# Status of the EGC SafetyNET, Inmarsat Maritime Safety Services today and tomorrow

**WWNWS-3 Meeting**
**Monaco**
**13-16 September 2011**

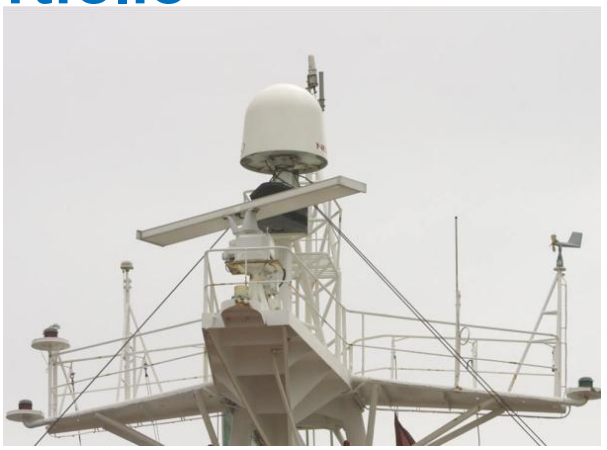
**Vladimir Maksimov**

Manager, Maritime Safety Operations

Maritime Safety Services Department

# The Core Maritime Safety Portfolio

- More than 235,000 maritime terminals in service
- More than 143,000 Inmarsat C / mini-C terminals
- Inmarsat B and Fleet F77 also provide safety services
- “505” emergency service on all FleetBroadband terminals – FB500, FB250 and FB150
- Distress and Urgency voice calls on T&T FB terminals
- GMDSS compliance
  - Inmarsat C is the only conventional satellite system required by IMO SOLAS Convention, Chapter IV “Radiocommunications”.
  - Inmarsat B - voice distress, the system will be closed down on 31 December 2014
  - Inmarsat Fleet F77 – voice distress with pre-emption and prioritisation in ship-to-shore and shore-to-ship direction





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

178 mm
Antenna

0.9 Kg, 122 mm

**Above deck equipment**

**Below deck equipment**

Transceiver
(with GPS) 1.3 Kg

Printer (required for SOLAS compliant vessels)

Messaging unit

Distress Button
and signalling box


145 mm
(without pole)
Antenna,
Transceiver, GPS
(single unit for some models)

1.1 Kg (without pole), 170 mm

Junction box

Messaging unit

Distress button
(if service is supported by the model)

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

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# Inmarsat C/Mini-C characteristics and services


Antenna Messaging unit Transceiver (with GPS) Distress button Printer

- Global coverage (between 76º North and 76º South under 5º 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 88,000 Maritime Inmarsat C and 55,000 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)

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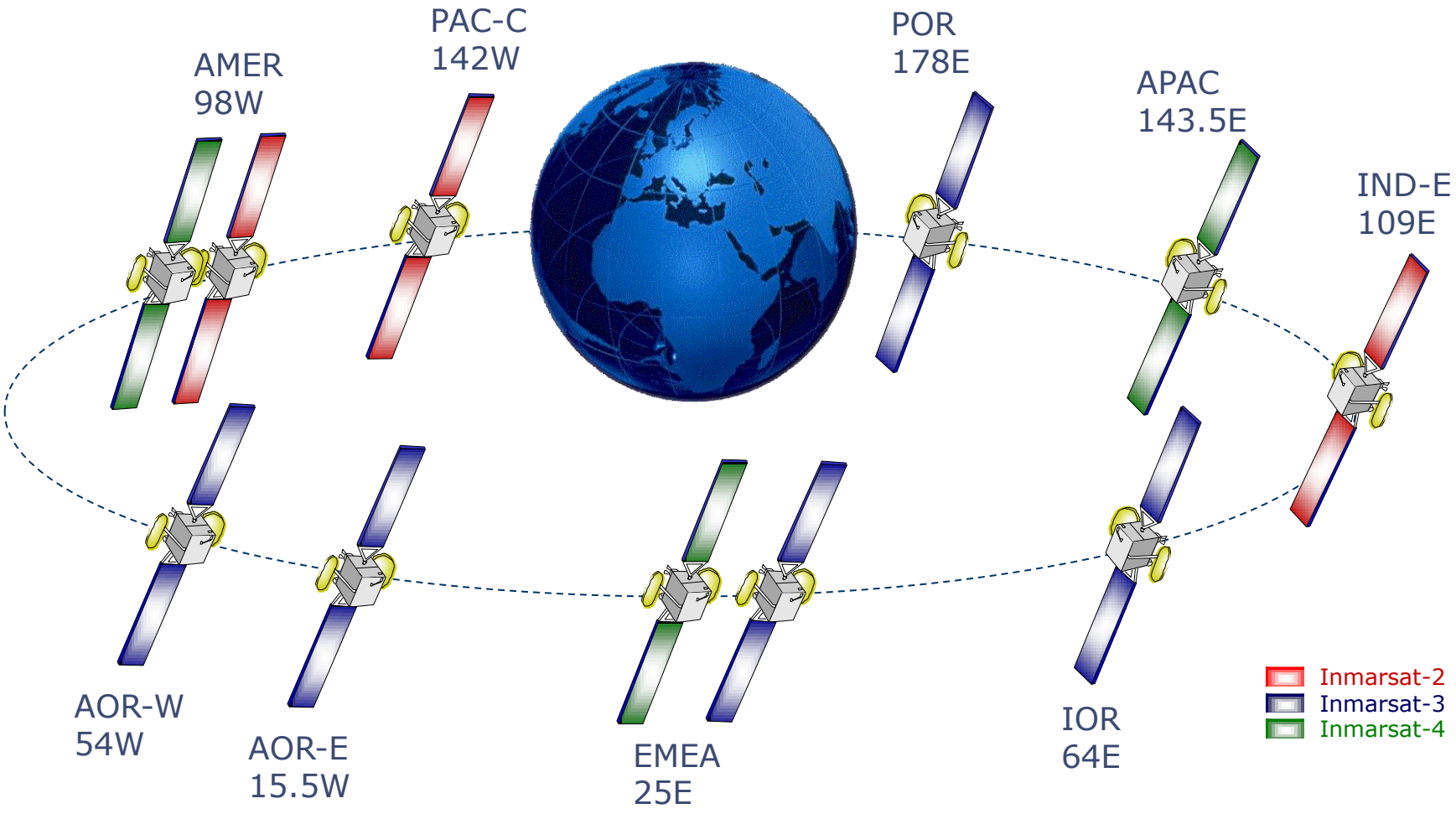
# Inmarsat's Satellite Constellation

