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

Per Setterberg, SMA & Jin Hyoung Park, SNPO/KRISO

Ministry of Oceans and Fisheries

international e-Navigation underway 2018

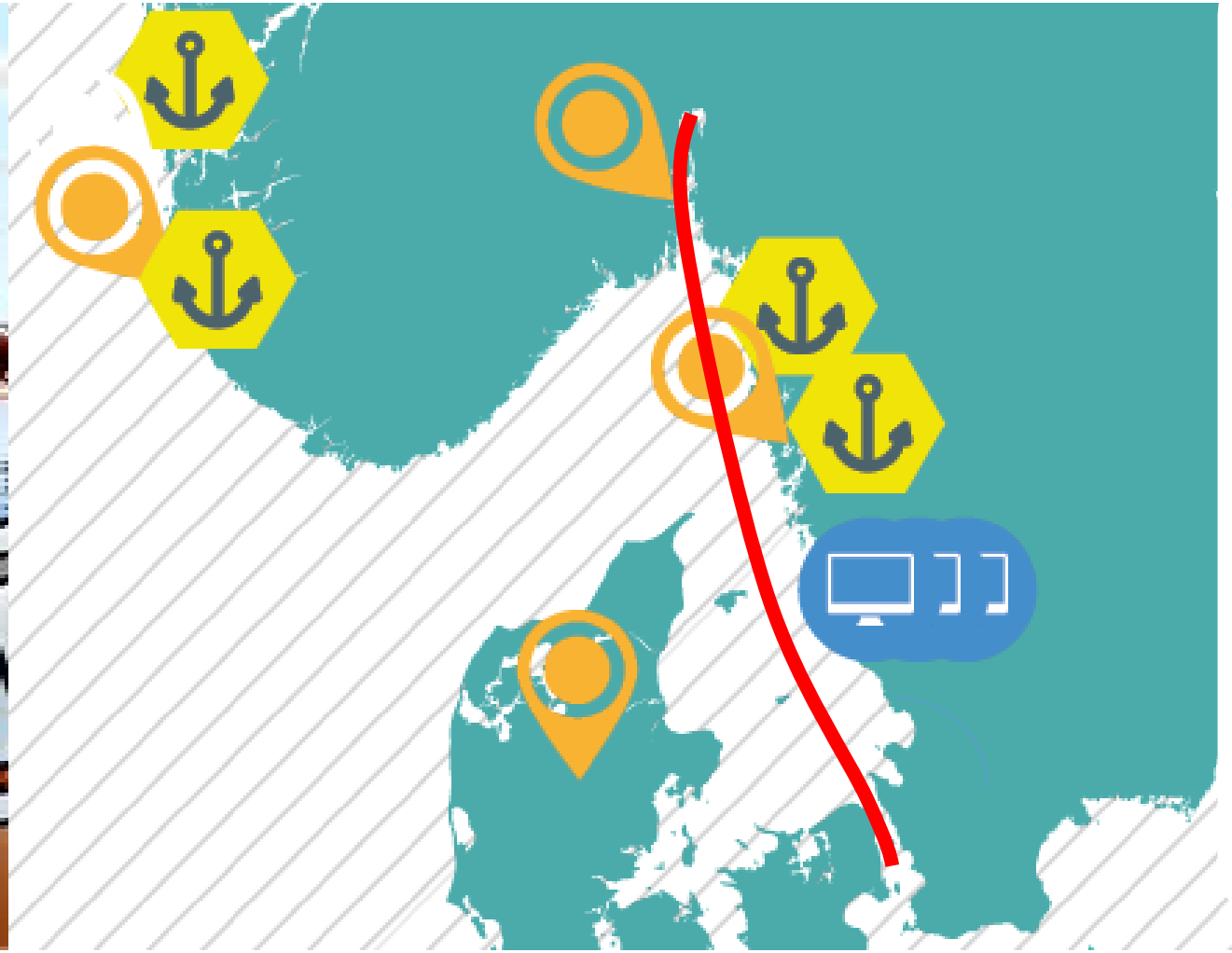
Co-financed by the European Union
Connecting Europe Facility

Honoured to present an e-Nav ship…

Co-financed by the European Union
Connecting Europe Facility

…m/s Pearl Seaways

As we speak!



Co-financed by the European Union
Connecting Europe Facility

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

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Setting sail for new horizons

