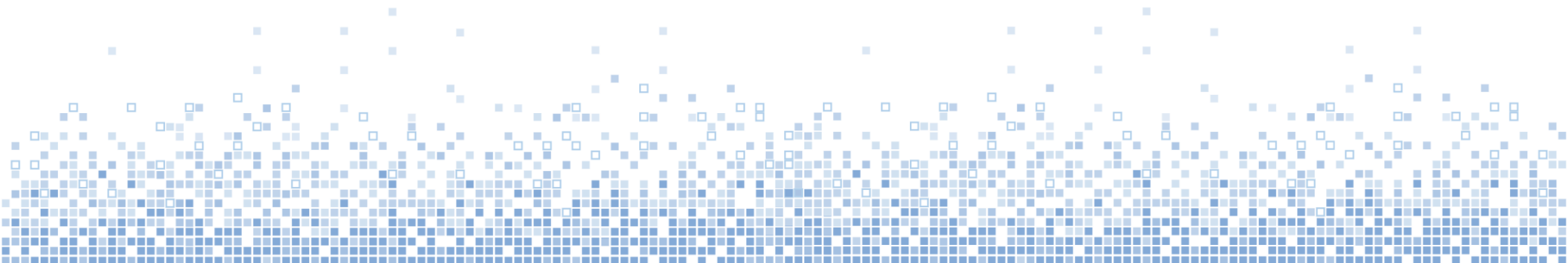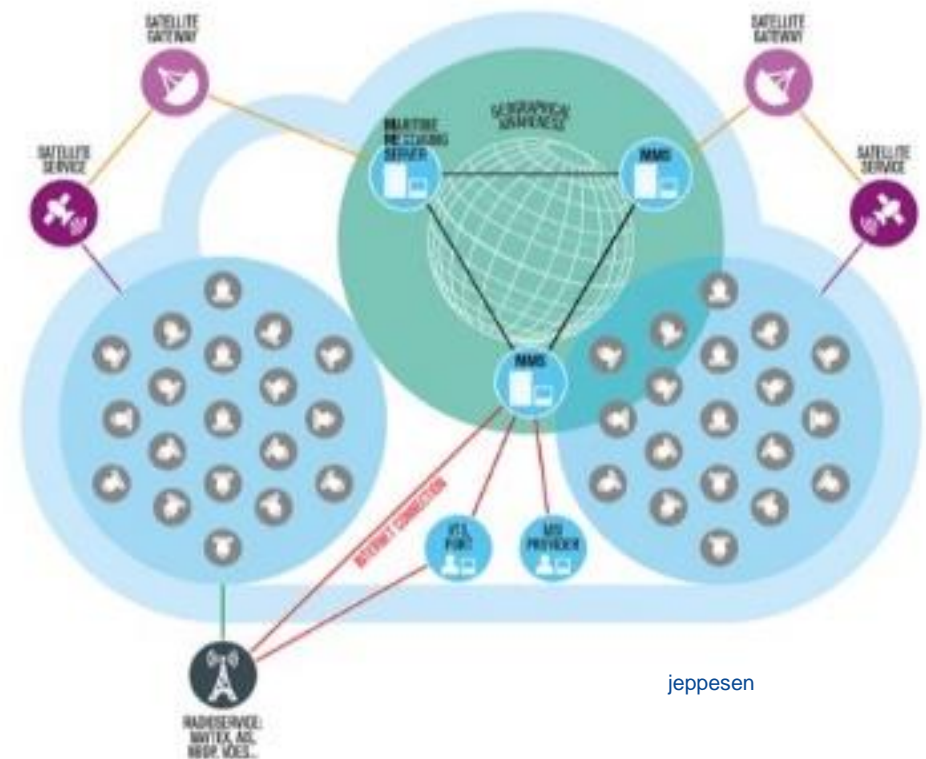# Progress in e-navigation