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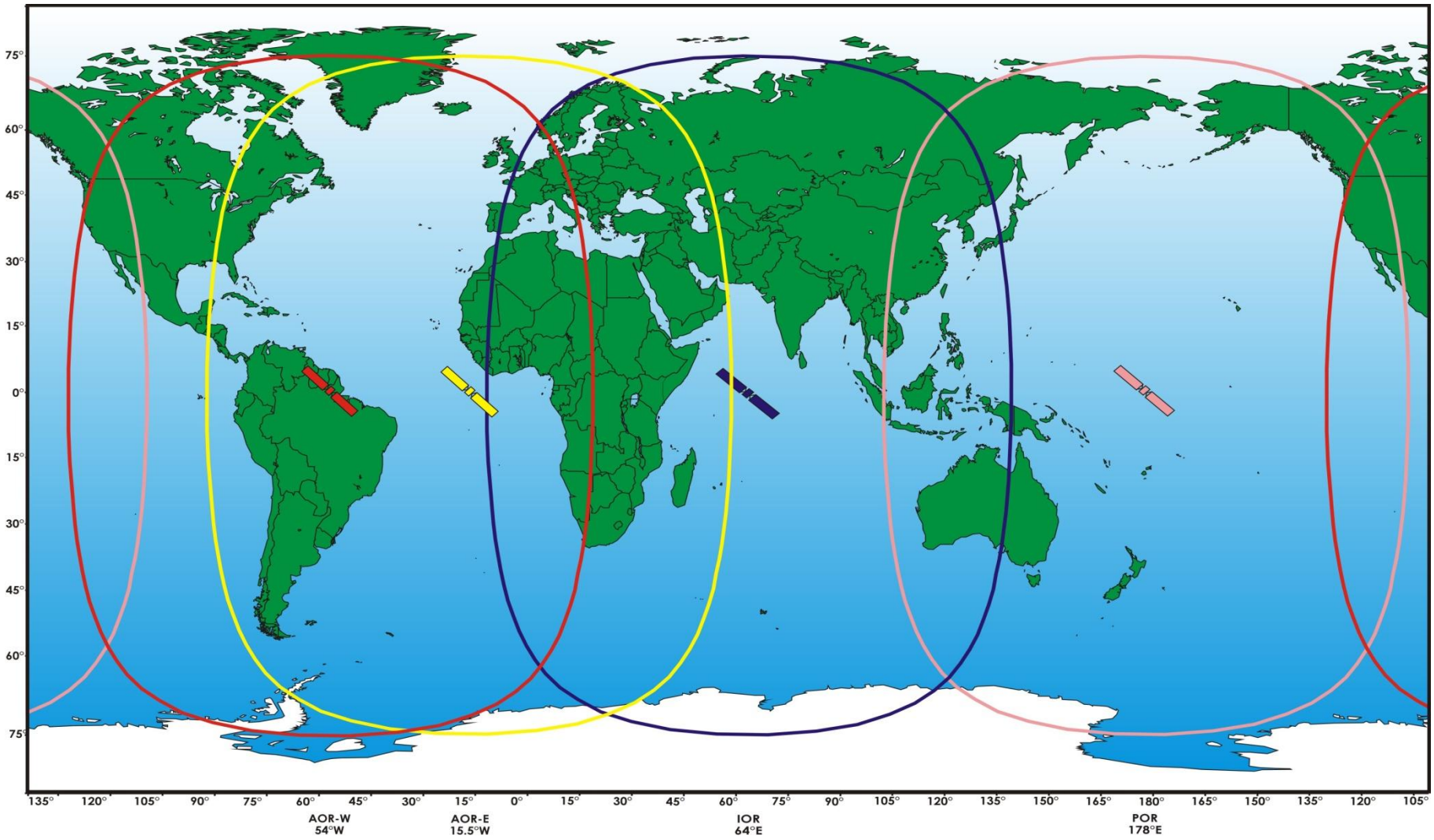
# Inmarsat's Primary Satellite Constellation




For Existing and Evolved Services

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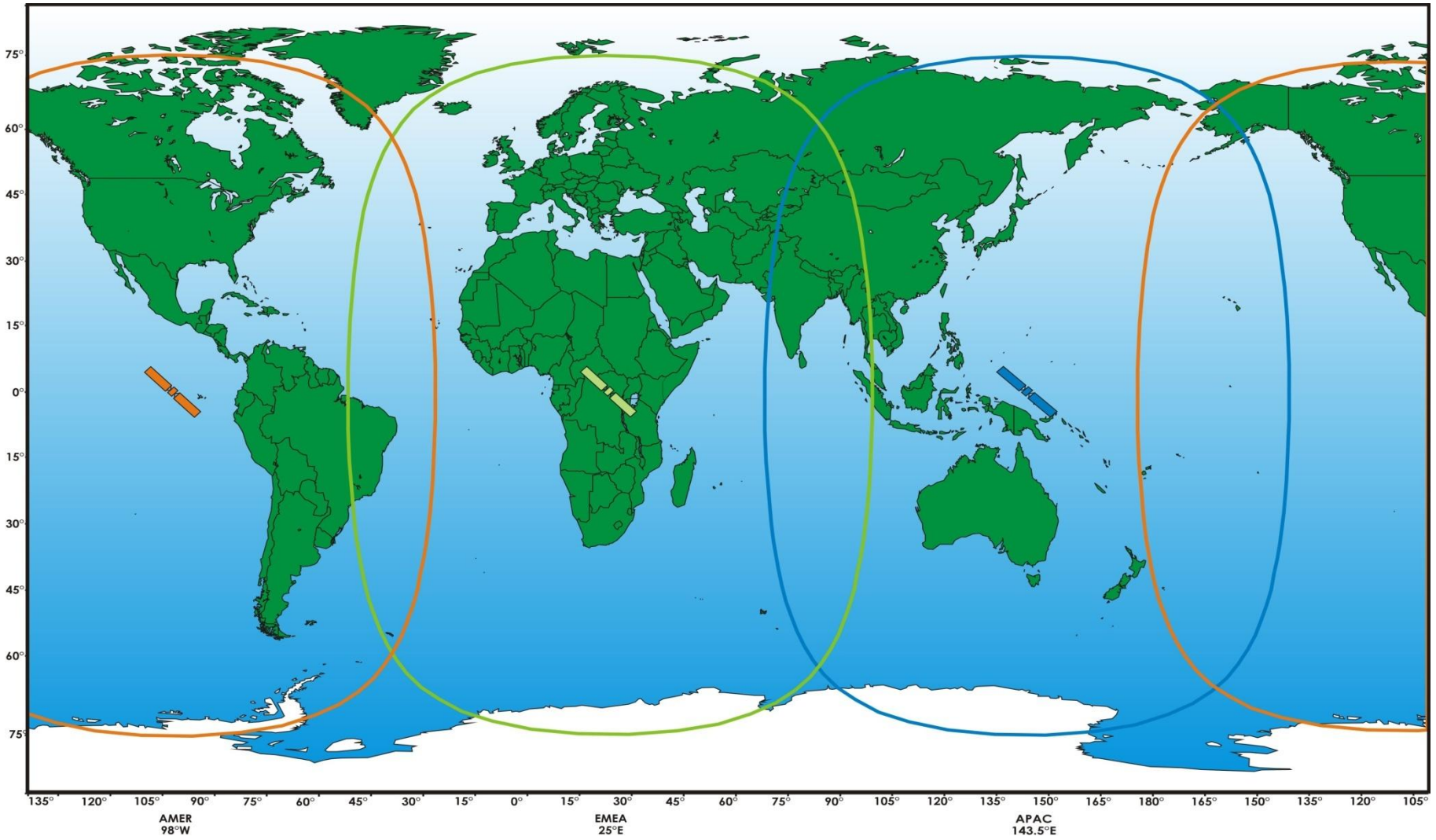
# Inmarsat's I4 Satellite Constellation




