



E-NAVIGATION, THE RECENT DEVELOPMENTS

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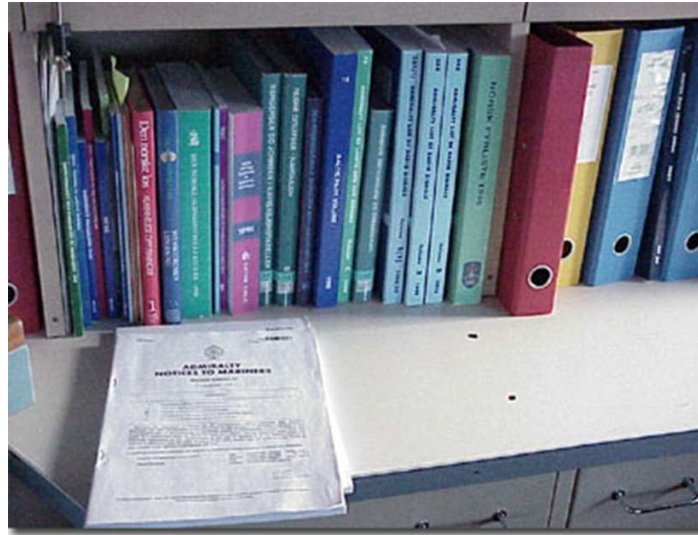
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The bridge of the Queen Mary



User friendly?





Portable Pilot Unit





e-Banking

Online banking, also known as internet banking, e-banking or virtual banking, is an electronic payment system that enables customers of a bank or other financial institution to conduct a range of financial transactions through the financial institution's website. The online banking system will typically connect to or be part of the core banking system operated by a bank and is in contrast to branch banking which was the traditional way customers accessed banking services.

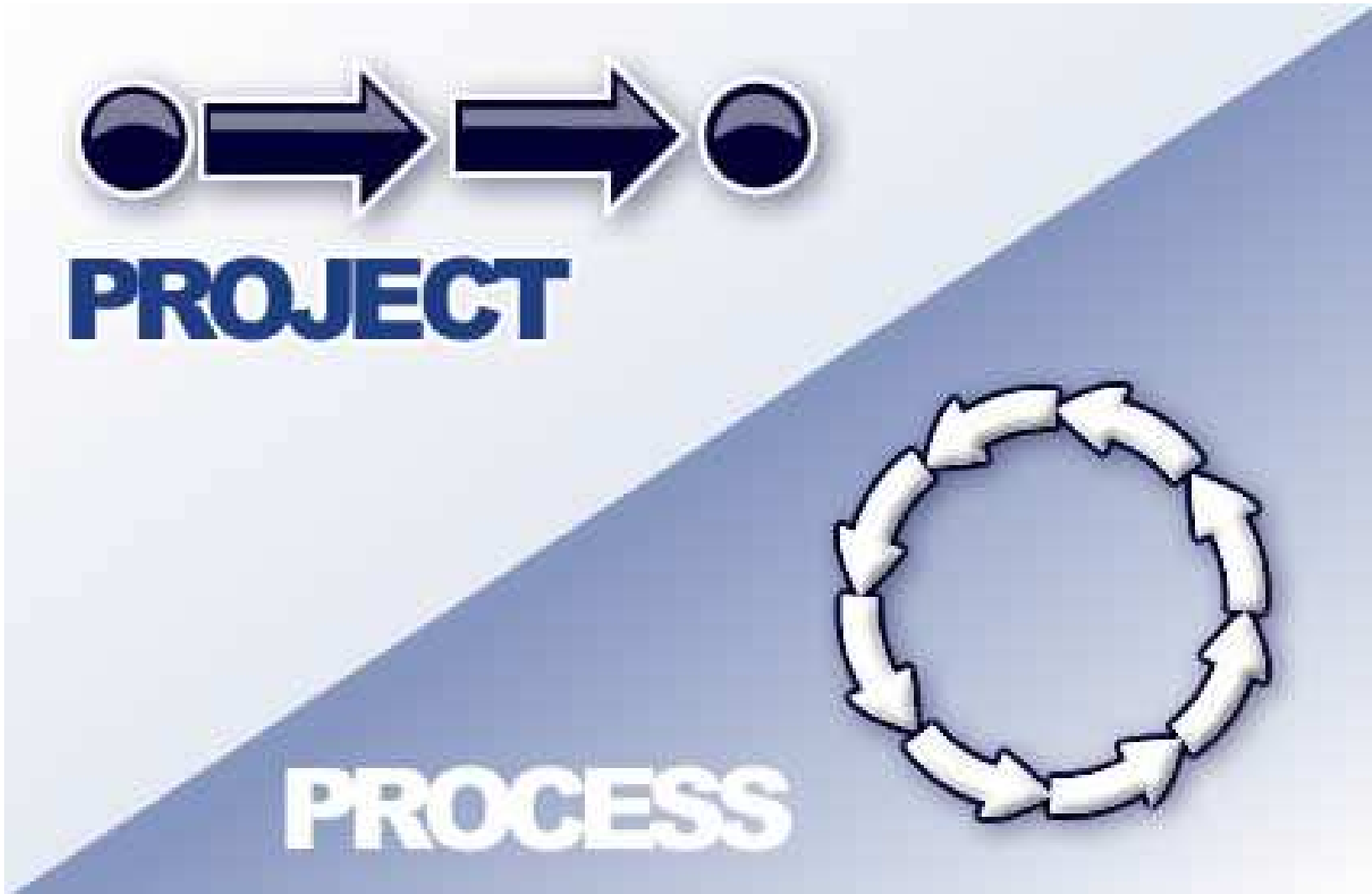
1-9-24	11	250 ✓	3-29-24	1250 -
1-14-24	11	250 ✓	APR 13 '24	3750 -
1-15-24	11	100 ✓	APR 20 '24	210 -
1-18-24	11	250 ✓	MAY 3 '24	250 -
1-28-24	11	750 ✓	MAY 15 '24	288 -
2-4-24	11	1770 82 ✓	MAY 10 '24	
2-13-24	11	1250 -		



