Maritime Communications
Strategic Sectorial Spectrum Needs

Eduardo Bolas

RSPG Work Programme 2012 and Beyond

1. Future spectrum for wireless broadband

2. Preparation of the next World Radio Conference (WRC)

3. Increasing opportunities for shared use of spectrum

4. Furthering efficient interference management through exchange of regulatory best practices concerning regulation and/or standardization

5. **Strategic sectorial spectrum needs**

6. Addressing situations resulting in underutilization of spectrum

7. Cross-border spectrum coordination

Identify emerging spectrum needs and demand over the coming years, on (11) strategic sectors:
- (...)
- **Intelligent transport systems**
- (...)
- **Maritime communications**

Outline

- Maritime Business & Maritime Communications

- e-N@vigation

- Spectrum Challenges and Opportunities

- Regulatory and Standardization Issues

- Future Regulatory Framework...

- Concluding Remarks

Maritime Business
&
Maritime Communications

"Traditional" Business

- Maritime Safety Information (MSI)
- Meteorologic and Oceanographic Information (METOC)

5

Search And Reascue (SAR)

Global Maritime Distress and Safety System (GMDSS)

6
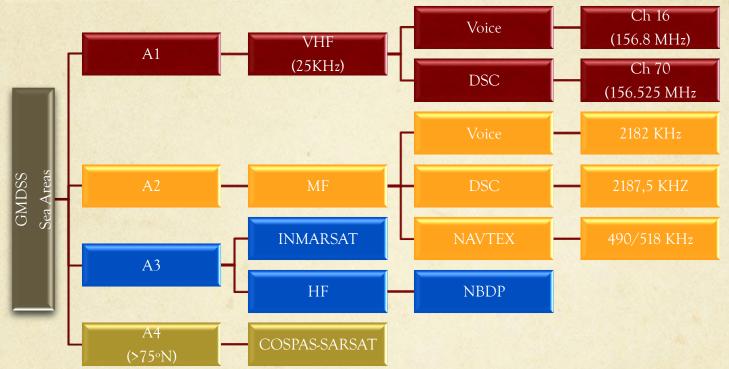
Automatic Identification System

- VHF DSC Channels
- SOTDMA

7

Vessel Traffic management System

- AIS
- Radar & Optic Sensors
- VHF voice (for coordination)

8

GMDSS – Assigned Spectrum

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GMDSS
Sea Areas
├── A1 ── VHF (25KHz) ─┬── Voice ── Ch 16 (156.8 MHz)
│                       └── DSC ──── Ch 70 (156.525 MHz)
├── A2 ── MF ─┬── Voice ──── 2182 KHz
│              ├── DSC ────── 2187,5 KHZ
│              └── NAVTEX ─── 490/518 KHz
├── A3 ─┬── INMARSAT
│        └── HF ── NBDP
└── A4 (>75ºN) ── COSPAS-SARSAT
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GMDSS – Assigned Spectrum

New Opportunities and Demands…

Broadband ?
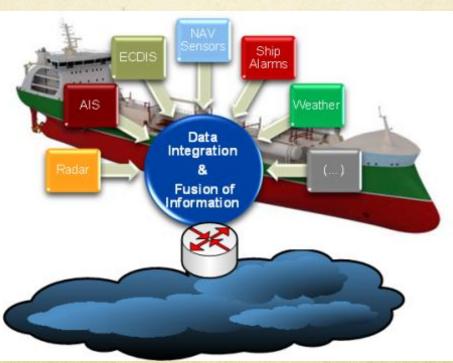
e-N@vigation:
Intelligent Transport System
or
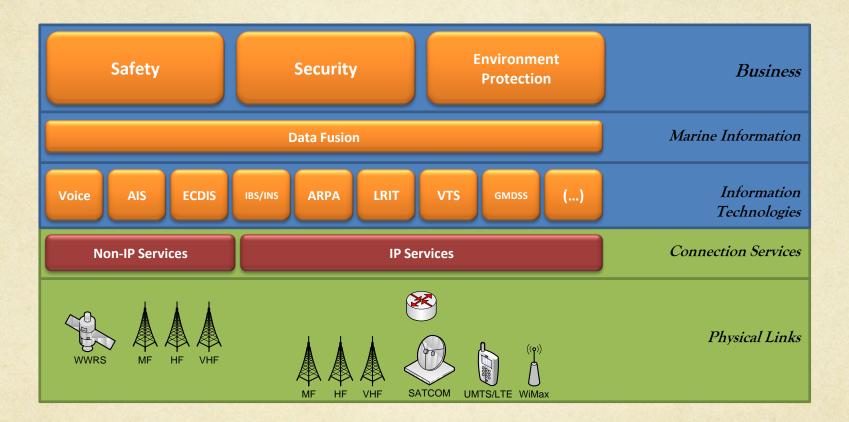## Maritime Communications