IALA ARM-5, Seoul, Republic of Korea 24-28 October 2016

Martin Bransby, General Lighthouse Authorities of the UK and Ireland
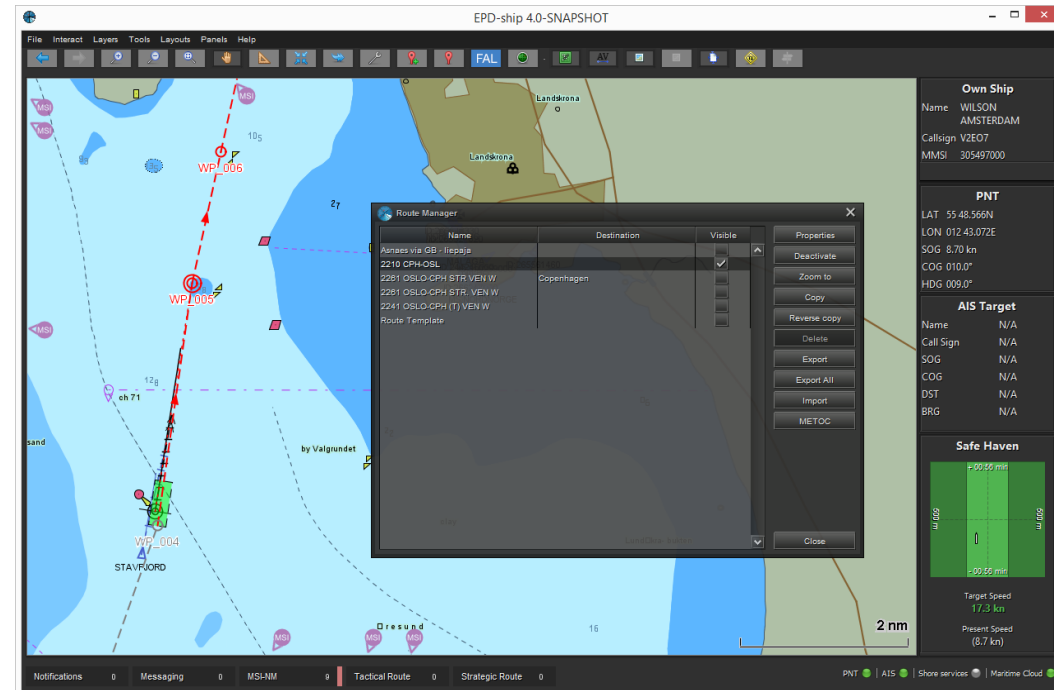
Introduction – what is e-navigation?

- IMO initiative for future, digital navigation in the maritime sector

- Need to equip the master of a vessel, and those ashore with responsibility for the safety of shipping, with

- Modern, proven tools to make marine navigation and communications more reliable and reduce errors.

jeppesen

Objectives

- safe and secure navigation of vessels

- facilitating communications, including data exchange between vessels and shore

- integration and presentation of information onboard and ashore to maximize navigation safety benefits and minimize risk of confusion

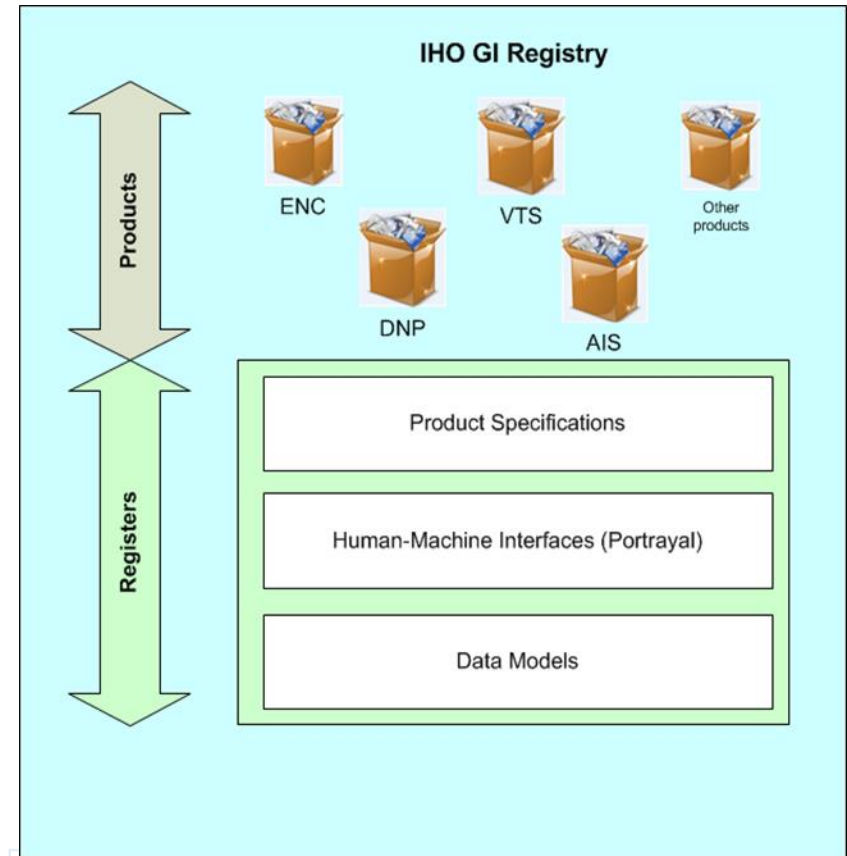- demonstrated in projects such as Mona Lisa 2.0, ACCSEAS.