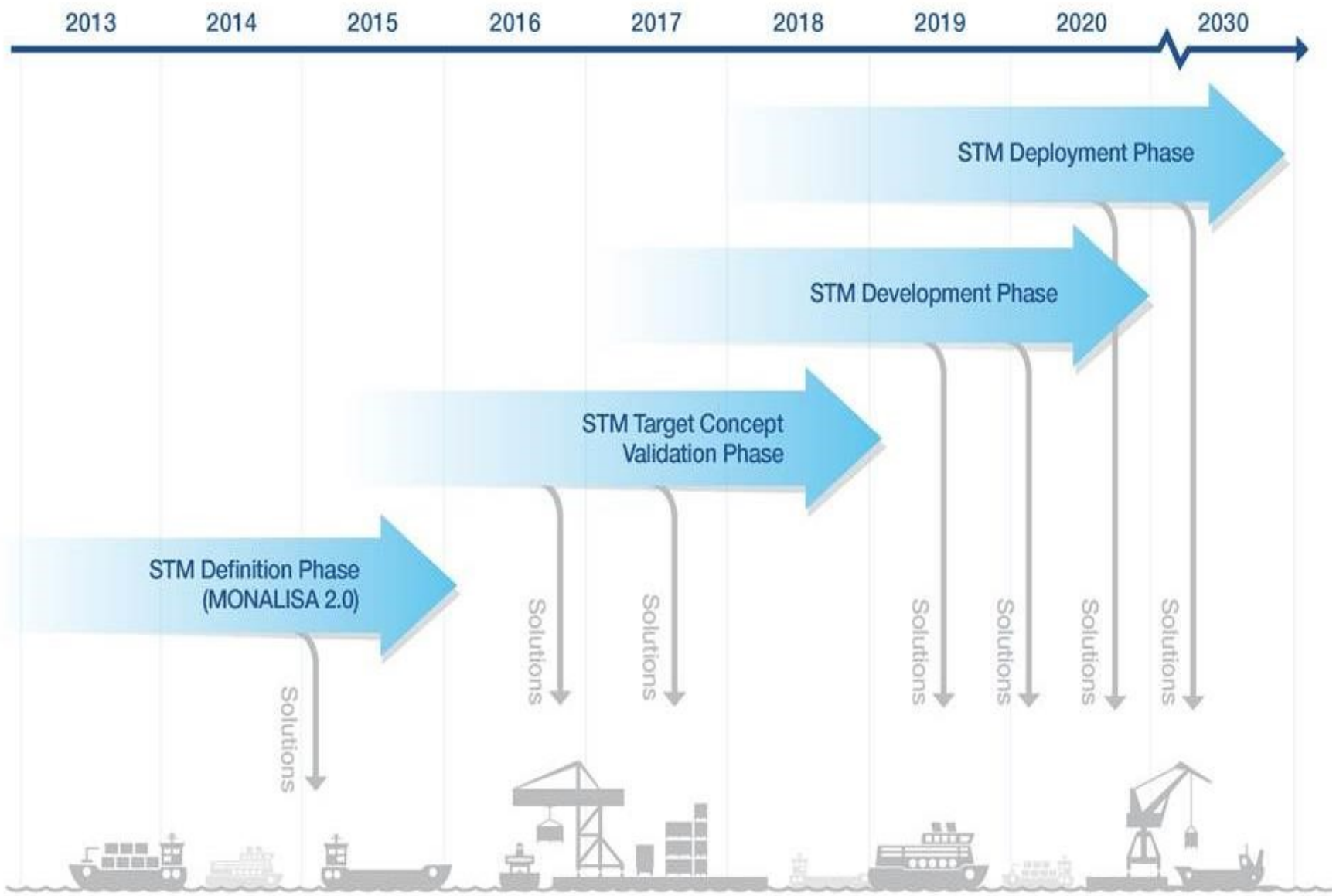
- STM Validation – ending Q
- ling on ships
- onths in po
- aign in April
- analysis
- mation Model
- Approved projects: Real Ti tFlow
- Applications: Baltic – Tanke

STM is not a project, it's a program!

Magnus Sundström