For all Broadband Services

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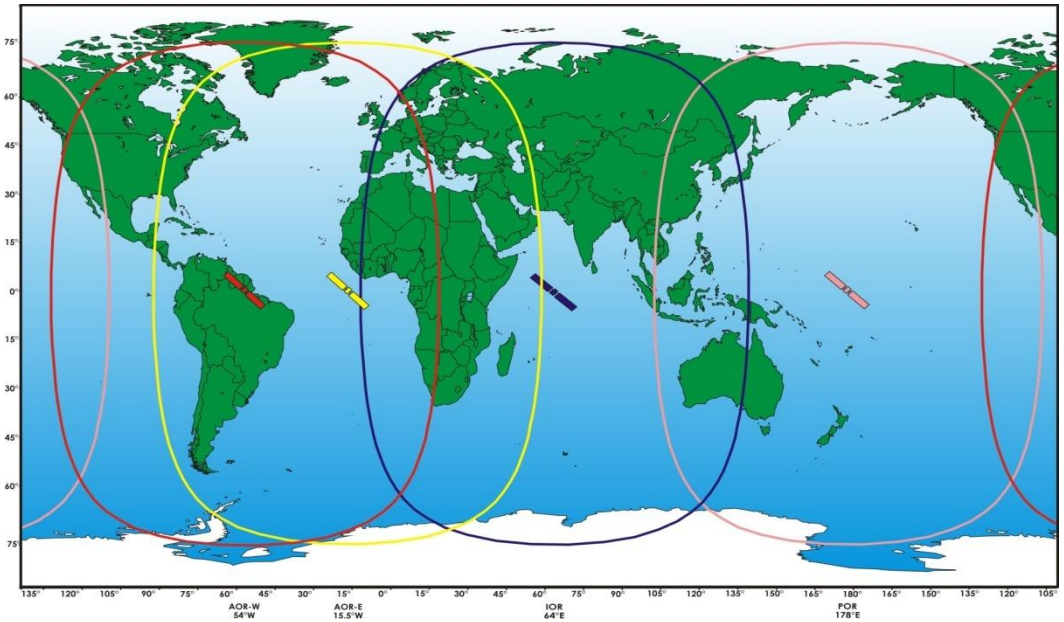
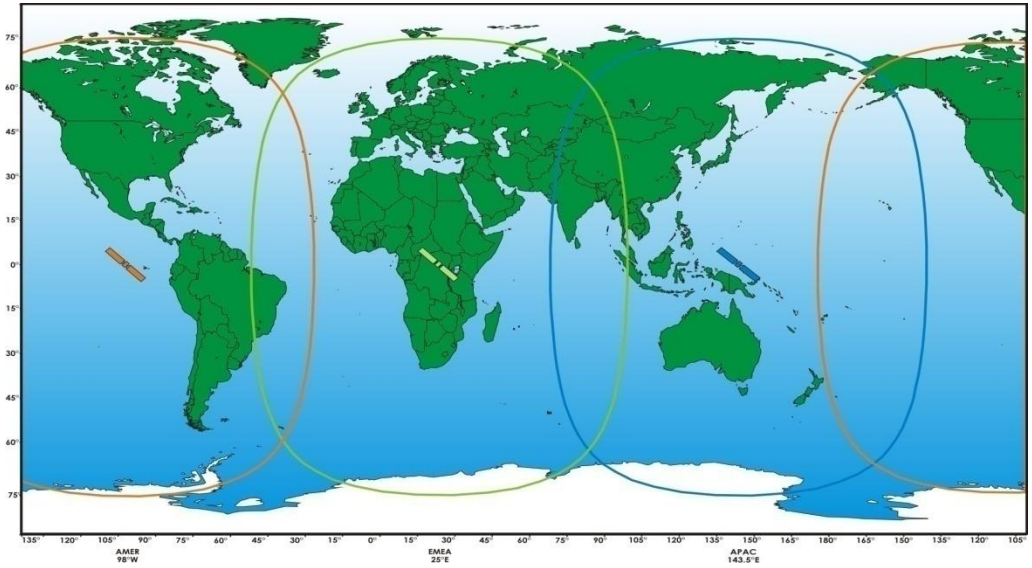
# Inmarsat's I-3 Primary Satellite Constellation

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

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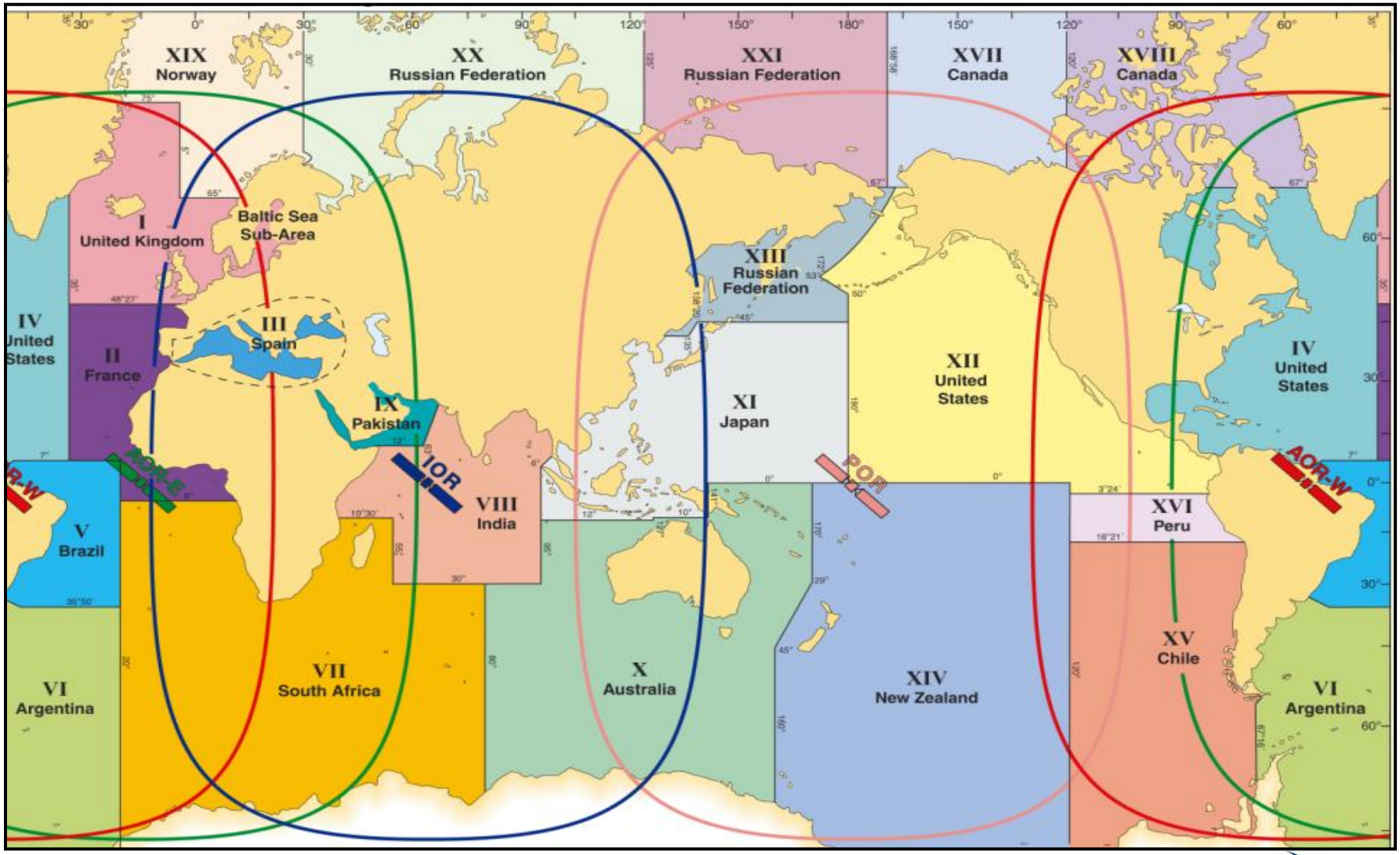
# IMO NAVAREAs/METAREAs incl. new Arctic areas

