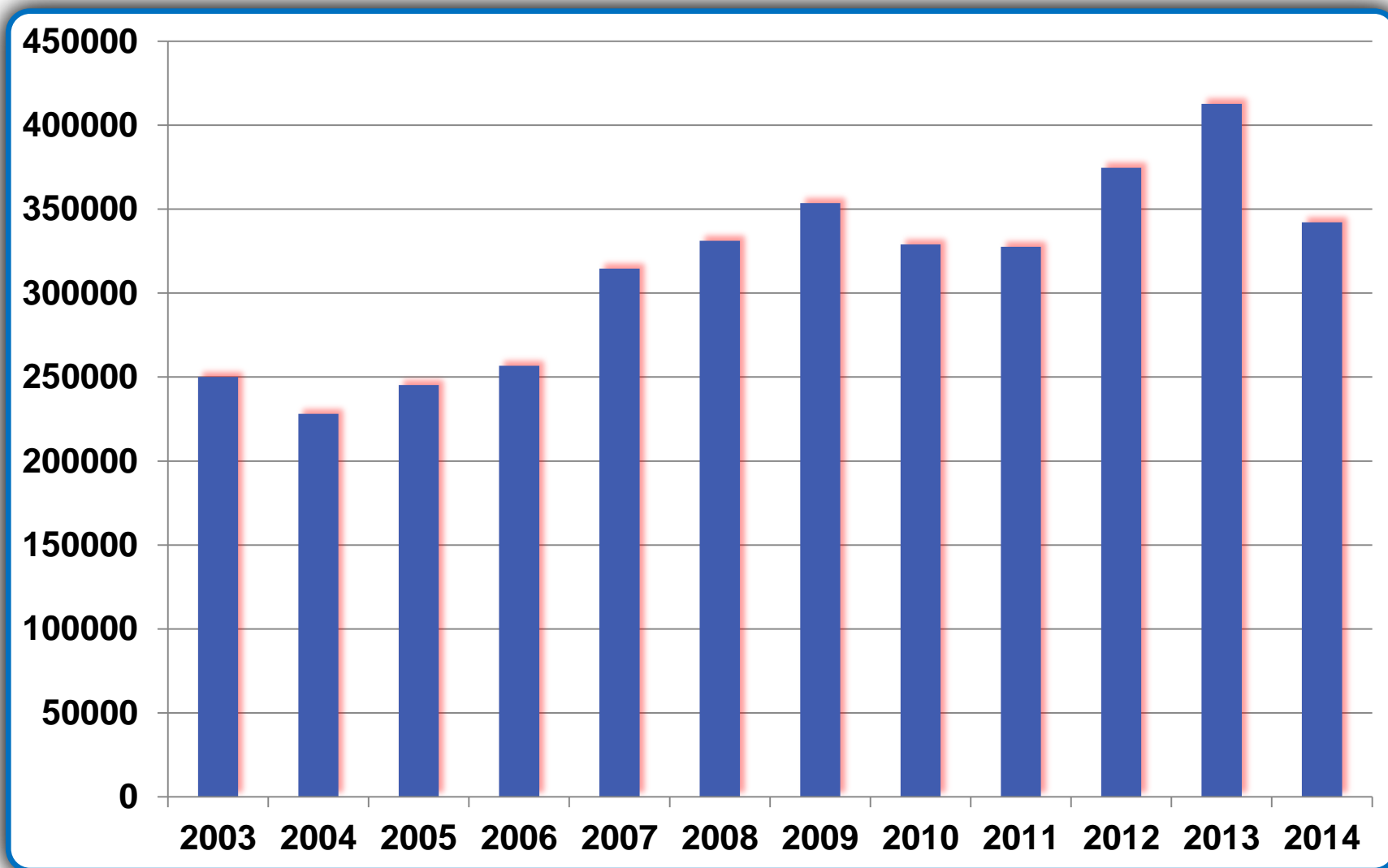
# Number of EGC SafetyNET messages per month & OR