Head of R&D
Swedish Maritime Administration

Co-financed by the European Union
Connecting Europe Facility

Setting sail for new horizons



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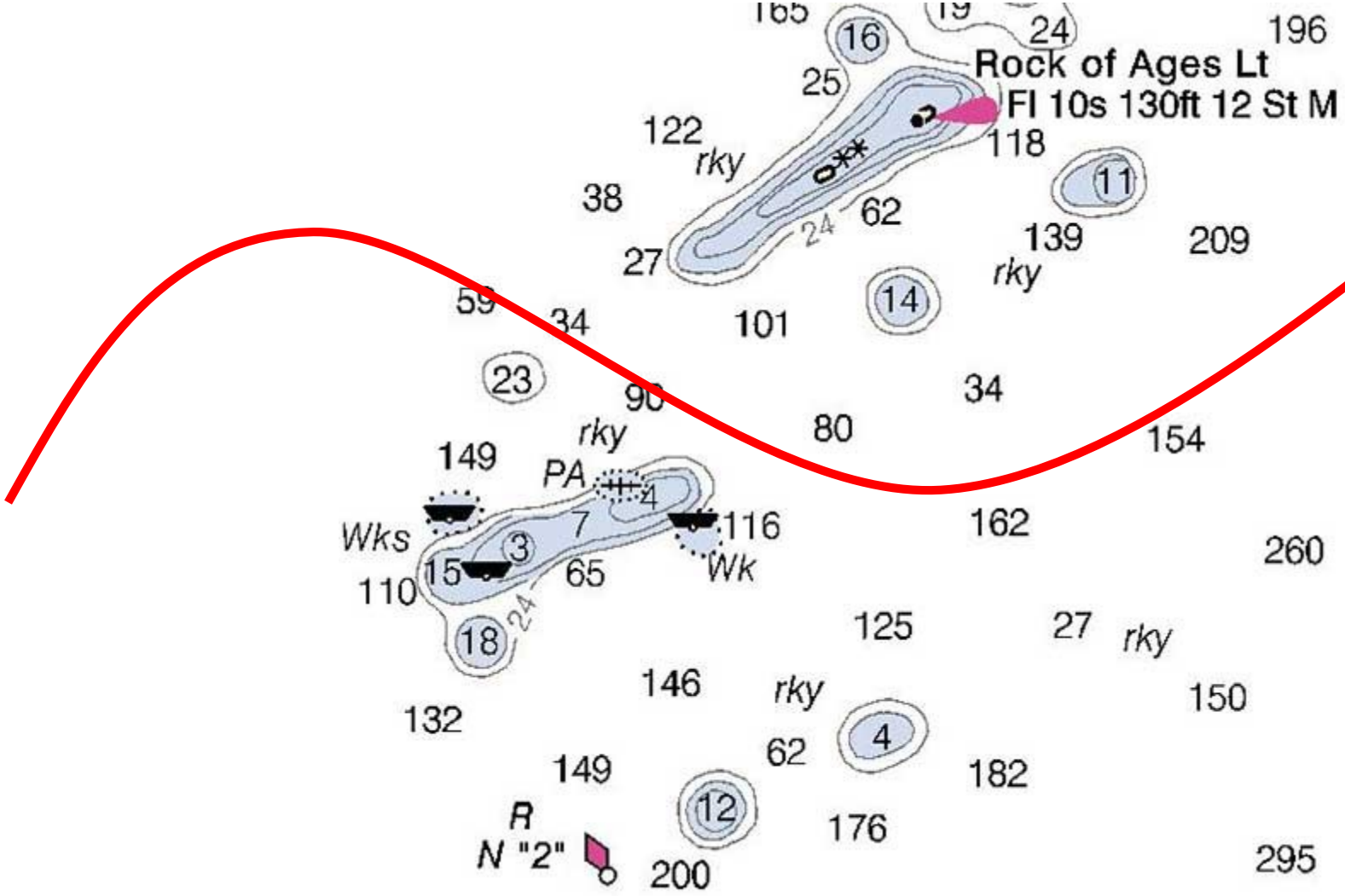
Connecting Europe Facility

