STM & SMART-navigation, test bed results, standardisation and future plans

Per Setterberg, SMA & Jin Hyoung Park, SNPO/KRISO
Honoured to present an e-Nav ship...
...m/s Pearl Seaways
As we speak!
Setting sail for new horizons

• STM Validation – ending Q1 2019
  • Currently installing on ships
  • Ongoing focus months in ports
  • Simulator campaign in April
  • Data collection and analysis starting
  • Common Information Model

• Approved projects: Real Time Ferries, EfficientFlow
• Applications: Baltic – Tankers and SAR
Setting sail for new horizons

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STM is not a project, it’s a program!

Magnus Sundström
Head of R&D
Swedish Maritime Administration
Setting sail for new horizons
...navigating in foul waters
…navigating in foul waters

Proliferation of standards

Towards interoperability
…navigating in foul waters

Proliferation of standards

Lack of coordination

Towards interoperability
Agreeing on standards!

- CMDS
- RTZ
- EPCIS
- PCM
- VIS
- MCP

Governance!
Agreeing on standards!

- CMDS
- RTZ
- EPCIS
- PCM
- VIS
- MCP

Governance!

- The business process of shipping
- Regulations
- Information model
- Data standards
- Interfaces
- …in an ever changing tech environment
SMART-Navigation Project

- 2013: Planning research for Korean e-Navigation strategy
- 2014: Preliminary feasibility study (ended)
- 2015: Preliminary feasibility study (ended)
- 2016: Start of the SMART-Navigation Project (JUL)
- 2017: Start of the SMART-Navigation Project (MAR)
- 2018: 1st prototype (DEC)
- 2019: Completion of the SMART-Navigation Project (DEC)
- 2020: Selection of SMART-Navigation Project Office (MAR)
- 2021: Completion of the SMART-Navigation Project (DEC)

19/54 = 35.19%
“More focus on Non-SOLAS ships”
“WIDER CONNECTION SAFER NAVIGATION”

- SOLAS, Merchant
  - GMDSS
  - VDE(S)
  - AIS
  - Satellite
  - ...

- M.C.P.
  - SMART-Nav. Center

- Tiny/Small Vessels
  - LTE-M
    - (3G/4G)
“Harmonization with International Standards”
“Systems Engineering Process”
<table>
<thead>
<tr>
<th>Service Name</th>
<th>Dedicated user/ship</th>
<th>Physical Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation Monitoring &amp; Assistance Service (NAMAS)</td>
<td>High risk ships</td>
<td>LTE-M / VDES</td>
</tr>
<tr>
<td>Service Name</td>
<td>Dedicated user/ship</td>
<td>Physical Link</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
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</tr>
<tr>
<td>Ship-borne System Monitoring Service (SBSMS)</td>
<td>• Passenger ships Korean Flag(Int’l, Domestic) • Ships requiring service</td>
<td>LTE-M, VDES, etc</td>
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**Remote Monitoring**
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<th>Service Name</th>
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</thead>
<tbody>
<tr>
<td>Safe &amp; Optimal Route Planning Service(SORPS)</td>
<td>- Passenger ships Korean Flag(Int’l, Domestic)</td>
<td>LTE-M, VDES, etc</td>
</tr>
<tr>
<td></td>
<td>- Ships requiring service</td>
<td></td>
</tr>
</tbody>
</table>
Real-time Electronic Navigational Chart Distribution & Streaming Service (REDSS)

Service Name: Real-time Electronic Navigational Chart Distribution & Streaming Service (REDSS)

Dedicated user/ship: Non-SOLAS ships

Physical Link: LTE-M

Electronic Navigational Chart

Departure

Arrival

ECS (Electronic Chart System) / Mobile App

SMARTNav Compliant dev.
<table>
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<th>Physical Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilots/Tugs Assistance Service(PITAS)</td>
<td>Pilot / Tug boat</td>
<td>LTE-M</td>
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**Pilots/Tugs Assistance**

[Image of a container ship being guided by a pilot and a tugboat, with a map and icons indicating various maritime operations such as navigation, communication, and monitoring.]
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<tbody>
<tr>
<td>Maritime Environment and Safety Information Service (MESIS)</td>
<td>Ships requiring the service</td>
<td>LTE-M, VDES, etc</td>
</tr>
</tbody>
</table>

**Marine Safety Information**

- **ECDS (Electronic Chart Display Information System)**
- **ECS (Electronic Chart System) / Mobile App**
Overall Architecture

- Maritime Connectivity Platform (MCP)
- MCP Connector
- Data Distribution Service (middleware)
  - NAMAS
  - SORPS
  - PITAS
  - SBSMS
  - REDSS
  - MESIS

SMART-Navigation Service System

Shore-based Technical services

Functional links

Physical links

- Korea Meteorological Administration
- Korea Hydrographic and Oceanographic Agency
- Korea Coast Guard
- Etc.
Inspection on the 1st Prototype
S-101 전자해도 표출

21:34:36
2017.11.27.MON
LTE-M Testbed
Drafting S-10x PS for SMART-Nav Svcs.