	AOR-E	AOR-W	IOR	POR	Total
Jan'14	7396	4164	15323	6911	33794
Feb'14	7232	3976	9349	6313	26870
Mar'14	7708	4003	6978	7343	26032
Apr'14	8050	3997	6424	8387	26858
May'14	7879	4454	6298	8470	27101
Jun'14	6944	5382	5651	8571	26548
Jul'14	7406	5247	6162	9306	28121
Aug'14	7244	6932	5905	10191	30272
Sep'14	7691	6875	5514	9026	29106
Oct'14	8633	7725	6638	9640	32636
Nov'14	7589	6658	6280	9115	29642
Dec'14	6629	5204	5751	7577	25161
Jan'15	6646	5082	7192	8721	27641
Feb'15	7453	5742	7008	8553	28756
Mar'15	8689	5491	8357	9351	31888
Apr'15	9965	5113	8393	9052	32523
May'15	8811	4627	7281	8509	29228
Jun'15	7965	5145	7634	8721	29465
Jul'15	7581	5800	8257	8976	30614

# Number of EGC SafetyNET messages per month & OR



# Total number of EGC SafetyNET messages per year 2003-2014



# Other issues

## ➔ Contingency exercises

- It is a contingency process to be followed in the event of a payload outage of any Inmarsat-I3 satellite carrying Existing & Evolved (GMDSS) servicers and includes the actions to be taken by Inmarsat NOC and LESOs to recover services on a contingent satellite(s).
- GMDSS service restoration within one hour time
- Each OR has its own satellite contingency arrangement (procedure)
- More details including graphics will be provided to IMSO for further submission to the NCSR3

## ➔ NCSR3: new agenda item 13 - Interconnection of NAVTEX and Inmarsat SafetyNET receivers and their display on Integrated Navigation Display Systems (TBA)