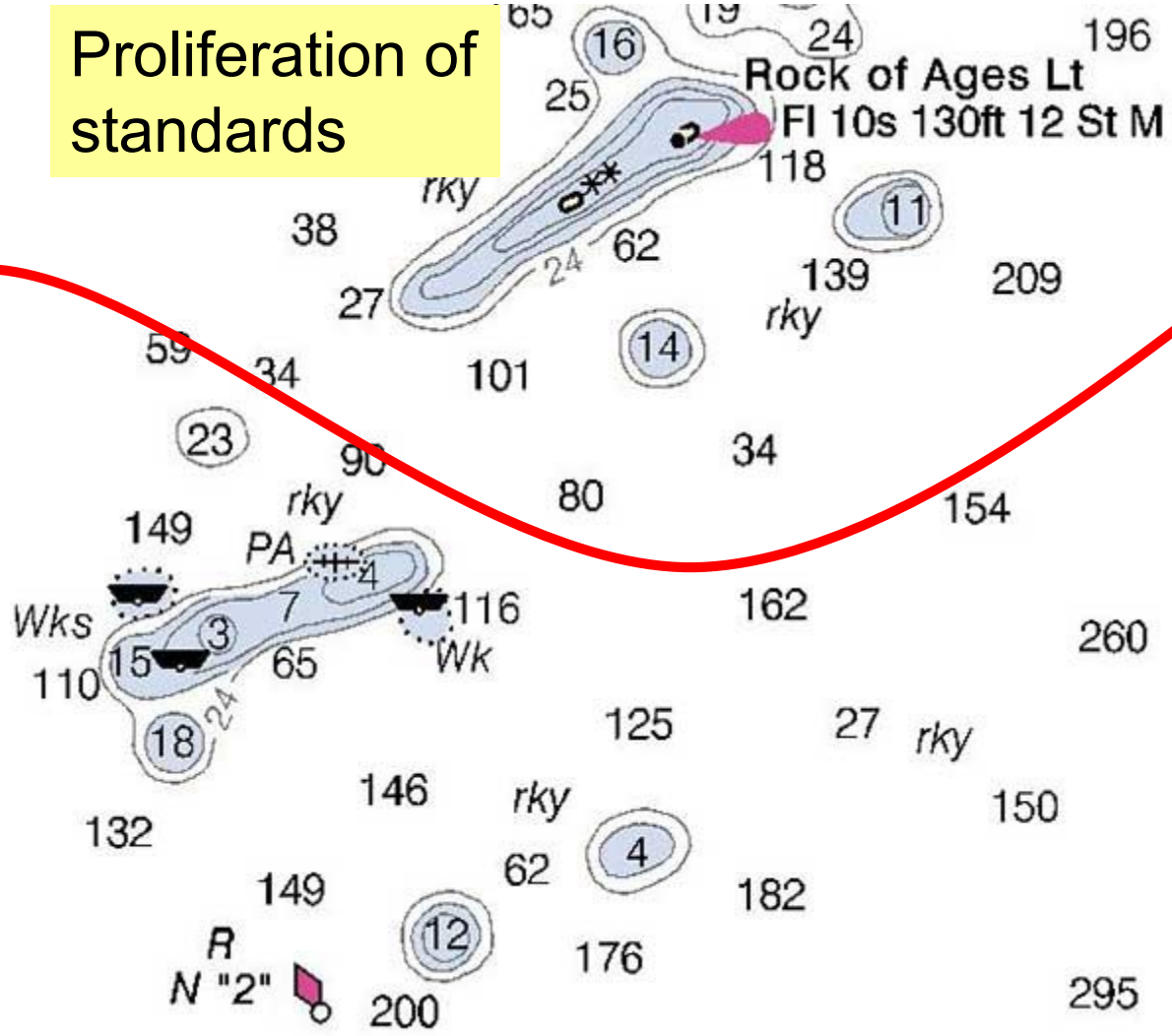
…navigating in foul waters



Co-financed by the European Union
Connecting Europe Facility

…navigating in foul waters

Proliferation of standards



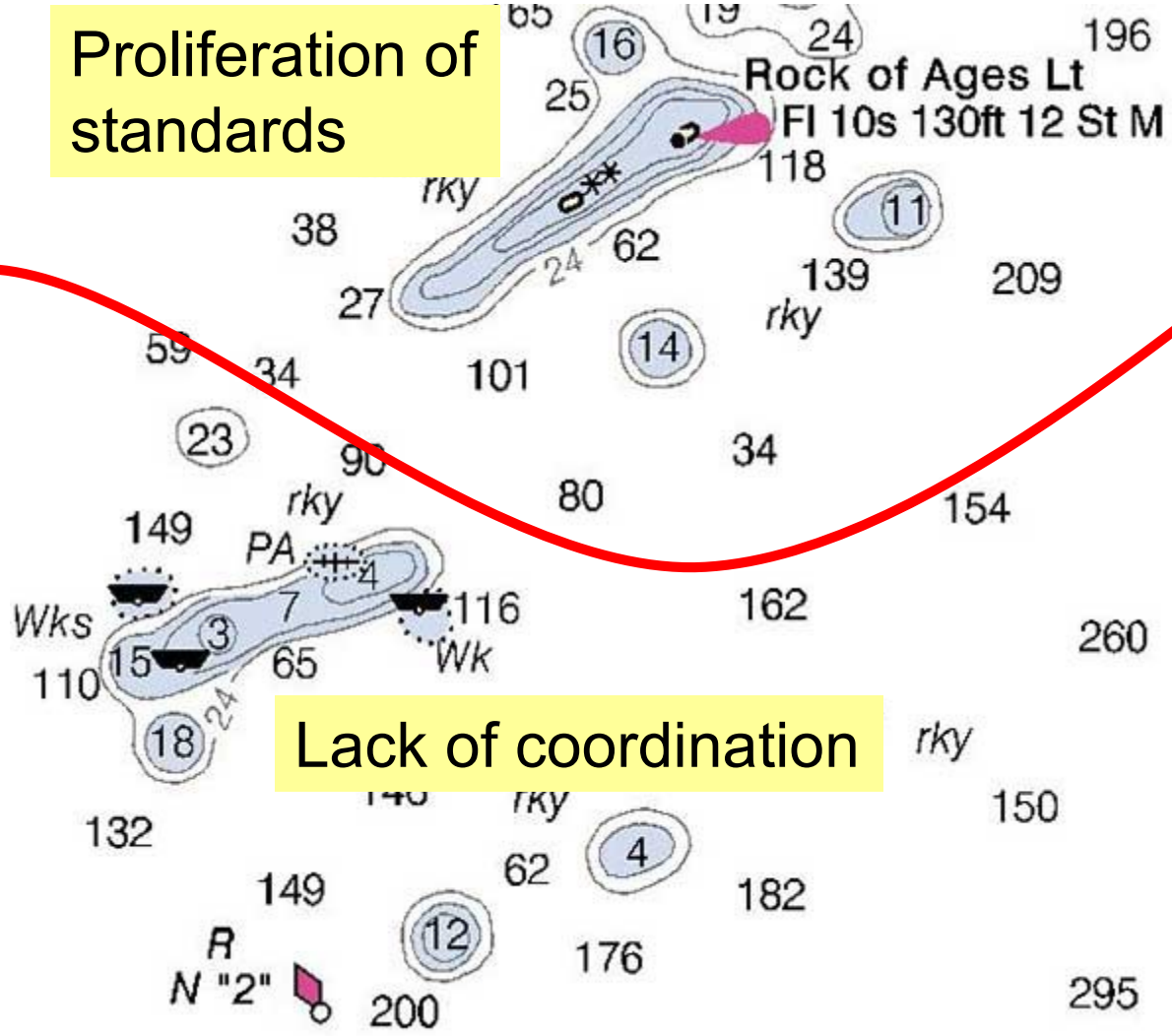
Towards interoperability

Co-financed by the European Union
Connecting Europe Facility

…navigating in foul waters

Proliferation of standards

Lack of coordination



Towards interoperability

Co-financed by the European Union
Connecting Europe Facility

Agreeing on standards!

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

Governance!