**(with Inmarsat coverage)**

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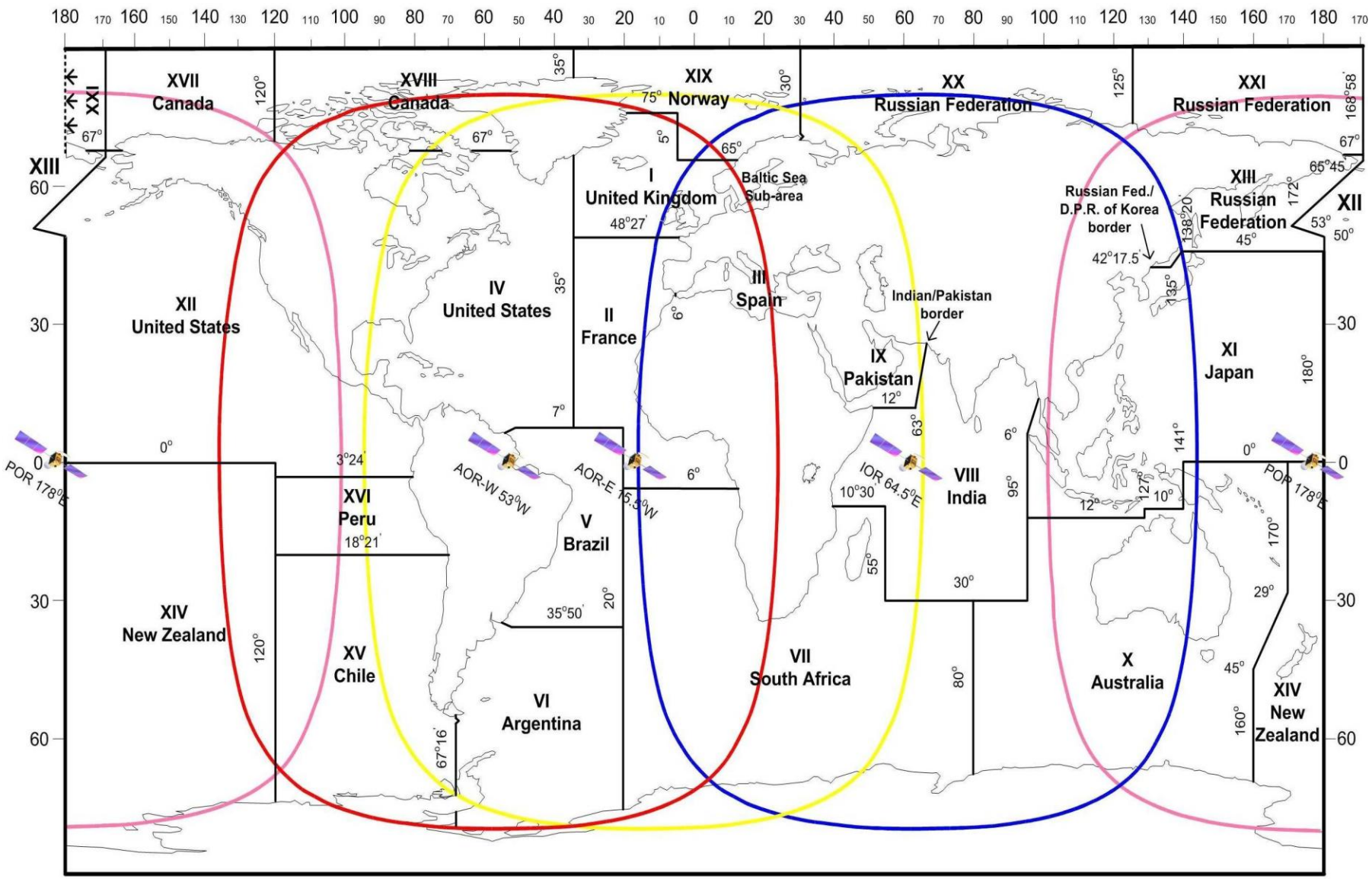
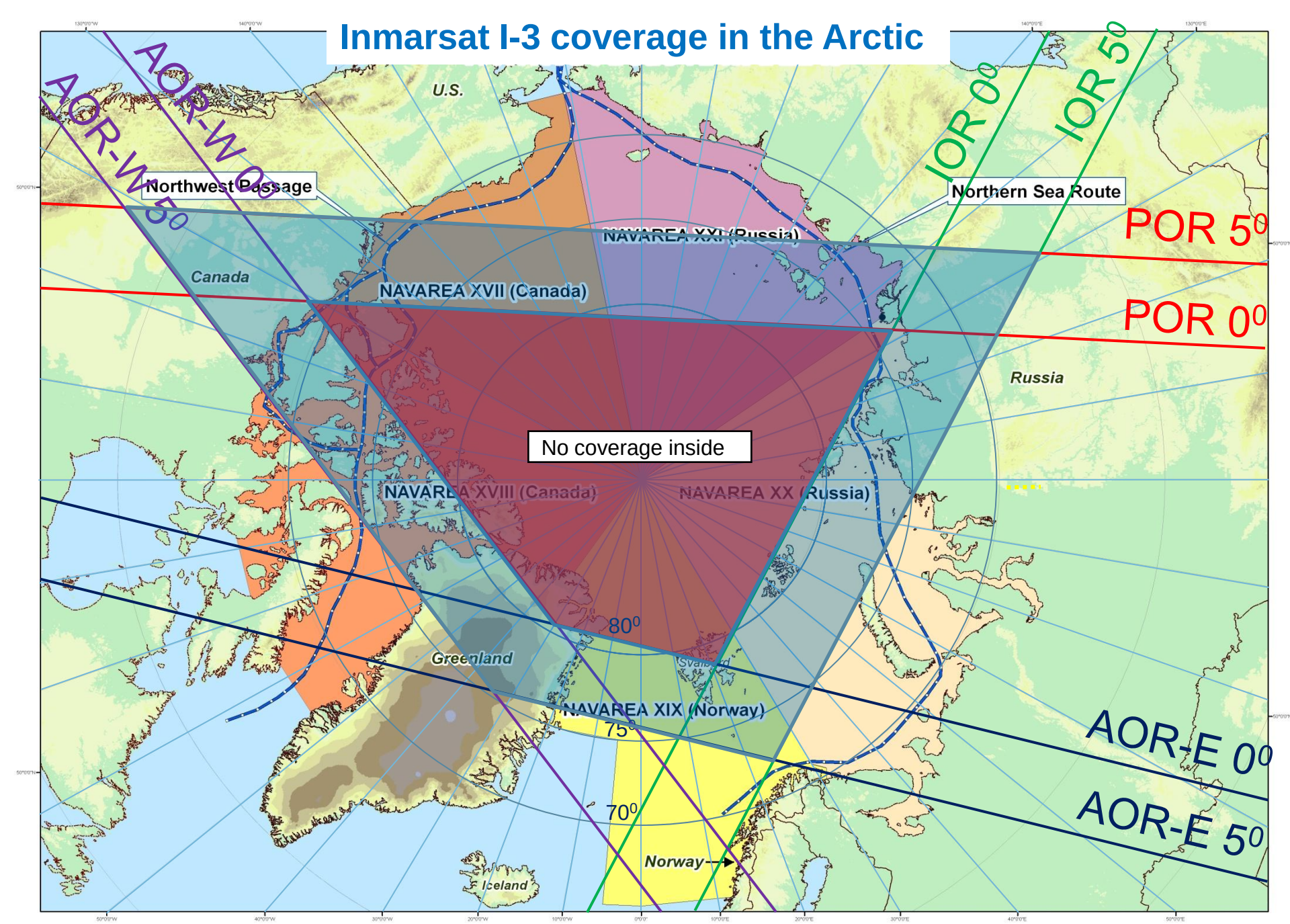
# NAVAREAs/METAREAs