## ➔ Satellite systems interoperability, NCSR2 final report refers

- Still not clear what it means, more clarification from IMO is required

## ➔ MSI monitoring (message from Chris of 18th May)

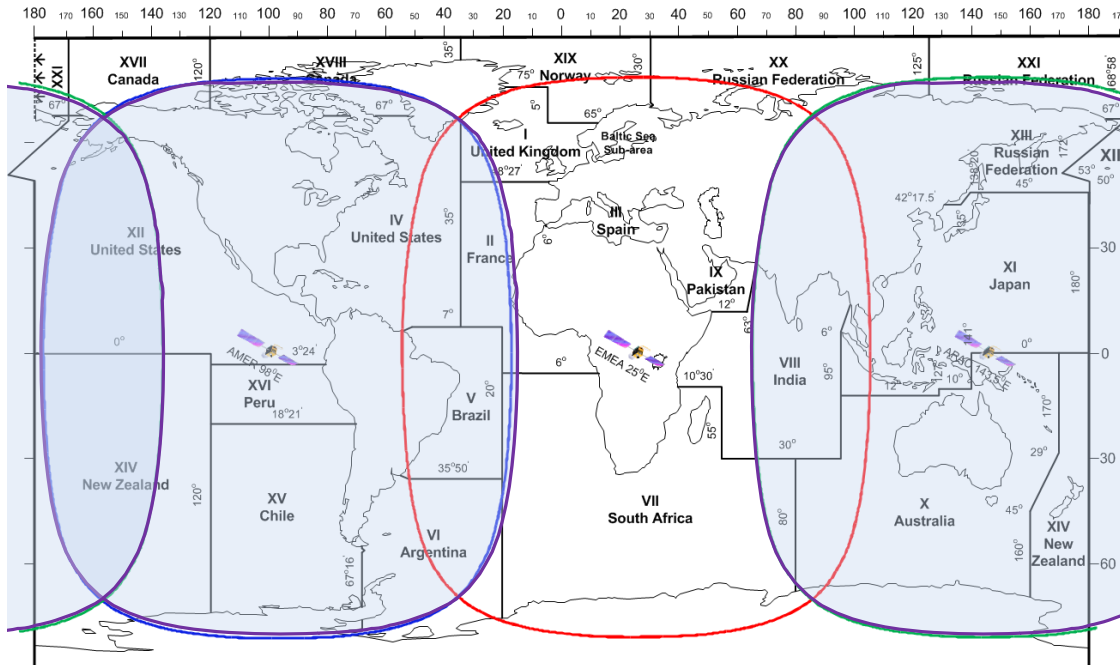
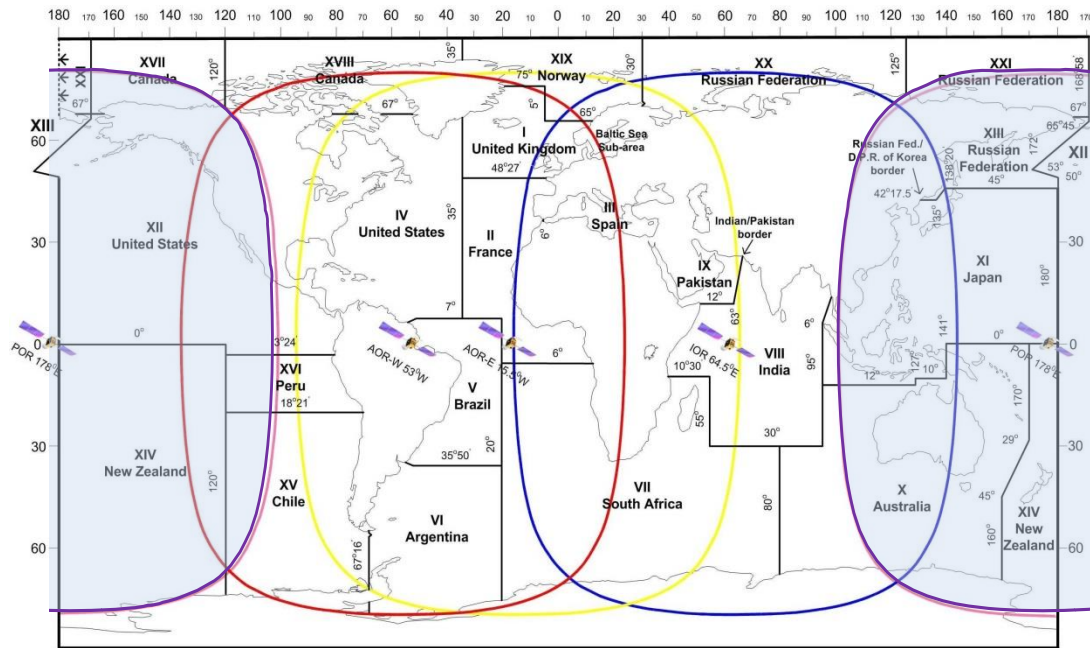
	NAME	SIGNATURE	DATE
AUTHOR	Jose Espinosa System Engineer Operations Engineering		
APPROVED	Elena Dimitrova Manager Network Operations Centre		
AUTHORISED FOR ISSUE	Claudio Galli Director Global Service Operations		

	CONTACT NAME	ADDRESS
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# Inmarsat's I-3 Primary Satellite Constellation

Contingency Real Exercise  
on POR satellite during lunar eclipse

**I3-F3 54W → I4-F1 (143.5E) and I4-F3 (98W)**



## Inmarsat's I-4 Satellite Constellation

Inmarsat C GMDSS services were transferred from I-3 POR satellite to I-4 APAC and AMER satellites during lunar eclipse and after that were returned back to the I-3 satellite



# FleetBroadband Specification



	FleetBroadband 500	FleetBroadband 250	FleetBroadband 150
<b>Antenna Diameter</b>	55 cm	32 cm	27 cm
<b>Antenna G/T* (at 5° elvn)</b>	-7 dB/K	-15 dB/K	-15 dB/K
<b>Antenna EIRP**</b>	22 dBW	15.1 dBW	15.1 dBW
<b>Antenna Type</b>	Directional/Stabilised	Directional/Stabilised	Directional/Stabilised
<b>Antenna Weight</b>	15-20 kg	3-5 kg	2-3 kg
<b>Voice</b>	4 kbps	4 kbps	4 kbps
<b>Standard IP</b>	Up to 432 kbps	Up to 284 kbps	Up to 150 kbps
<b>ISDN Data</b>	Yes	No	No
<b>IP Streaming</b>	32, 64, 128, 256 kbps	32, 64, 128 kbps	No