Co-financed by the European Union
Connecting Europe Facility

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

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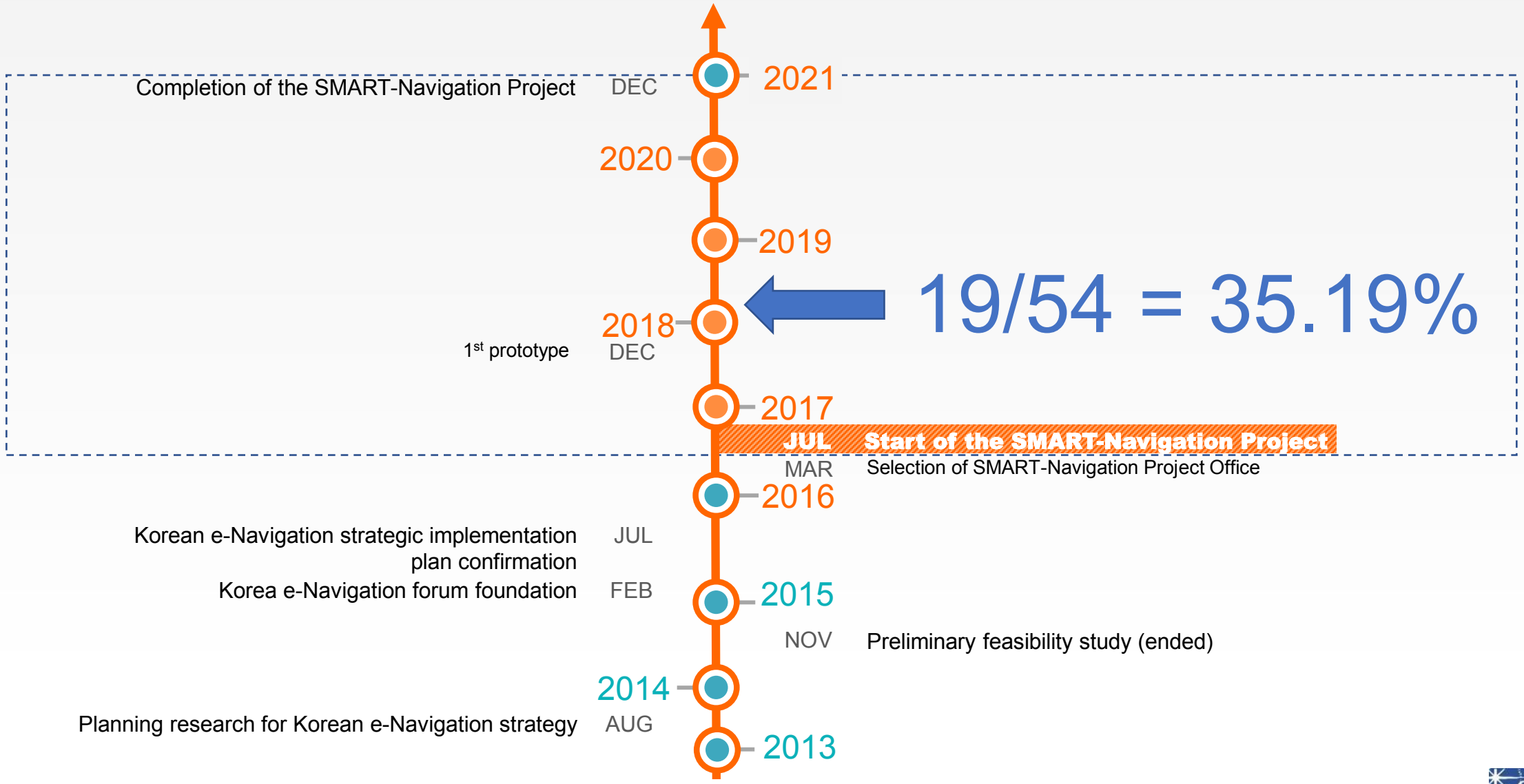
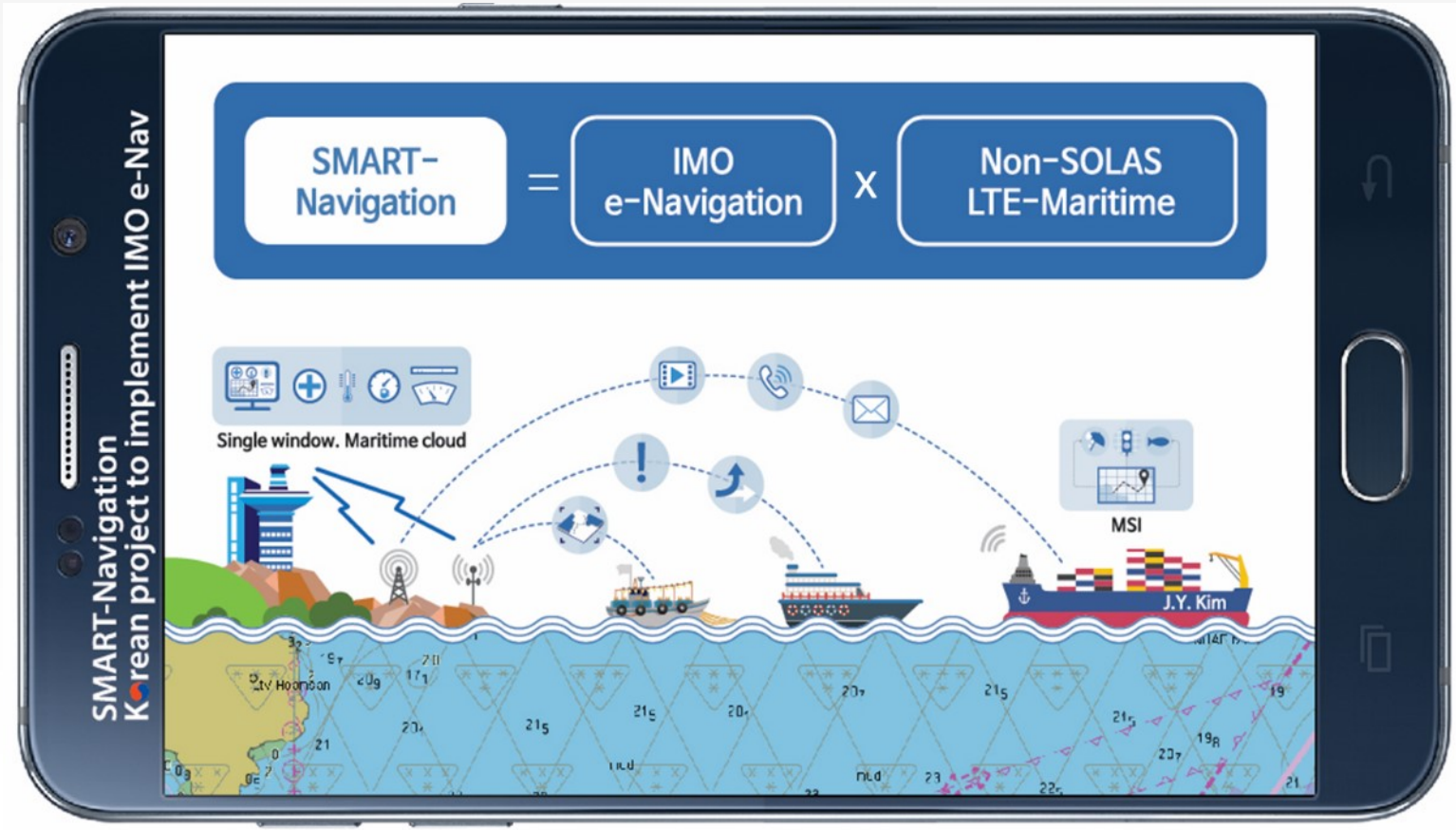
Connecting Europe Facility