IMO e-Navigation

○ *"E-navigation is the <u>harmonized collection, integration, exchange, presentation and analysis of marine information</u> on board and ashore <u>by electronic means</u> to enhance berth to berth navigation and related services <u>for safety and security at sea</u> and protection of the marine environment.".*
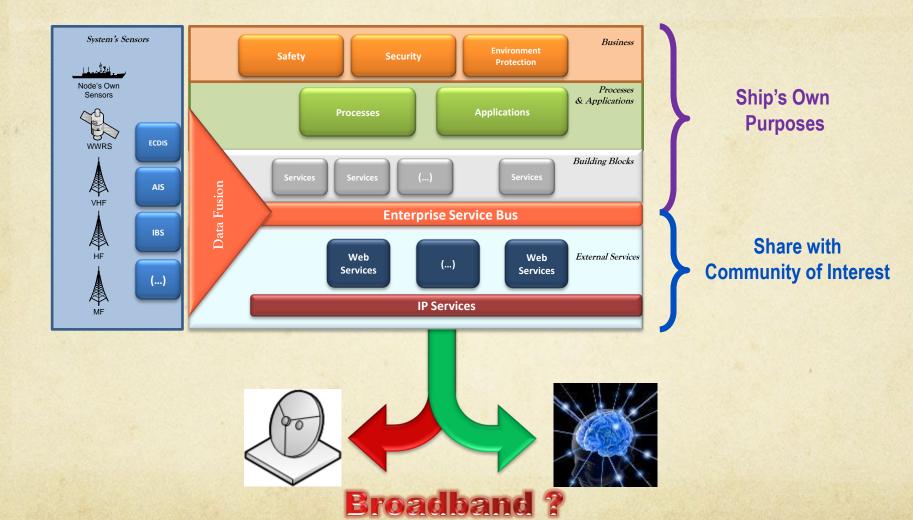
MSC 85/26/Add.1 annex 20

e-NAV Conceptual Model

e-NAV: Service Oriented Architecture

e-NAV – IMO @ WRC-12

○ **Agenda item 8.2**

"Initial consideration by IMO technical bodies have identified that e-navigation could not be deployed without additional frequency allocations for these advanced maritime systems. Based on respective future studies both in IMO and ITU, spectrum requirements will be refined and validated."
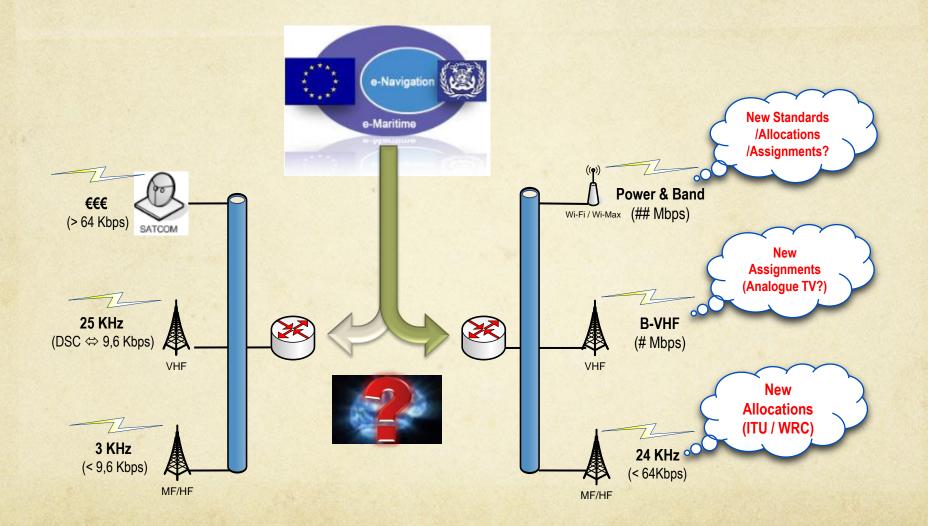
Spectrum
Challenges and Opportunities
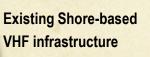
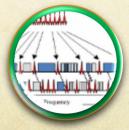# Spectrum Challenges