\* **Gain-to-noise-temperature** (G/T) is a characteristic of antenna performance, where G is the antenna gain in dB at the receive frequency and T is the equivalent noise temperature of the receiving system in K<sup>0</sup>

\*\* **Effective isotropically radiated power** (EIRP) is the amount of power that antenna would emit to produce the peak power density in the direction of maximum antenna gain

# 505 Emergency Calling service via FleetBroadband

**505**  
for FleetBroadband  
In an emergency  
call 505. You will  
be connected to a  
Maritime Rescue  
Coordination Centre  
**inmarsat**

- ➔ 505 Emergency Calling developed for FleetBroadband family of equipment – FB150, FB250 and FB500 in advance of GMDSS
- ➔ Three satellite regions give global coverage:
  - Americas @ 98°W
  - Europe/Middle East/Africa @ 25°E
  - Asia Pacific @ 143.5°E
- ➔ Dial 505
  - Short-code dialling to one of 3 strategically located RCCs
    - Automatic routing to RCC Den Helder (the Netherlands), RCC Norfolk (USCG) and RCC Australia
  - 505 Emergency Calling brings increased safety for all mariners using the same satellites as for the GMDSS
- ➔ **No Priority or pre-emption – Not a substitute for the GMDSS**
- ➔ No Charge for the service



# Voice distress and urgency on Inmarsat FB



- ➔ Introduced in July 2011 on T&T (Sailor) and JRC FB terminals and meet requirements of IMO A.1001(25) Resolution for priority and pre-emption
  - at present is not compliant with requirements of para 3.6 Restoration and spare satellites
- ➔ Services
  - Distress priority voice (non-SOLAS) ship-to-shore – initiated by pressing “SOS” button
    - automatic connection to one of three RCCs (Norfolk, Canberra, Den Helder)
  - Distress priority voice shore-to-ship – initiated by RCCs via two-stage dialling access and pin code
  - Urgency calls – in ship-to-shore direction and routing agreed with the RCCs
    - 32 – Medical advice
    - 38 – Medical assistance
    - 39 – Maritime assistance
  - Distress test
    - via Distress test mode and pressing SOS button
    - automatic connection to terrestrial network and audio announcement
- ➔ No charge for Distress and Urgency calls

# Why we need new safety data services on FB platform

- ➔ Existing services (text only) defined more than 25 years ago (!) and never been changed, modified or revised except Arctic NAV/METAREAs
- ➔ IMO/IHO/WMO may require new data type safety services, e.g. Weather charts, etc. subject to IMO GMDSS revision
- ➔ All Nav/Met services use the same C2 service codes (except Coastal warnings) and it is not possible to distinguish between these MSI
  - New services (will) use unique service codes
- ➔ Additional addressing is proposed
  - Sub-areas and Fixed areas
- ➔ “Pull” archive MSI from ships (NAV/MET services only)
- ➔ Need for “on air” software upgrade for EGC configuration
- ➔ IMO requirement for standard user interface (COMSAR 15/INF.3 “Scoping exercise...”)
- ➔ RCCs may require acknowledgement on reception of P3 & P2 SAR related MSI
- ➔ Distress alert – new data fields for Nature of Distress (MOB), number persons on board and list of RCCs
- ➔ Distress Chat and Surface Picture services for RCCs (SAR services only)

# Maritime Safety Data Services (MSDS) via Maritime Safety Server (MSS)

- ➔ Provide promulgation of MSI and SAR related information
  - Promulgation of MSI & SAR related information (D/U/S) – SafetyNET “Mark2”
  - Retrieval archived MSI by ships with MB safety terminals (under development)
- ➔ Provide SAR services (mobile terminals under development)
  - Distress alerting and Distress priority messaging (Ship-to-Shore)
  - Ship-to-Shore Urgency priority messaging (SAC 32/38/39)
  - Ship-to-Shore Safety priority messaging (SAC 41/42/43)
  - Distress priority “Chat” originated by SAR authorities
  - Surface picture of ships with FB terminals for RCCs
- ➔ Promulgation of MSI & SAR related information using MSS is under development and trial
  - Web registered service with no additional software and hardware
  - MSIPs and MRCCs are welcome to participate
  - Service is free now for test and for practical promulgation of MSI and SAR information
- ➔ Feed-back and comments are required for MSDS s/w upgrade