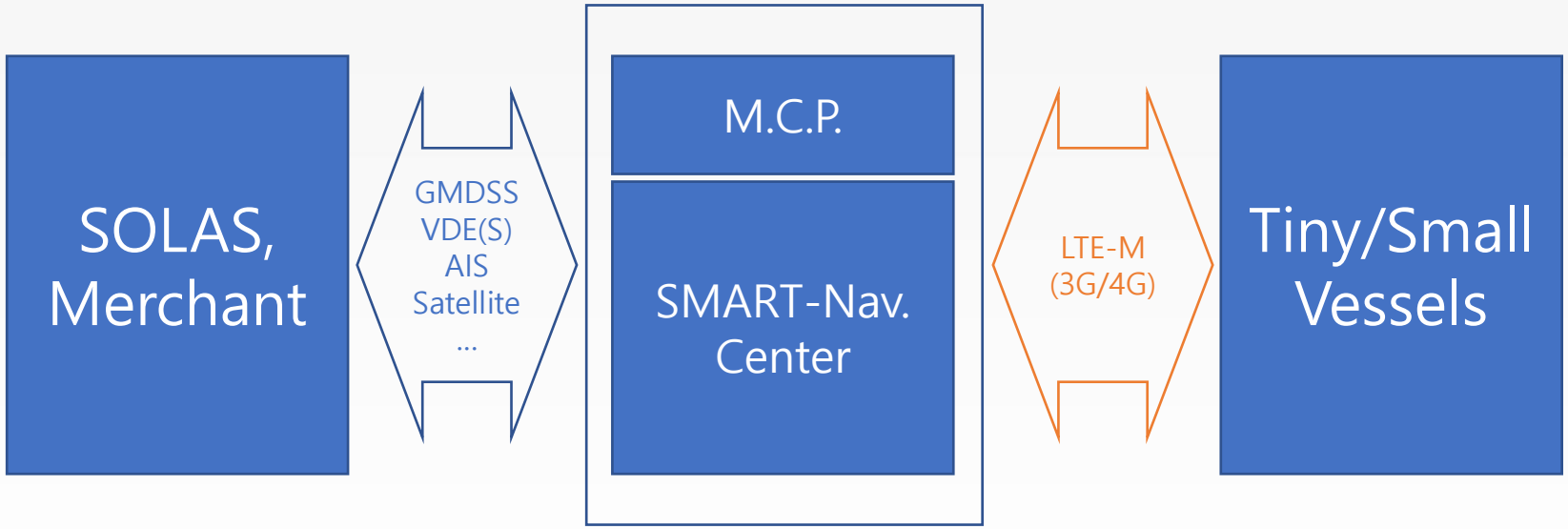
SMART-Navigation Project



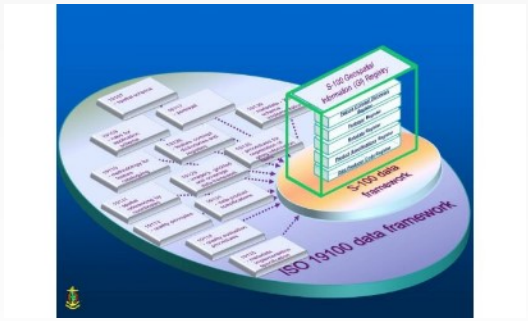
“More focus on Non-SOLAS ships”

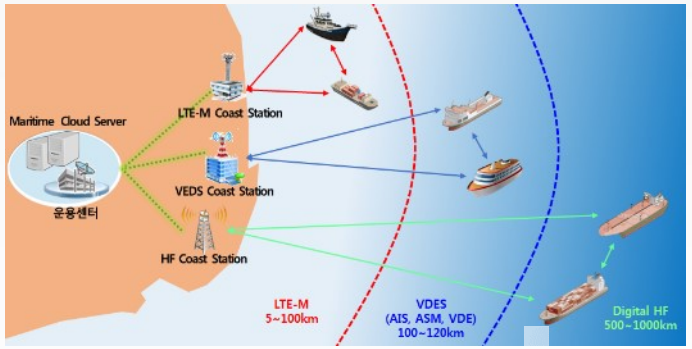


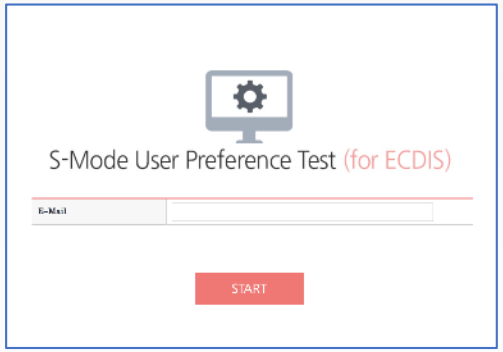
"WIDER CONNECTION SAFER NAVIGATION"