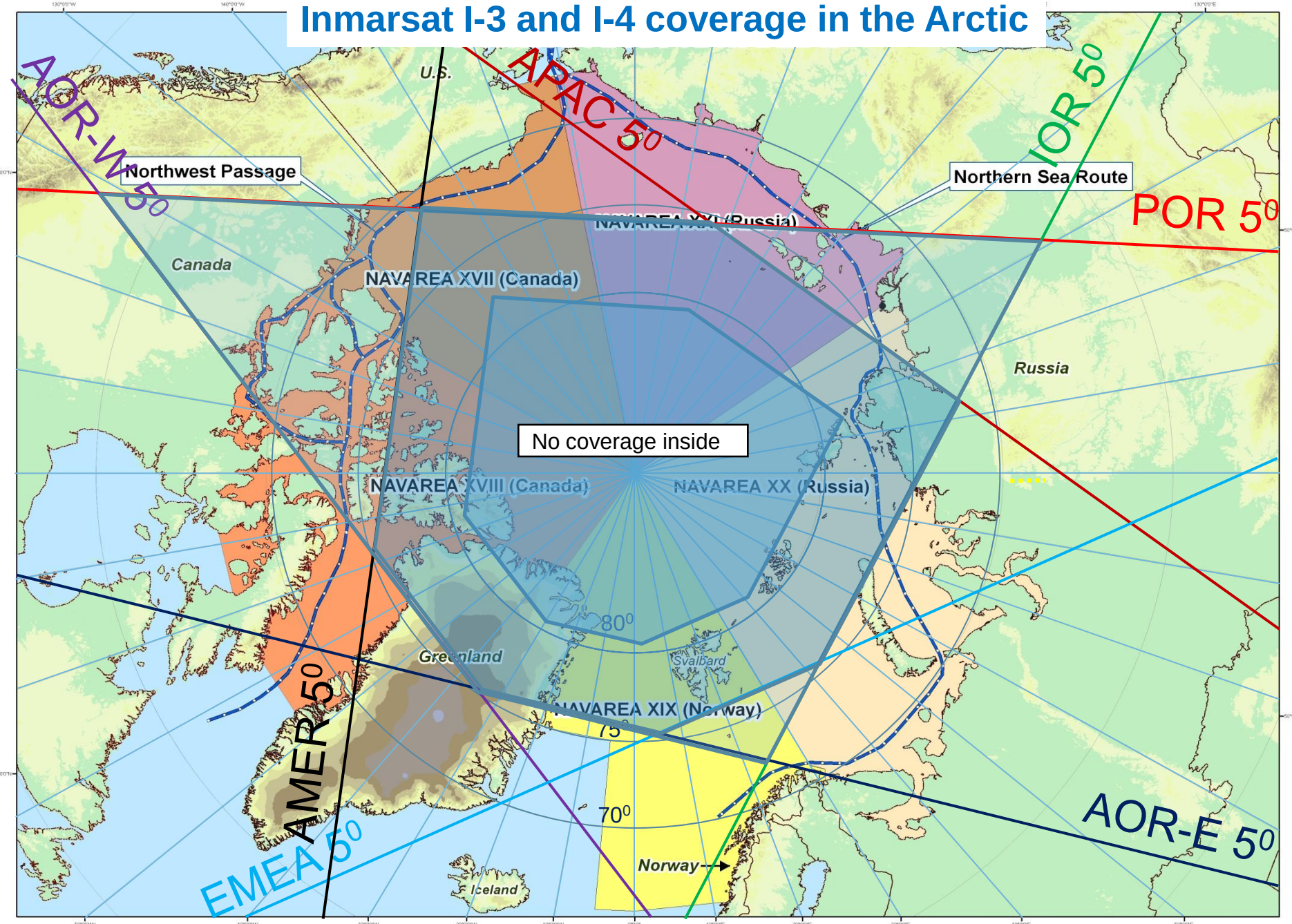

GMDSS NAVAREAs/METAREAs with Inmarsat coverage

# Inmarsat I-3 coverage in the Arctic



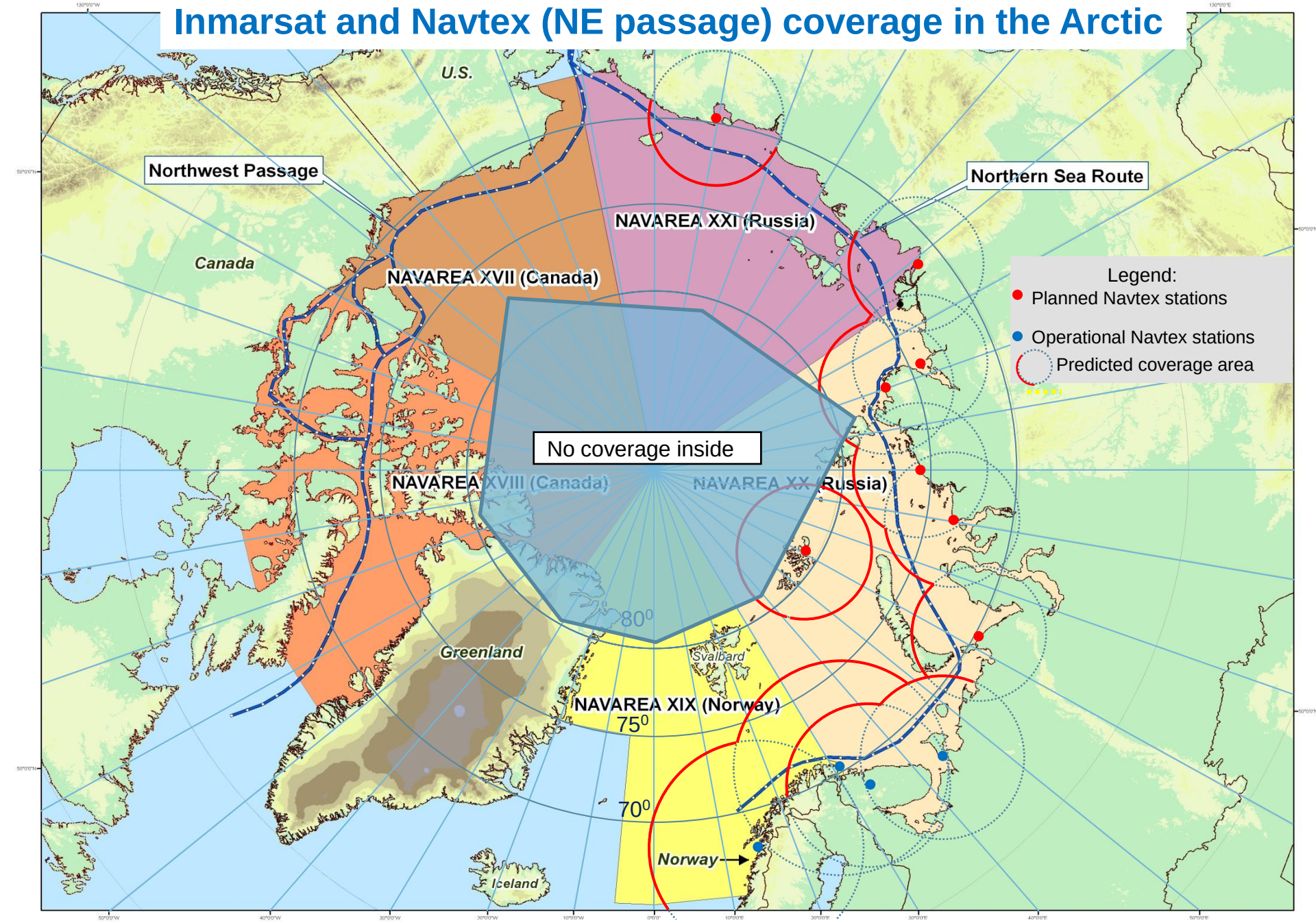

Base chart is provided by the Chairman of the IHO WWNWS-SC

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




Base chart is provided by the Chairman of the IHO WWNWS-SC

# Inmarsat and Navtex (NE passage) coverage in the Arctic




Base chart is provided by the Chairman of the IHO WWNWS-SC

# 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 will be closed down on the 31 December 2014

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# 505 Emergency Calling service via FleetBroadband

505
for FleetBroadband
In an emergency call 505. You will be connected to a Maritime Rescue Coordination Centre
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- 505 Emergency Calling developed for FleetBroadband family of equipment – FB150, FB250 and FB500 in advance of GMDSS
- Three satellite regions give global coverage:
  - Americas @ 98ºW
  - Europe/Middle East/Africa @ 25ºE
  - Asia Pacific @ 143.5ºE
- Dial 505
  - Short-code dialling to one of 3 strategically located RCCs
    - Automatic routeing 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


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# 505 Emergency Calling for FleetBroadband

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In an emergency, call **505** and press either the ☎ or # key on the handset. You will be connected to a Maritime Rescue Coordination Centre.