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18

Spectrum Opportunities

Cognitive Radio

**Reduced Occupancy
on MMS Assigned Spectrum**
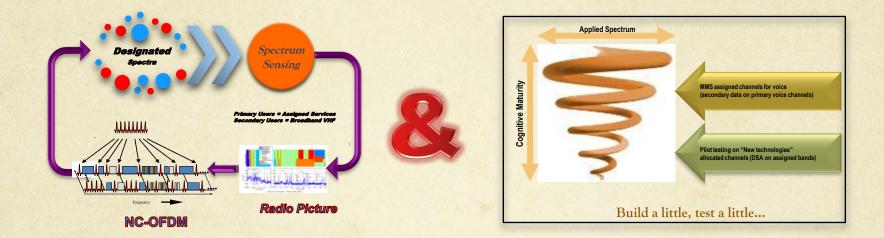
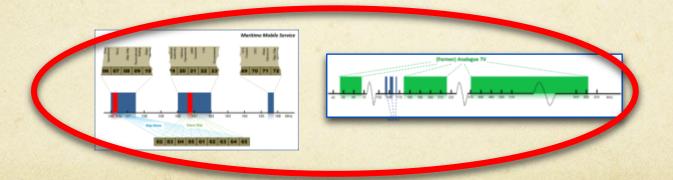**Significant world sailing activity
occurs within 40 miles from cost line**