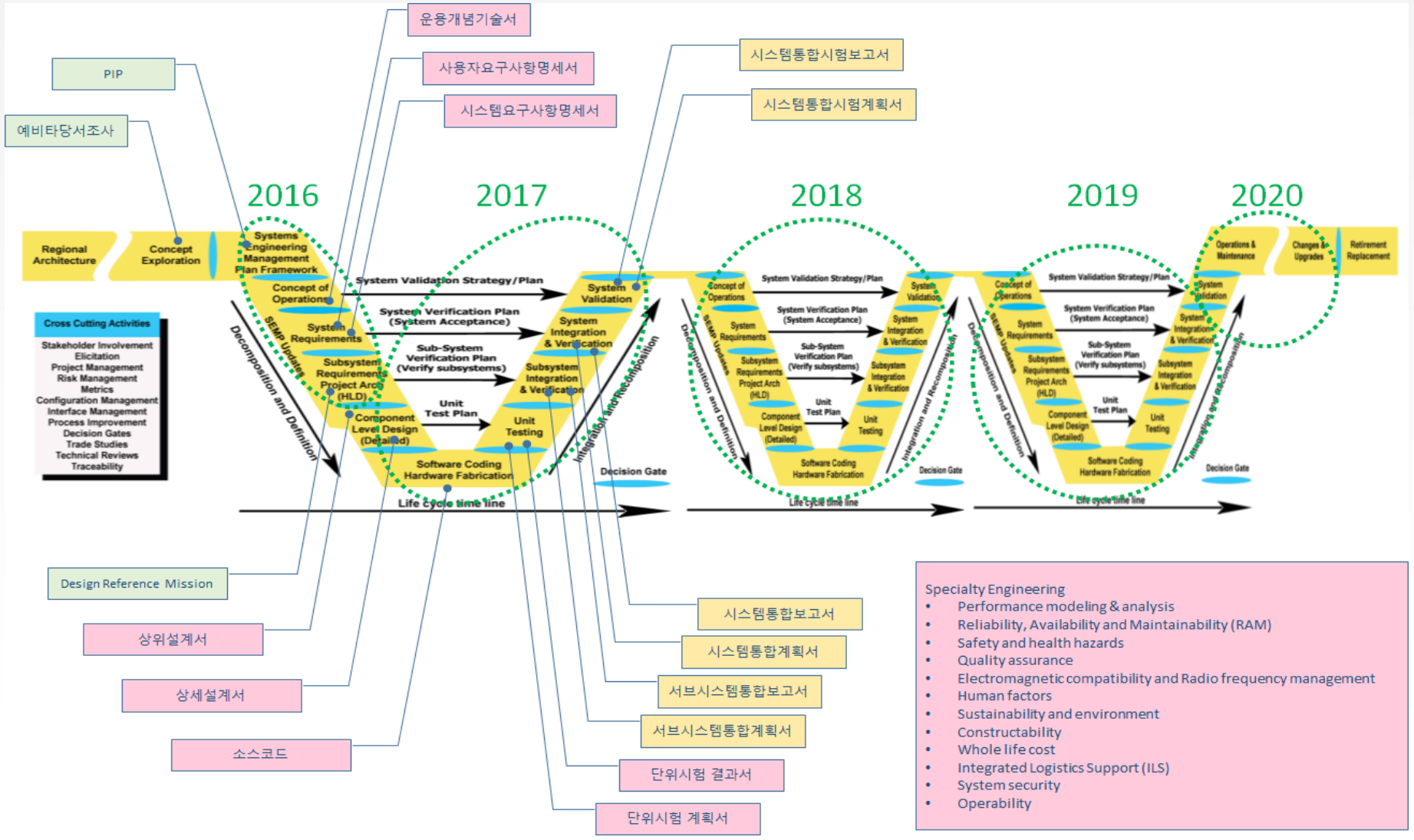
"Harmonization with International Standards"







"Systems Engineering Process"

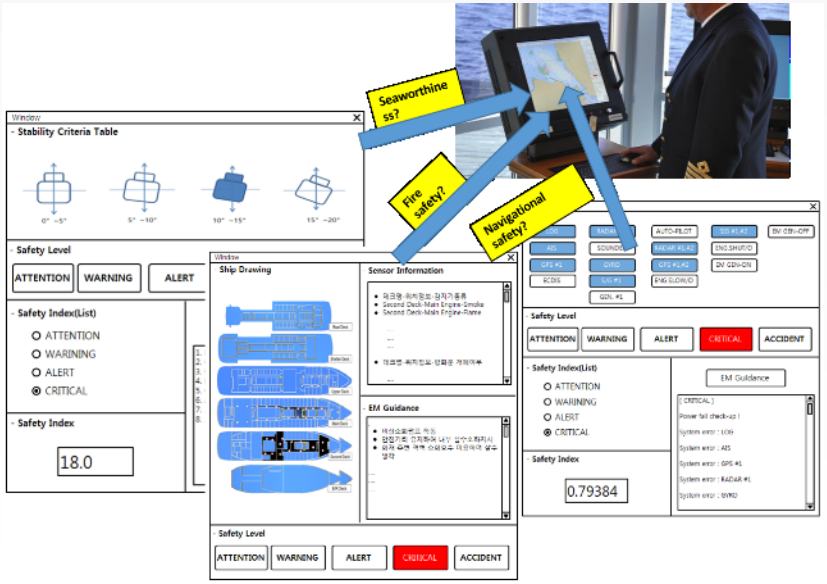


Specialty Engineering

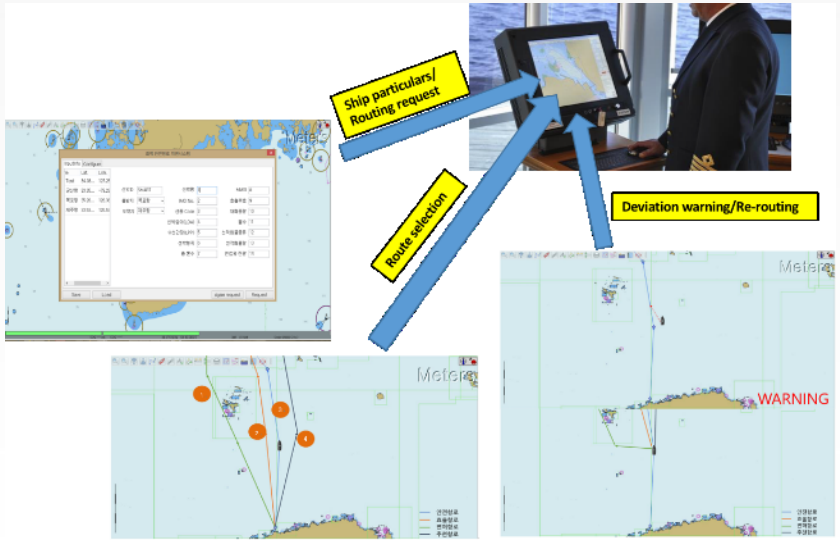
- Performance modeling & analysis
- Reliability, Availability and Maintainability (RAM)
- Safety and health hazards
- Quality assurance
- Electromagnetic compatibility and Radio frequency management
- Human factors
- Sustainability and environment
- Constructability
- Whole life cost
- Integrated Logistics Support (ILS)
- System security
- Operability