**Speak slowly and clearly and provide the following information:**

**Who you are:** vessel name, telephone number and callsign

**Where you are:** your position in latitude and longitude or a bearing and distance from a known geographical point

**What is wrong:** nature of emergency or difficulty

**Type** of assistance required

**Number** of persons on board

**Please do not abuse this service. Only use 505 if you need urgent assistance.**
Please note that 505 Emergency Calling is **not** GMDSS compliant.

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

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# FleetBroadband – New generation of maritime services from Inmarsat

FleetBroadband is part of broadband (BGAN) family of services based on 3G network technology and operated over Inmarsat I4 (4th generation) satellites since Nov 2007.

The traffic is grounded at Inmarsat Satellite Access Stations (SASs) – 3 ocean regions

Maritime portfolio – FB500, FB250, FB150

- Standard IP data (up to 432kbps)
- Voice (accessible simultaneously with data via a single terminal) and fax
- Streaming IP with guaranteed data rates on-demand
- ISDN for Voice & Data
- Distress voice on T&T MESs

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# FleetBroadband Specification




| | FleetBroadband 500 | FleetBroadband 250 | FleetBroadband 150 |
|---|---|---|---|
| **Antenna Diameter** | 55 cm | 32 cm | 27 cm |
| **Antenna G/T* (at $5^0$ elvn)** | -7 dB/K | -15 dB/K | -15 dB/K |
| **Antenna EIRP**** | 22 dBW | 15.1 dBW | 15.1 dBW |
| **Antenna Type** | Directional/Stabilised | Directional/Stabilised | Directional/Stabilised |
| **Antenna Target Weight** | 15-20 kg | 3-5 kg | 2-3 kg |
| **Voice** | 4 kbps | 4 kbps | 4 kbps |
| **Standard IP** | Up to 432 kbps | Up to 284 kbps | Up to 150 kbps |
| **ISDN Data** | Yes | No | No |
| **IP Streaming** | 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 $K^0$

**** 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

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# Into The Future

- GMDSS continues on Inmarsat B, Inmarsat C/mini-C and Fleet F77
- Inmarsat B
  - Ageing equipment – no longer manufactured
  - Modern equipment requires better spectrum efficiency
  - Service retirement 31st December 2014 – COMSAR 14/INF.6
- GMDSS planning for FleetBroadband (FB)
  - Aim initially to provide similar service as Fleet 77 and Inmarsat–C implemented on T&T MESs (non-SOLAS distress voice)
  - Two phases approach
    - 1 - Maritime Safety Voice Services with 4 priorities and prioritisation in ship-to-shore and shore-to-ship direction - implemented on T&T MESs (non-SOLAS distress voice)
    - 2 - Maritime Safety Data Services
- IsatPhone Pro launched in June 2010
- FleetPhone launched in July 2011

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# Voice distress on Inmarsat FB


- Introduced in July 2011 on any T&T FB terminal 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
- Charging for Distress and Urgency calls
    - no charge for Distress calls in ship-to-shore and shore-to-ship direction
    - no charge for Urgency calls in ship-to-shore direction

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# IsatPhone Pro


- The first Inmarsat global handheld
- Purpose-built for the Inmarsat network
- Optimised to give the best performance on Inmarsat satellites
- Services
  - Satellite telephony
  - Voicemail
  - Text and e-mail messaging
    - Text-to-text
    - Text-to-email
    - Web message-to-IsatPhone
- GPS location data
- Bluetooth for hands-free use

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# FleetPhone overview and services

- Maritime satellite telephony with global Inmarsat coverage via I4 satellites (2 models)
- Voicemail
- Text and email messaging
  - Text-to-text
  - Text-to-email
  - Free web message-to-FleetPhone
  - GPS look-up-and-send
    - Position reporting/tracking
- 2.4kbps circuit-switched data
- 505 Emergency Calling
  - from Oceana 800 only
- An option for migration of maritime Mini M and SPS FleetPhone
- Network has an expected operational life well into 2020s


**Oceana 400**


**Oceana 800**

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# FleetPhone features summary

| Features | Oceana 800 | Oceana 400 |
|---|---|---|
| Environmental specs | IP 54 (dust/shower proof) | IP53 (dust/splash proof) |
| Marine antenna | Yes | Yes |
| SIM operation | Built-in plus additional exterior SIM slot | Built-in SIM slot |
| RJ11 connection | Yes | Yes |
| Integrated privacy handset | Yes | No |
| Speaker Phone Operation | Yes | No |
| LCD display | Yes | No – LEDs only |
| Integrated keypad | Yes | No |
| Languages supported | English, Arabic, Spanish, French, Japanese, Portuguese, Russian, Chinese | English |
| Tracking | Via SMS/SMS to email messages | No |
| 'Instant Message' | Via SMS/SMS to email messages | No |
| Supports '505' calling | Yes | No |



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# Into The Future (data services)

- Planning for GMDSS on FB Maritime Safety Data Services
  - In first stages of development
  - Expected to accommodate all current and expected GMDSS data requirements
    - All current Inmarsat C safety type functions
      - Distress alerting/messaging
      - “EGC SafetyNET” functions based on a new idea/services (and technology) of promulgating MSI
    - Future innovative maritime safety and security services/applications, e.g. weather charts, notice to mariners, e-nav applications, etc.
    - Simultaneous MSI submission via Inmarsat-C and FB using Maritime safety server
  - Need feedback from IMO/WMO/IHO/IMSO, etc. on what future requirements for Maritime safety services will be (list of questions)