## MSS participants as of 17/8/15

<u>Authority</u>	<u>Login assigned</u>	<u>Trial</u>
New Zealand RCC	X	X
New Zealand MOC	X	X
NAVAREA I – UK HO	X	X
METAREA I Coordinator - UK Met Office	X	
NAVAREA IV and XII Coordinator – US	X	
METAREA XVII Coordinator – Canada	X	
Den Helder RCC	X	
Stavanger RCC	X	
RCC Australia	X	
RCC Norfolk	X	
MRCC Brazil	X	
MRCC Japan	X	
Hong Kong SAR	X	

# Definition of EGC SafetyNET Service Codes (as in the IMO Manual)

Service Code	Navigational information (5 services)	Meteorological information (4 services)	Search and Rescue (SAR) (4 services)	Piracy countermeasures broadcast (4 services)
<b>00</b>			All ships call	
<b>04</b>	Navigational, Meteorological or Piracy warning to a rectangular area	Navigational, Meteorological or Piracy warning to a rectangular area		Navigational, Meteorological or Piracy warning to a rectangular area
<b>13</b>	Navigational, Meteorological or Piracy coastal warning	Navigational, Meteorological or Piracy coastal warning		Navigational, Meteorological or Piracy coastal warning
<b>14</b>			Shore-to-ship distress alerts to a circular area	
<b>24</b>	Navigational, Meteorological or Piracy warning to a circular area	Navigational, Meteorological or Piracy warning to a circular area		Navigational, Meteorological or Piracy warning to a circular area
<b>31</b>	NAVAREA/METAREA warning, MET forecast or Piracy warning to NAVAREA/METAREA	NAVAREA/METAREA warning, MET forecast or Piracy warning to NAVAREA/METAREA		NAVAREA/METAREA warning, MET forecast or Piracy warning to NAVAREA/METAREA
<b>34</b>			SAR coordination to rectangular area	
<b>44</b>			SAR coordination to circular area	
<b>73</b>	Chart correction service to fixed areas – Not available			