**Existing Shore-based
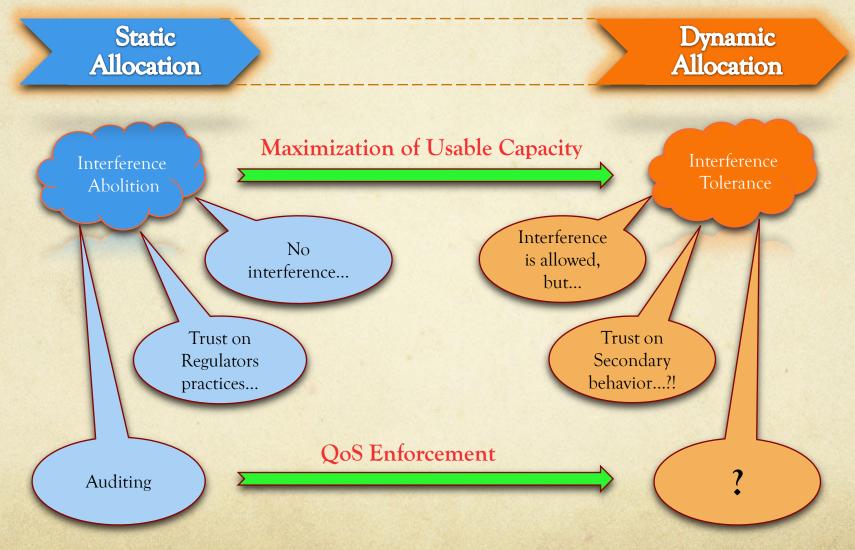VHF infrastructure**

**Multicarrier
Modulation Schemes**

Overcoming Spectrum Scarcity

Regulatory and Standardization Issues

Spectrum "Multiplication" Exercise

Incumbent Harmful Protection

Static Allocation

Transition Plan

Dynamic Allocation

Current Regulatory Framework

International Coordination

Future Regulatory Framework
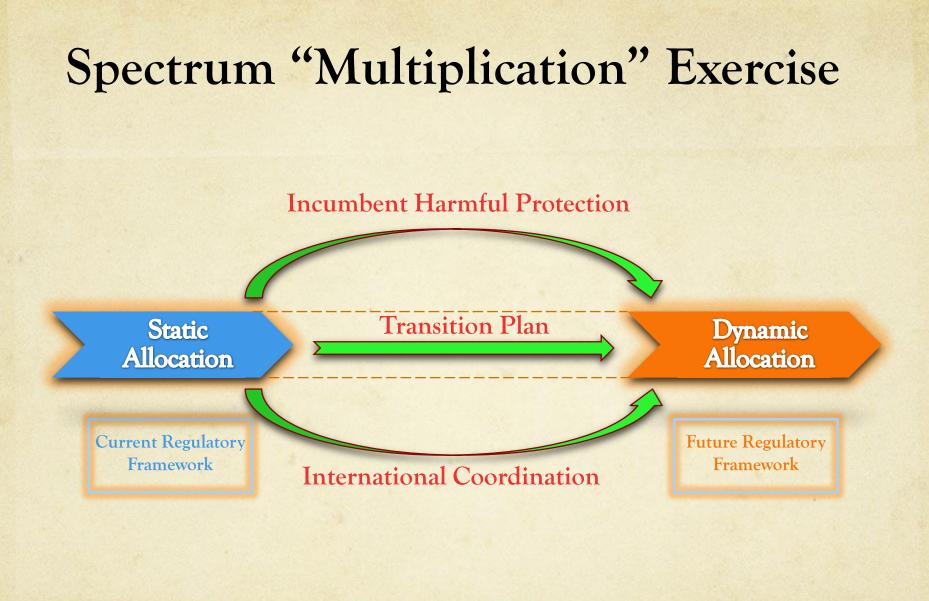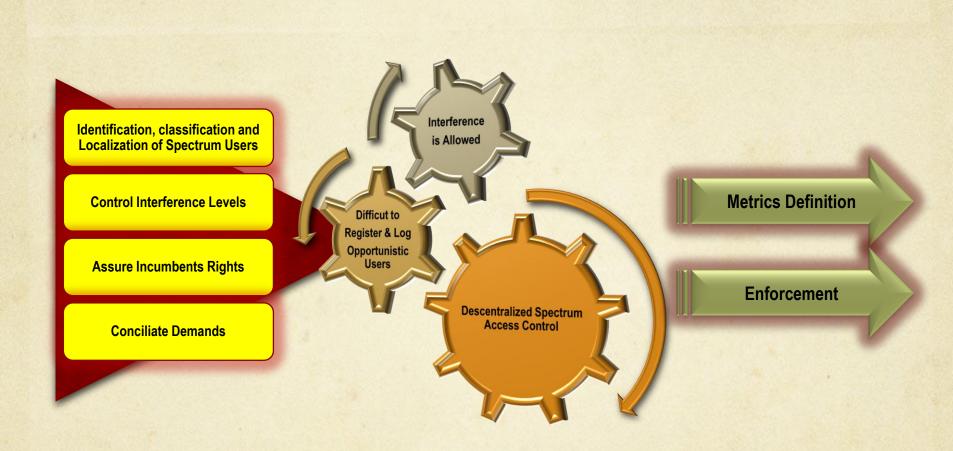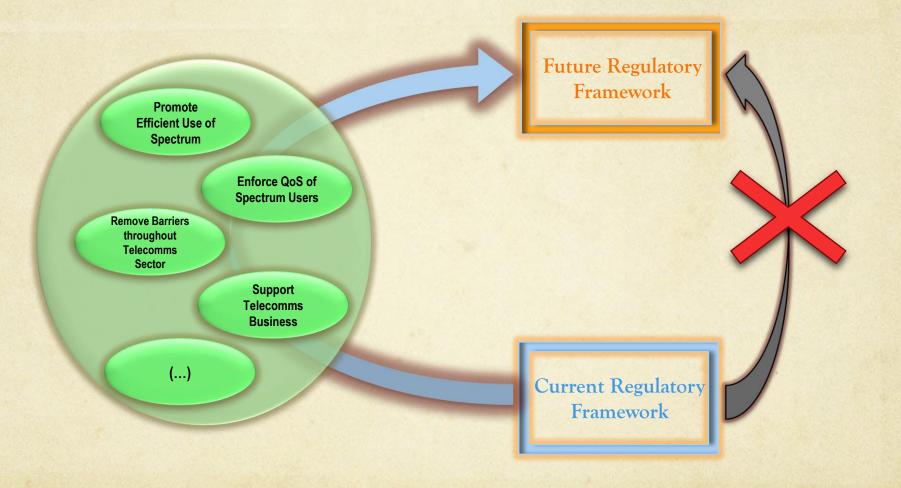
A Suitable Regulatory Framework

Evolution ...

Identification, classification and Localization of Spectrum Users

Control Interference Levels

Assure Incumbents Rights

Conciliate Demands

Interference is Allowed

Difficut to Register & Log Opportunistic Users

Descentralized Spectrum Access Control

Metrics Definition

Enforcement

Back to Foundations...

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Strategic Sectoral Spectrum Needs

- e-Navigation
- Economical Activity
- Internet…

27

Obrigado!

Maritime Communications

Strategic Spectrum Needs

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Conferência sobre Gestão do Espectro: Perspectivas, Desafios e Estratégias

Lisboa, 20 de setembro de 2013