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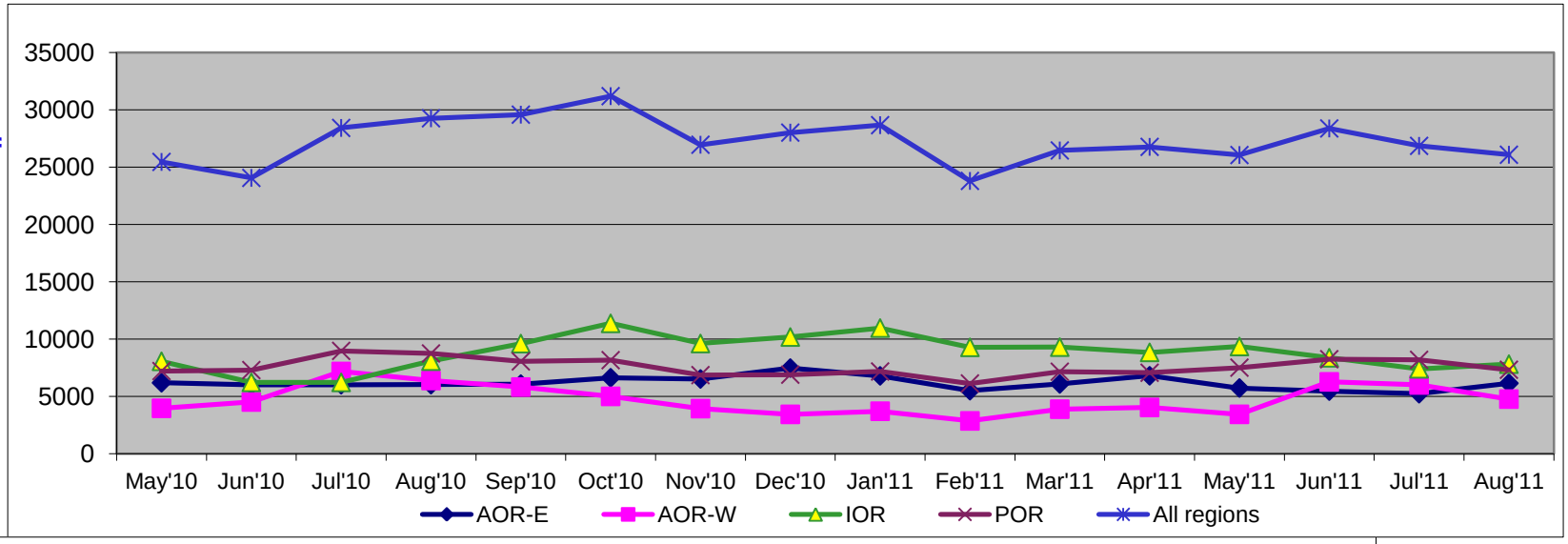
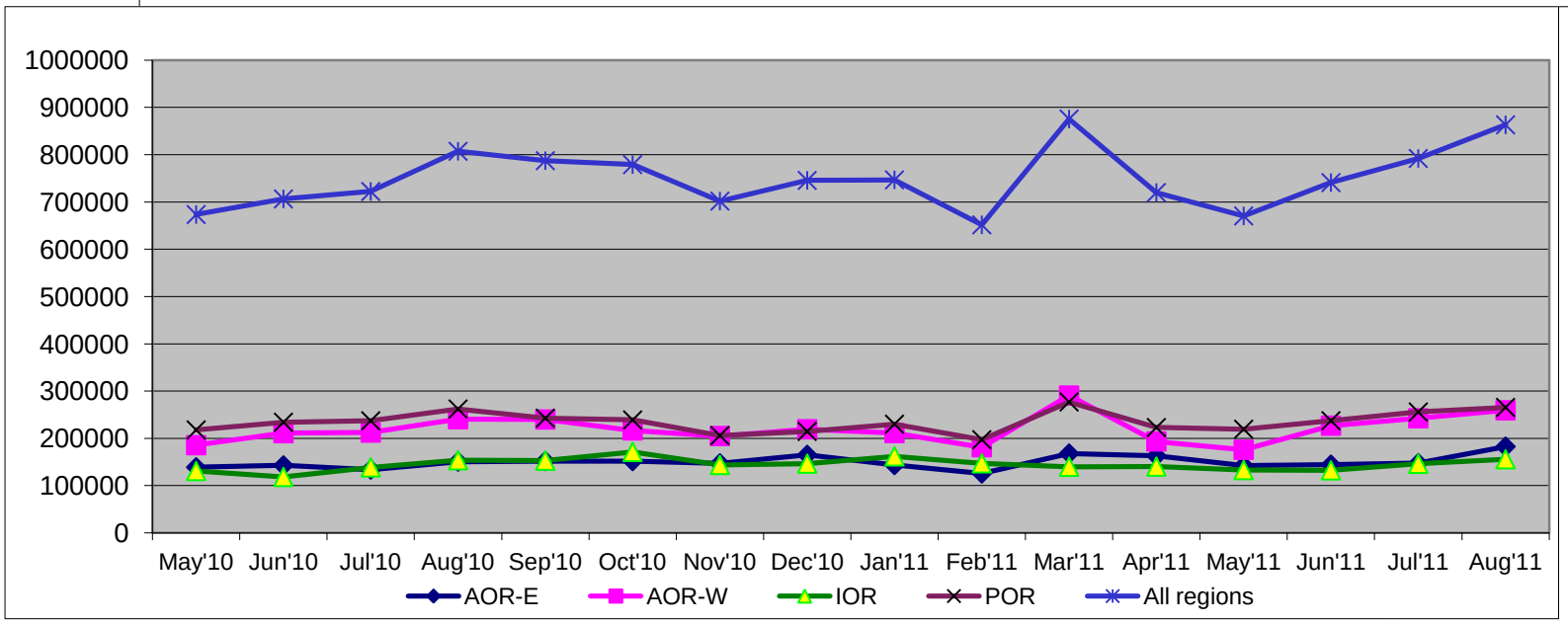
# Number and size of EGC SafetyNET messages per ocean region

**Number of messages per month**




**Size of messages per month in number of 32-bytes units**

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# 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) |
|---|---|---|---|---|
| **00** | | | All ships call | |
| **04** | 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 |
| **13** | Navigational, Meteorological or Piracy coastal warning | Navigational, Meteorological or Piracy coastal warning | | Navigational, Meteorological or Piracy coastal warning |
| **14** | | | Shore-to-ship distress alerts to a circular area | |
| **24** | 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 |
| **31** | 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 |
| **34** | | | SAR coordination to rectangular area | |
| **44** | | | SAR coordination to circular area | |
| **73** | Chart correction service to fixed areas – Not available | | | |
| **21** | | Weather graphical service - Not available | | |

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

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# Existing (Inm-C) and proposed (FB) Navigational services

| C2 Service code | Existing Type of service | C2 Service code | Proposed Type of service |
|---|---|---|---|
| **04** | Navigational, Meteorological or Piracy warning to a rectangular area | **21 → 31** | Navarea Warnings addressed to NAVAREA |
| **13** | Navigational, Meteorological or Piracy coastal warning | **22 → 04, 24** | Navigational warnings addressed to Circular or Rectangular area, Sub-area or Fixed area |
| **24** | Navigational, Meteorological or Piracy warning to a circular area | **23 → 04, 24** | International Ice Patrol warnings addressed to Circular or Rectangular area |
| **31** | NAVAREA/METAREA warning, MET forecast or Piracy warning to NAVAREA/METAREA | **24 → 04, 24** | Piracy and armed robbery warnings addressed to Circular or Rectangular area |
| **73** | Chart correction service to fixed areas – Not available | **25 → ???** | Chart correction service addressed to ??? |
| | | **31 → 13** | Coastal warning addressed to coastal warning areas (B2 = A, C, … L) |
| | | | |

Numbering for proposed C2-codes TBD



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# Existing (Inm-C) and proposed (FB) Meteorological services

| C2 Service code | Existing Type of service (same as for Navigational services) | C2 Service code | Proposed Type of service |
|---|---|---|---|
| **04** | Navigational, Meteorological or Piracy warning to a rectangular area | **11 → 31** | Metarea Warnings or forecasts addressed to METAREA |
| **13** | Navigational, Meteorological or Piracy coastal warning | **12 → 04, 24** | Meteorological warnings or forecasts addressed to Circular or Rectangular area, Sub-area or Fixed area |
| **24** | Navigational, Meteorological or Piracy warning to a circular area | **13 → 04, 24** | Storm warnings addressed to Circular or Rectangular area, Sub-area or Fixed area |
| **31** | NAVAREA/METAREA warning, MET forecast or Piracy warning to NAVAREA/METAREA | **14 → 04, 24** | Tropical warnings addressed to Circular or Rectangular area, Sub-area or Fixed area |
| | | **15 → 04, 24** | Tsunami warnings addressed to Circular or Rectangular area, Sub-area or Fixed area |
| | | **31 → 13** | Coastal warning addressed to coastal warning areas (B2 = B, D, E) |
| | | **???** | Weather Charts addressed to METAREA, fixed area ??? |

Numbering for proposed C2-codes TBD



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# Existing (Inm-C) and proposed (FB) SAR services

| C2 Service code | Existing Type of service (same as for Navigational services) | C2 Service code | Proposed Type of service |
|---|---|---|---|
| **00** | General (All Ships) call to an ocean area | **42 → 00** | General (All Ships) call to an ocean area |
| **14** | Shore-to-Ship distress alerts to circular area | **41 → 14** | Shore-to-Ship distress alerts to circular area |
| **34** | SAR Coordination to Rectangular area | **43 → 34** | SAR Coordination to Rectangular area |
| **44** | SAR Coordination to Circular area | **44 → 44** | SAR Coordination to Circular area |
| | | | ??? |

Numbering for proposed C2-codes TBD



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# Other proposed services (TBD)

| C2 Service code | Other Urgent Safety Related information | C2 Service code | Security Information |
|---|---|---|---|
| ? | Weather charts (already covered for meteorological services) | ? | SSAS relay messages |
| ? | Electronic chart corrections | ? | ??? |
| ? | Notice to mariners, ECDIS display info | | |
| ? | ??? | | |