IMO MSC approved work items

- Integrated Navigation Systems, harmonisation of bridge design and display of information;

- Harmonised display of navigation information;

- Standardised modes of operation (referred to as S-mode);

- 'Built-In Integrity Testing' for navigation equipment;

- Work on Maritime Service Portfolios approved at MSC 96 (May 2016)

gcaptain.com

Maritime Service Portfolios

- Maritime Service Portfolios (MSP) define the method of delivering e-navigation services

- Data exchange standardized through product specifications conforming with the IHO S-100 standard for geo-spatial information

- Leading to a Common Maritime Data Structure.

p.hooijmans

Example MSP: Nautical Chart Service

- Sea State
- Swell (height & direction)
- Wave (height & direction)
- Bottom objects
- Accuracy coverage characteristics
- Contour line
- Navigational Route areas and limits
- Aids to navigation
- S-101 Charts

Imray

Example MSP: Real-time Hydrographic and Environmental Information Services

RESEARCH & RADIONAVIGATION
GENERAL LIGHTHOUSE AUTHORITIES
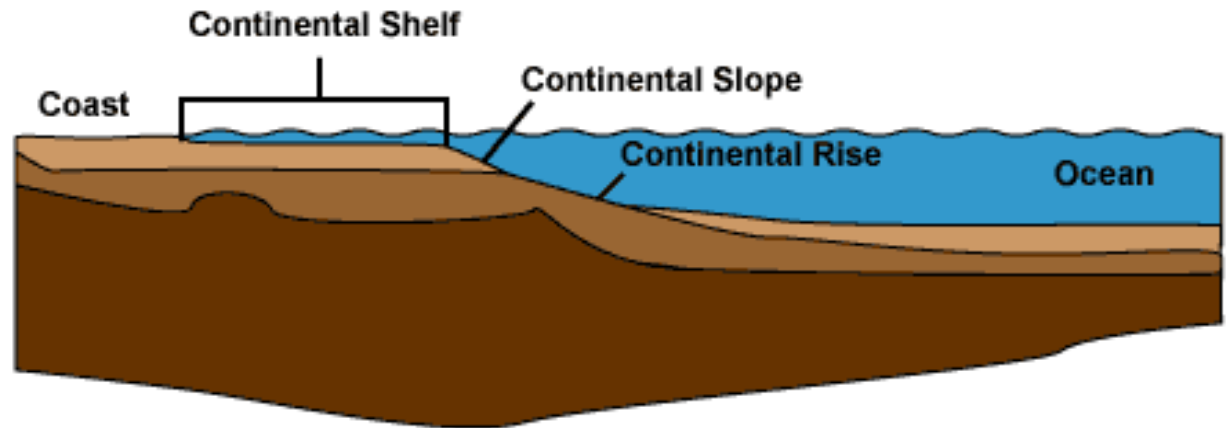United Kingdom and Ireland