*C2 = 04, 13, 24 and 31 are services for NAV, MET and Piracy MSI*

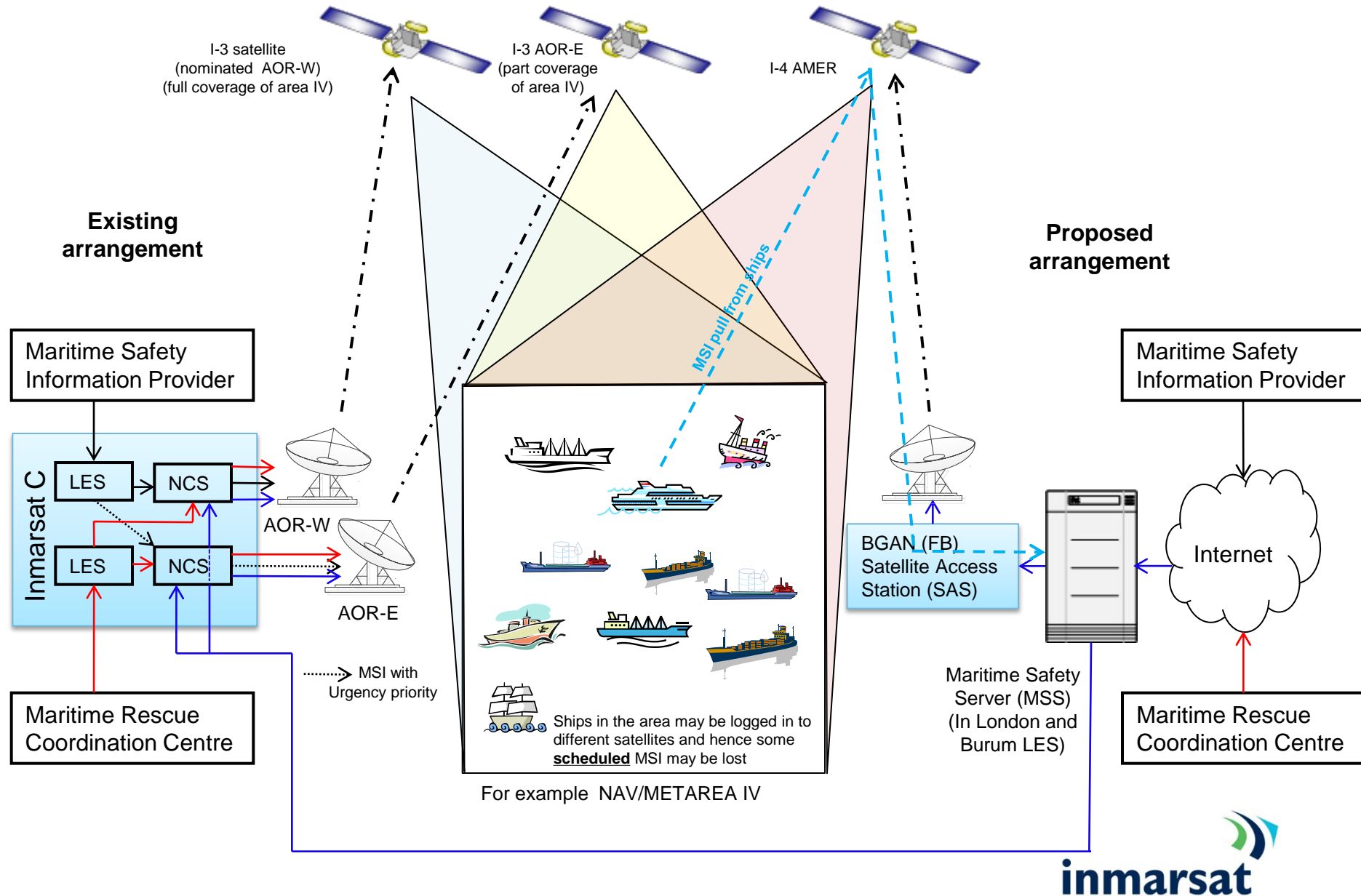
# MSDS codes and routing to Inmarsat-C MESs

MSI Type	MSDS C2 Service Code	Service Name*	C3 Address *	Relevant Inm-C C2 Service Codes**
Navigational	51	NAVAREA warnings	2 digits NAVAREA number (01-21)	31
	52	Navigational warnings	Circular, Rectangular, (Sub-area, Fixed area)	24 04
	53	International Ice patrol warnings	Circular, Rectangular	24 04
	54	Piracy and Armed robbery warnings	Circular, Rectangular	24 04
	13	Coastal warnings (type A, C, F, G, H, J, K, L, Z)	Coastal addressing	13
Meteorological	61	METAREA warnings	2-digit METAREA number (01-21)	31
	62	Meteorological warnings	Circular, Rectangular, (Sub-area, Fixed area)	24 04
	63	Storm and Tropical warnings	Circular, Rectangular, (Sub-area, Fixed area)	24 04
	13	Coastal warnings (type B, E, Z)	Coastal addressing	13
SAR	00	All Ships call	00 only	00
	14	Shore-to-Ship Distress alert	Circular	14
	34	SAR coordination to rectangular area	Rectangular	34
	44	SAR coordination to circular area	Circular	44
	13	Coastal warnings (type D, Z)	Coastal addressing	13