e-Navigation – IMO definition

“e-Navigation is the harmonized collection, integration, exchange, presentation and analysis of marine information on board and ashore by electronic means to enhance berth to berth navigation and related services for safety and security at sea and protection of the marine environment.”

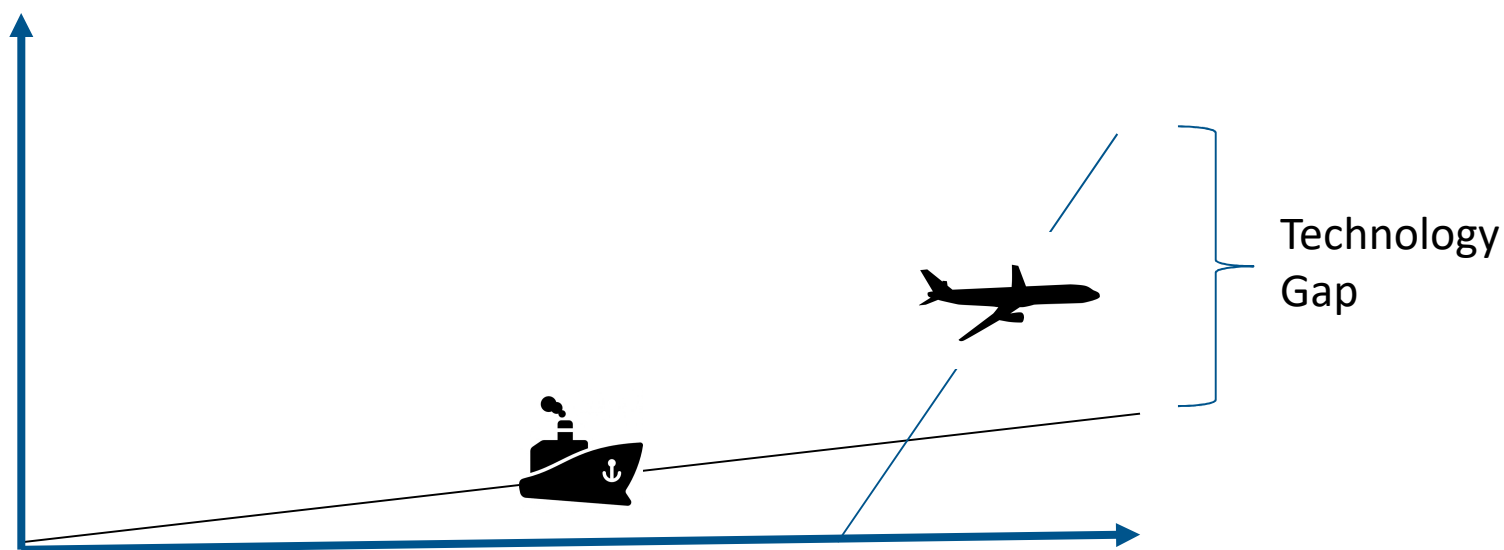






Mind the Gap

The Maritime domain into the digital age





e-Navigation – what does it take?

- Physical communication links
- Logical Infrastructure (for roaming etc.)
- Service providers



Emerging e-Navigation Concepts

Physical Communication Links

- VHF Data Exchange System (VDDES)
- MF Radiobeacon network (DGNSS)
- ITU (ensure frequency resources)
- NAVDAT (on any frequency)



Emerging e-Navigation Concepts

Physical Communication Links

- Overarching Infrastructure
- The Maritime Cloud



The Maritime Cloud

(Identity and service portfolio management & roaming)





The Connectivity Glue

- VHF DATA EXCHANGE SYSTEMS



- AVAILABLE & EMERGING COMM. TECHNOLOGIES

- ROBUST, SEAMLESS & LOW COST ROAMING

- CONNECTION TO SHIP SYSTEMS





Commercial Solutions



MARITIME ROAMING

BEING AT SEA DOESN'T STOP YOU FROM
BEING CONNECTED ANYMORE



Emerging e-Navigation Concepts

Service Providers

- Maritime Service Portfolios (types of services)
- Product Specifications (S-100, S-200)
(service description)



Some benefits

- **Harmonized Concepts and Standards for Global Connectivity and Interoperability**
- **Automatic Communication Framework** (roaming)
- **All Information available as eNav services**
- **Bidirectional flow** (shore-ship / ship-shore)
- **All data available to all systems – in principle**



Captains of the future





Thank you





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