- Weather

- Ice

- Water

- Bathymetry S-102

- Bathymetry Accuracy

Canadian Hydrographic Service

Example MSP: Aids to Navigation

- S-201, S-240

- Lighthouses

- Buoys

- Beacons
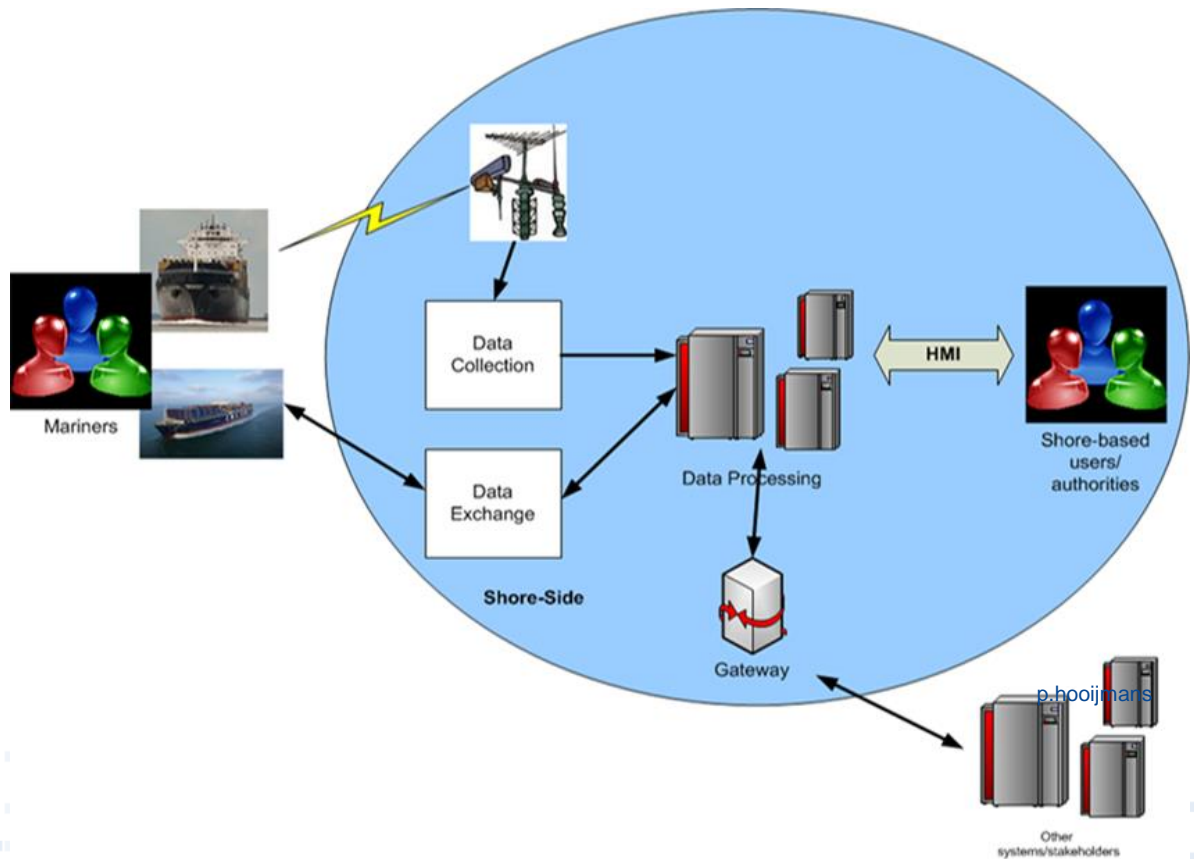
- Radio AtoN

- Radar AtoN

Evaluation of solutions

- Solutions evaluated in test-beds:
  - ACCSEAS
  - MONA LISA 1 & 2
  - STM Validation (son of Mona Lisa!)
  - EfficienSea 2
  - Sesame STRAITs
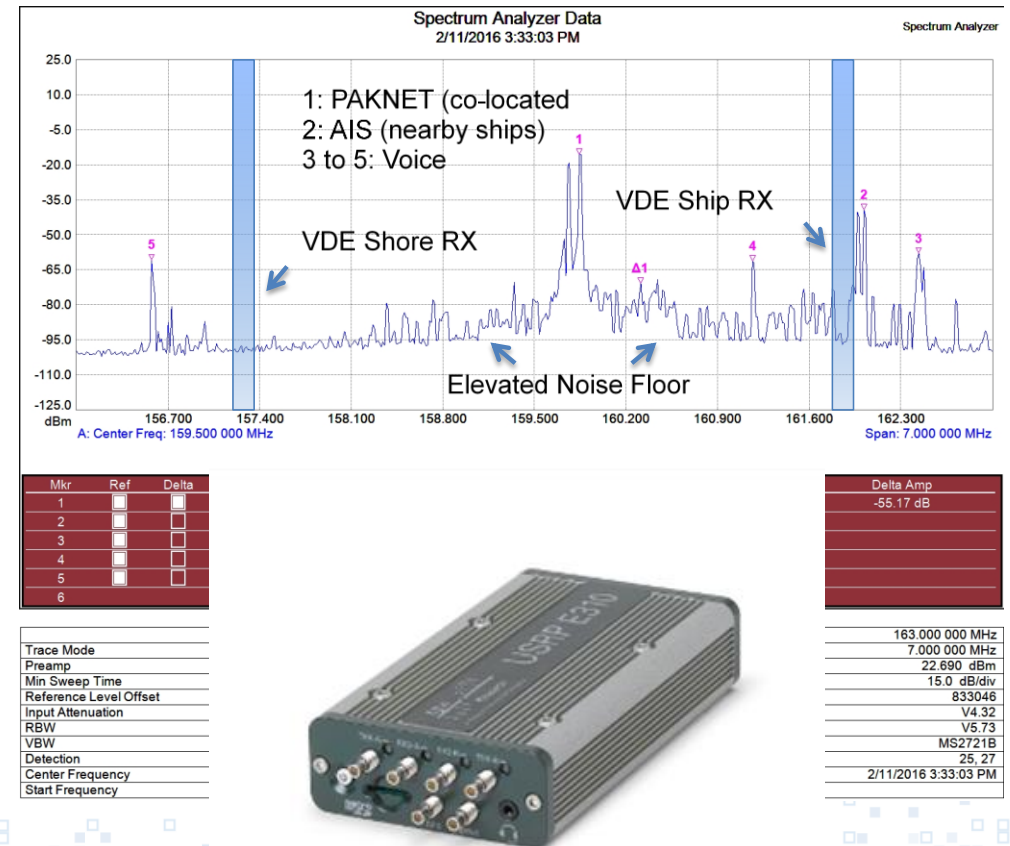 - MUNIN
  - ENSI
  - eMIR
  - ESABALT