<Feature Catalogue & Portrayal Catalogue>

<data identification>

<data specification>

<SV10 DCEG>
Maritime Messaging Service in MCP
Specialty Engineering

- Performance modeling & analysis
- Reliability, Availability and Maintainability (RAM)
- Safety and health hazards
- Quality assurance
- Electromagnetic compatibility and Radio frequency management
- Human factors
- Sustainability and environment
- Constructability
- Whole life cost
- Integrated Logistics Support (ILS)
- System security
- Operability
“A lot of times, people don't know what they want until you show it to them.”
Integrated Test Center
Maritime Connectivity Platform
MCP v0.7 Release

MCP v. 0.7 release notes

**MSR**

New Features:
- Added simulation state
- Added compliant/noncompliant service flag

Fixes:
- Fixed status update API call
- Improved Instance creation UI
- Fixed inconsistencies when using update status method
- Fixed error when trying to update state of specification
- Fixed error 404 on deletion of simulated service
- Fixed error 404 when updating status of simulated service
- Improved API for getting service instances across simulation and non-simulation status
- Fixed missing response on creation of instance

**Keycloak SPI**

This release includes the following changes:
- Name change
- Removed some dependencies
- Fixed bug where error text was not shown

**PKI**

This release includes the following changes and fixes:
- Name change
- Added PKI constants for relationship between a service and a vessel

**Endorsement service**

Name change

**Identity Registry**

The release comes with these new features and changes:
- URLs for OIDC redirects are no longer validated as URL
- Added functionality to issue certificates in other formats than PEM
- Added functionality to link a vessel to a service instance
- Added functionality to add an image to a vessel
- Better checking for if a user already exists
- Bumped some dependencies
- Fixed bug where only one permission was copied from Keycloak
- Fixed bug where default sub id was wrong
- Made it possible to have more than one email address that receives requests for new organizations
- Made it possible to disable user creation and user update for federated organizations

**Management Portal**

New features of this release

- Resumed Maritime Cloud to Maritime Connectivity Platform
- Updated to use and facilitate the Maritime Connectivity Platform core components Identity Registry v. 0.7 and Service Registry v. 0.7
- "About" page is now available from login screen or through the Menu. The page will show version information of the MCP core components Identity Registry and Service Registry.
- It is now possible to update the status of a Specification/Design Instance without uploading a new XML. To do this, just choose the desired status from the dropdown in the "Update" page.
- It is now possible to set the status of an Instance to "simplified".
- The list of instances can now be filtered for simulated or non-simulated instances.
- Instances now show a "Compliant" flag, which follows the rules for compliance defined by the Service Registry.
- A better description is now shown to the user, if the server(s) of the core components are not reachable.
- It is now possible to upload a picture of a vessel.
- It is now possible to add a link between a service and a vessel. This is close through the Service Register/Update page. The host vessel will display the services registered to the vessel.
- When a service is linked to a vessel, the vessel attributes e.g. MRN, IMO, MMSI is also available through the Service Certificate. For more information see Developer documentation.
- It is now possible to create an ID Service in the Identity Registry, without the need to create a Service Instance in the Service Registry. Previous these were always linked together. To do this, choose "ID Service" in the Menu.
- When creating a Certificate, additional formats are now downloadable e.g. PKCS12 and JCS.
- Fixed an error where it was not possible to register a new version of an Instance with same MRN of the previous version.
- Fixed several other errors and general housekeeping.
The Last “Season 1” MCDF Meeting
MCP “Consortium”: MCPC

- **Advisory board**
  - Int. associations: IALA, CIRM...
  - Meets around 4 times a year

- **General assembly**
  - Does not meet as a separate group
  - Meet 1-2 times a year for big decisions

- **Host organisations**

- **Regular members**
  - Daily operation

- **Board Secretariat**
  - Meets around 4 times a year
MCPC D&R Model

Decision & Responsibility Model

- Support
- Business Strategy
- Criteria for MCP operator
- PKI root Cert.
- Management Org. / roles
- Acquisition
- Membership application
- Host Membership agreement
- Endorsing MCP operator
- Establish WG
- Budget (resources)
- Development / standards
- Security Quality & Performance strategy
- Knowledge management
- All members
- Host org responsibility

MCPC
Waiting for MCDF “Season2”
Converging initiatives!

- Letter of Collaboration
- Signed 11 Oct 2017
- Agree to facilitate interoperability
- SESAME 2 receives funding
Converging initiatives!

- Interoperable
  - ETA from STM ships
  - PTA to ships
  - Static port data to ships

- Coordinating efforts
- Planning for projects

International Taskforce

Port Call Optimization

Shell, Maersk, MSC, CMA-CGM and the ports of Rotterdam, Algeciras, Busan, Gothenburg, Houston, Singapore and Ningbo Zhoushan
Converging initiatives!

- Overlapping partnership
- Developing MCP
- Foundation for STM
- STM Populating MCP
- Same MSR and MIR
Converging initiatives!

- RTZ and VIS interface in 2018 work programme
- SMART services in STM test-beds
- Regular coordination meetings
- Cooperation on port call optimization
Converging initiatives!

• RTZ and VIS interface in 2018 work programme
• SMART services in STM test-beds
• Regular coordination meetings
• Cooperation on port call optimization
Lasting results, collaboration!
Study visit on the bridge

Want to see a route exchange between different systems live from the bridge.

Meeting point: Conference lobby, by elevators.
Time: Two visits: 1730 or 1800

Sign up by the door at Coffee break
고맙습니다！