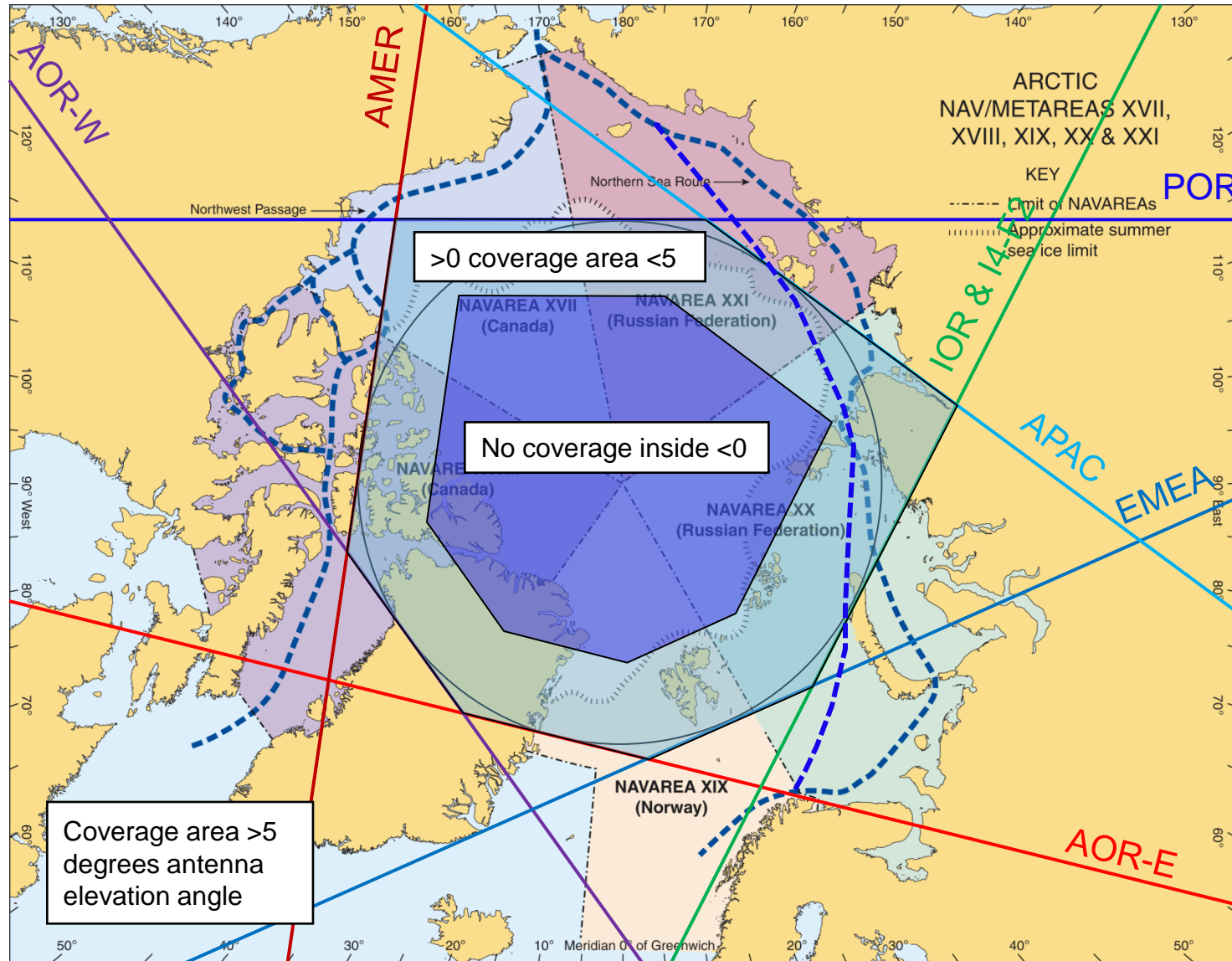
\* Subject to further changes on the MSDS Mark2 upon feed-back from MSIPs and SAR authorities

\*\* Codes “translated” by the MSS

# MSI and SAR info submission via Inmarsat C and FB routes



## Inmarsat I-3 and I-4 coverage in the Arctic





A background image of a sunset over the ocean. The sun is low on the horizon, casting a bright orange and yellow glow across the sky. Several small, dark clouds are scattered across the sky. The ocean surface is visible in the foreground, with a white wake from a ship extending from the bottom center towards the horizon. On the right side, a vertical white pole or mast is visible.

# Thank you

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