Digital Infrastructure provides the basis for e-navigation

- Communications

- Information systems
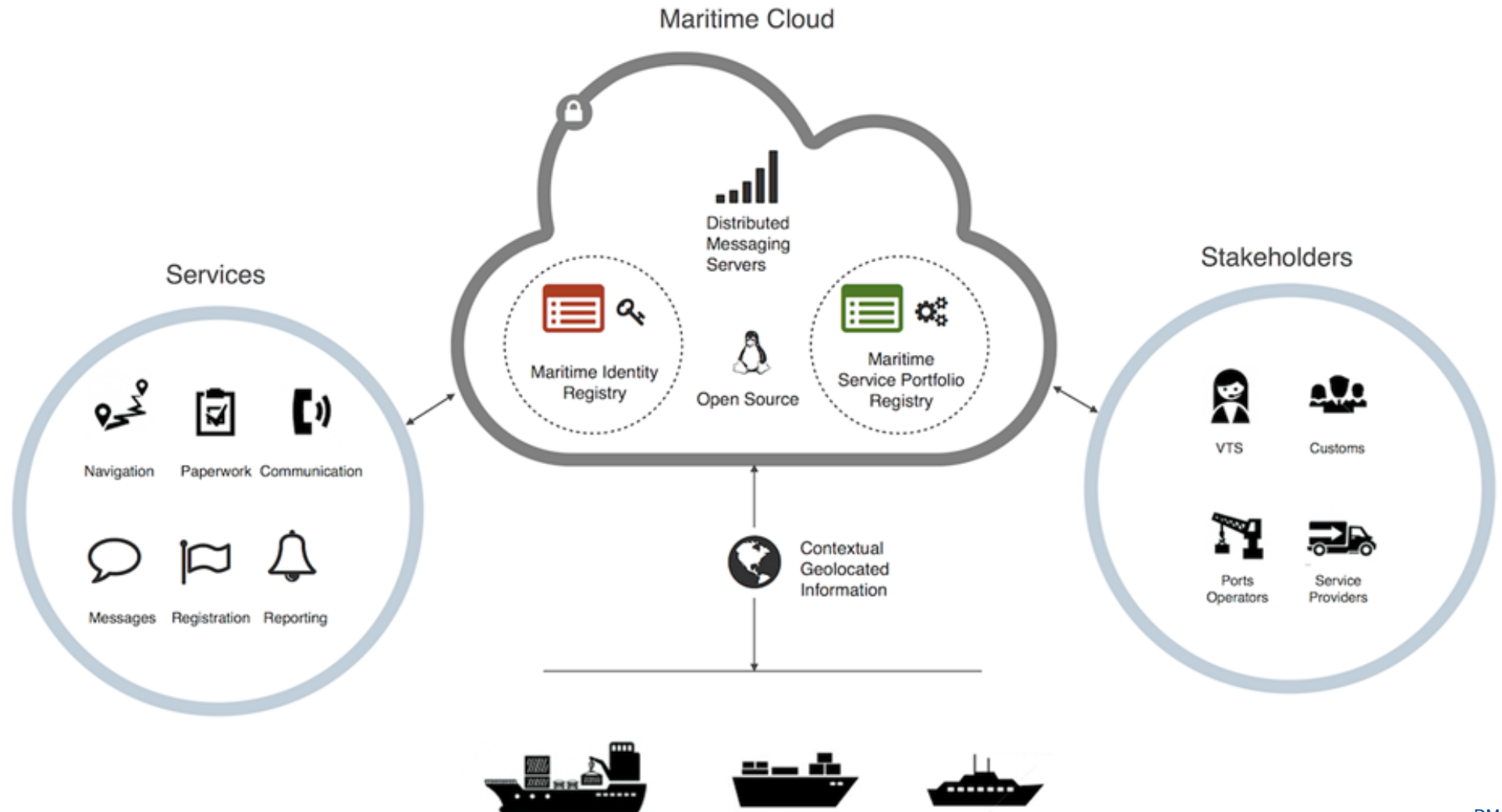
- Positioning

- Timing

- Security

e-Navigation Communications

- VHF Data Exchange System (VDES)
  - Channel sounding tests
  - System requirements study
  - SDR development
  - First test broadcasts

- NAVDAT
  - 500 kHz digital successor to NAVTEX
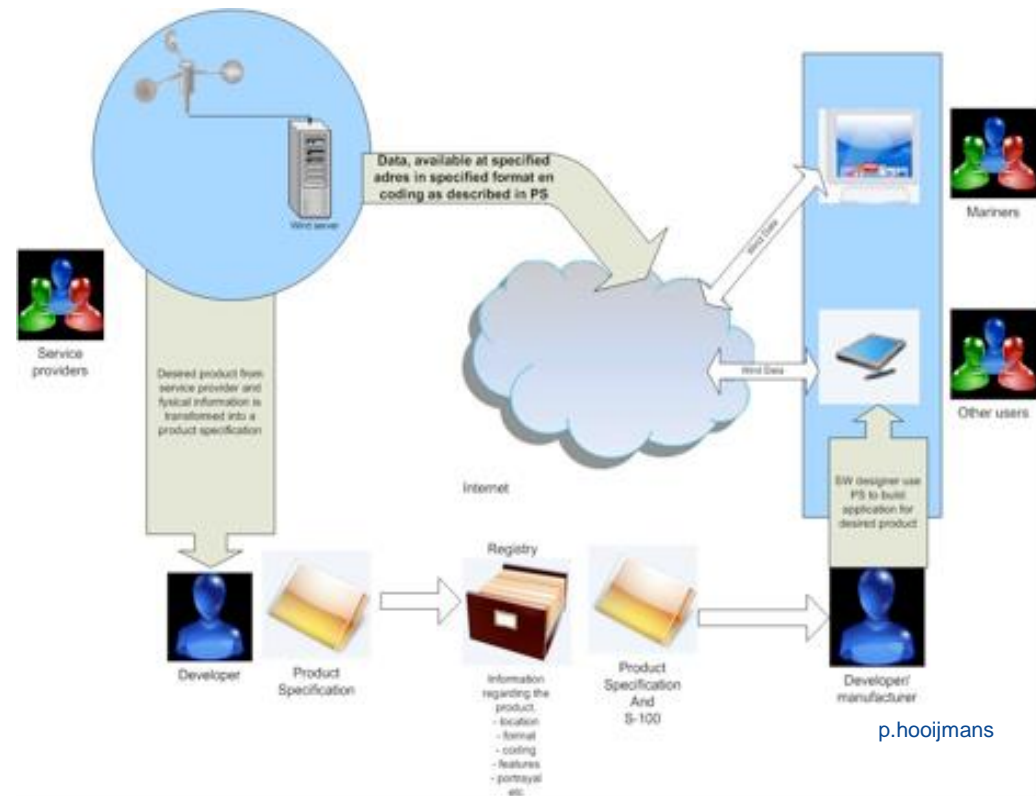
- WiFi/4G/5G/satcoms

Maritime Cloud – an information system being developed in EfficienSea 2 – an EU H2020 project

Structure of e-Navigation Information

- Information system – e.g. Maritime Cloud

- Contains Maritime service Portfolios, which specify:
  - Data exchange formats
    - e.g. S-200 domain, carried by:
  - Communications systems:
    - VDES, NAVDAT, WiMax, 4G/5G/satcom

Conclusions

- Implementation of e-navigation is to continue in IMO, 2017-2019

- IALA is progressing definition of Maritime Services and development of infrastructure

- Applications and solutions are being tested and demonstrated in various test bed projects

- Those that offer real benefits to mariners, pilots, ship operators, ports and other stakeholders will be adopted and standardized

- e-navigation will be realized by a process of user selection, rather than top-down imposition

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Thank You