# MSI priorities - existing and proposed

- Same priorities for new service
  - P1 - Safety
  - P2 - Urgency
  - P3 - Distress
- Allocation and use is regulated by IMO publications (MSI providers)
  - Same as for existing servicers
- P1 - Safety priority MSI will be broadcast as existing MSI
  - 85-92% of total traffic
- P2 - Urgency priority MSI may be broadcast/unicast with (possible) confirmation back from ships if required by MSI provider (TBD)
  - 5-10% of total traffic
- P3 - Distress priority MSI (mainly SAR coordinatgion and Distress alerts) may be unicast with (possible) confirmation back from ships if required by MSI provider (TBD)
  - 3-5% of total traffic
  - technology for all priorities - TBC

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# MSI addressing – existing (Inm-C) and proposed (FB)

- Existing addressing
  - NAVAREA/METAREA (fixed) - 00-99 – two digits
  - Circular area (user defined) - 10 alphanumerics (up to 999 kn miles in radius)
  - Rectangular area (user defined) - 12 alphanumerics
  - Ocean region (all ships) - always 00
  - Coastal warning areas - $X_1X_2B_1B_2$
- Proposed addressing in addition to above
  - Sub-area within NAVAREA/METAREA – 3 alphanumerics, e.g.
    - Baltic Sea - 01A
    - Black Sea - 03A
    - Caspian Sea - 03B
    - Great Lakes - 04A, etc.
  - Fixed areas (e.g. for international inland waterways) – (5) numerics
    - Amazon basin - 51111
    - Rhine river - 12345. etc.
- Who will propose/define new areas???
  - IMO/WMO/IHO/IMSO
  - Can Inmarsat assist???

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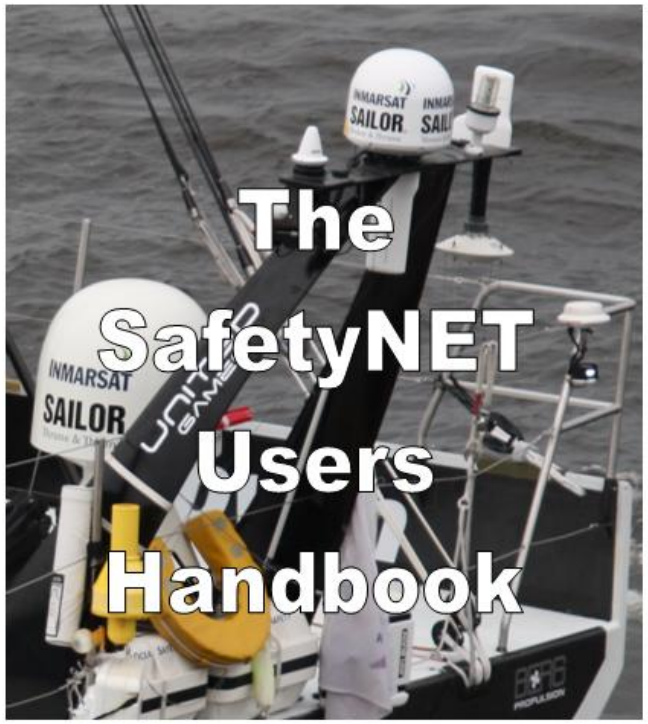
# Inmarsat SafetyNET Users Handbook, 5th Edition




- Handbook is PDF file to be published on www.inmarsat.com/safety
- Mainly for mariners to explain how to use SafetyNET to obtain required MSI
  - The IMO International SafetyNET Manual is official reference for SafetyNET service
- Explains operation of SafetyNET service and what MSI MUST and MAY be received
  - gives typical MSI broadcasts and its availability
  - EGC receiver types
  - how to manage EGC receivers (incl. position update)
  - good operating practice
- NEW items
  - EGC setup screen and how to set up EGC receiver to receive Coastal Warnings
  - EGC log and its details
  - revised IMO performance standards for EGC equipment



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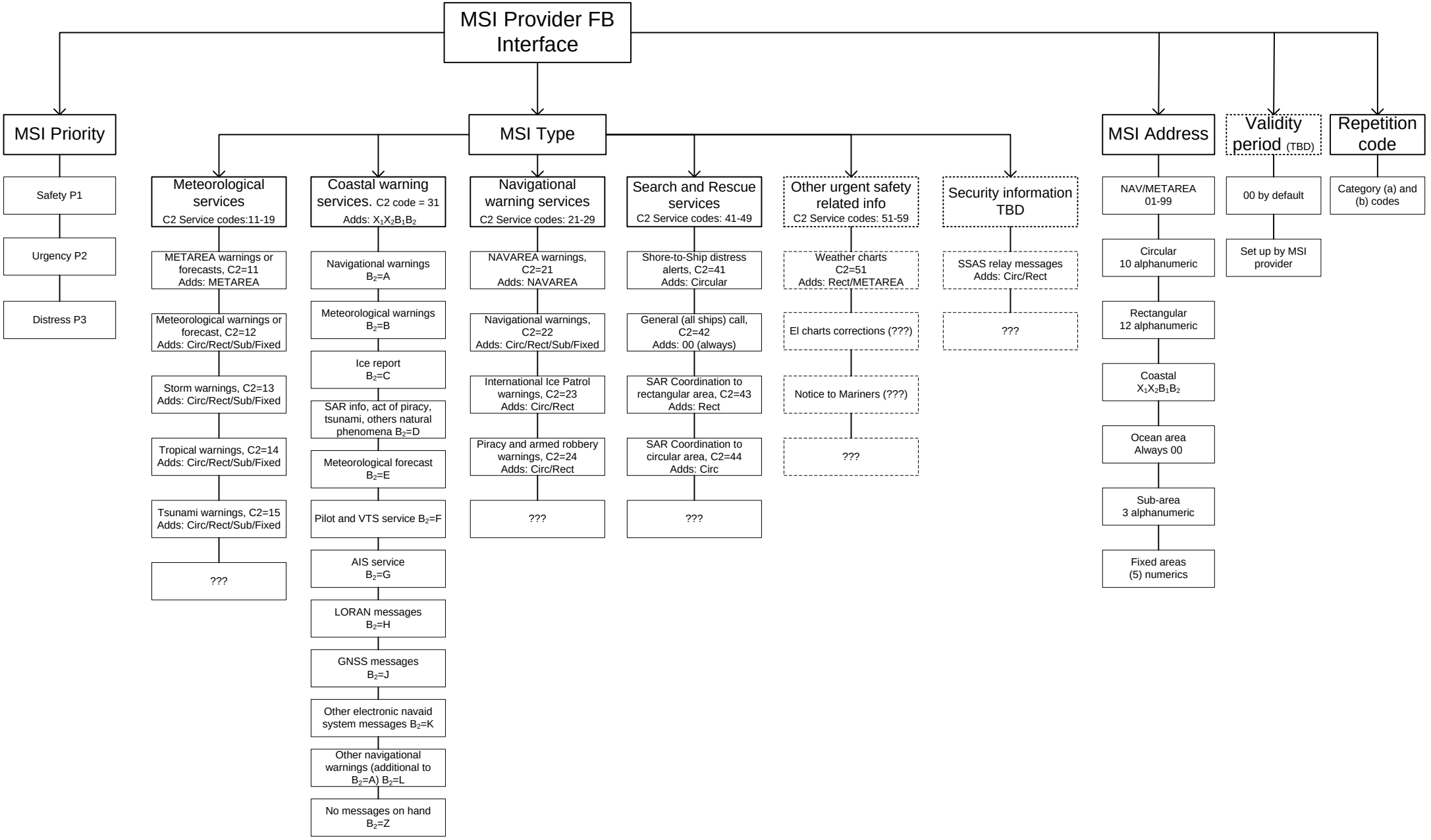


Figure 1. High level structure of MSI Provider user interface

**Thank you and kind regards from Maritime safety services team:**

Peter Blackhurst

Chris Wortham

Vladimir Maksimov