Service Name	Dedicated user/ship	Physical Link
Navigation Monitoring & Assistance Service (NAMAS)	High risk ships	LTE-M / VDES

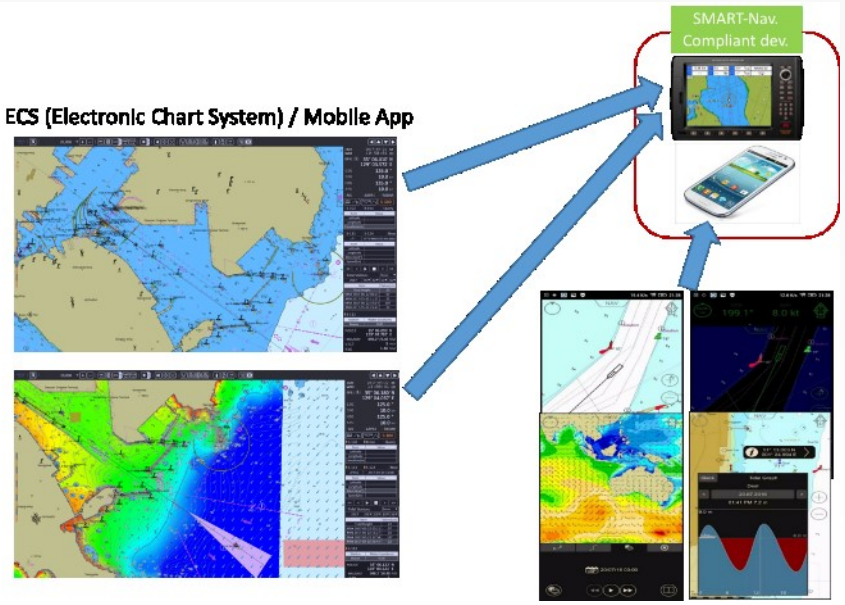
Service Name	Dedicated user/ship	Physical Link
Ship-borne System Monitoring Service (SBSMS)	• Passenger ships Korean Flag(Int'l, Domestic) • Ships requiring service	LTE-M, VDES, etc



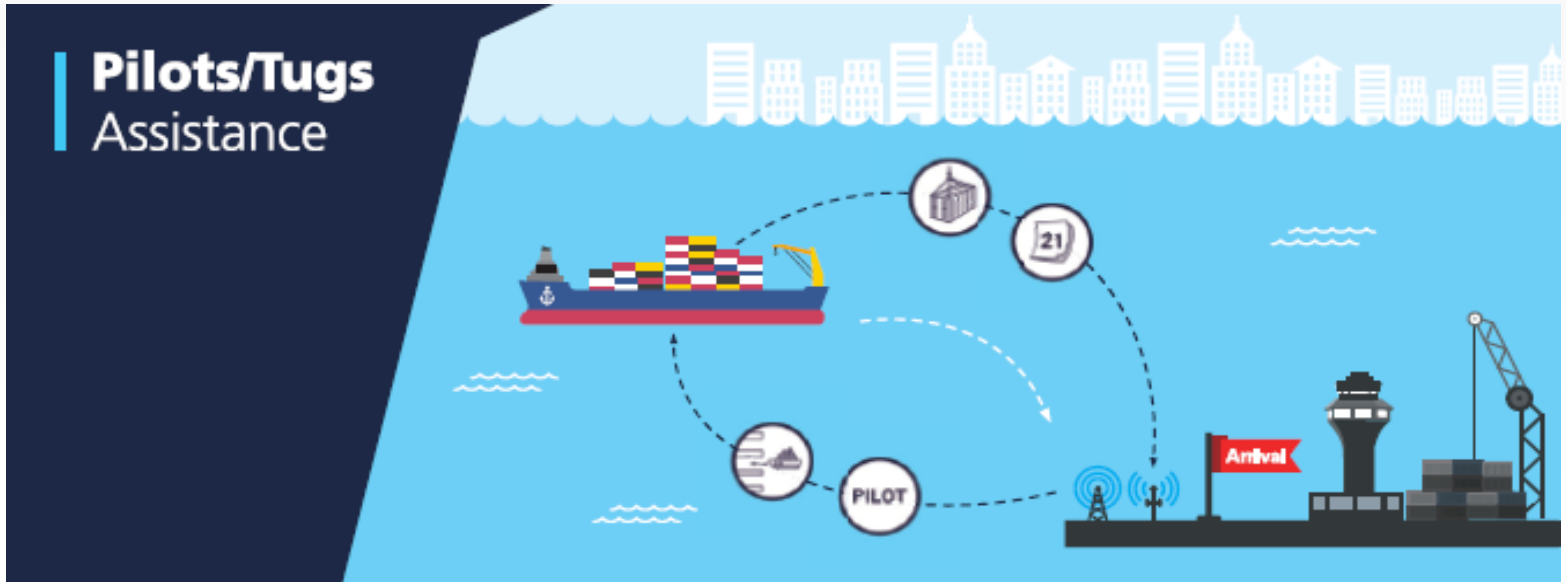
Service Name	Dedicated user/ship	Physical Link
Safe & Optimal Route Planning Service(SORPS)	• Passenger ships Korean Flag(Int'l, Domestic) • Ships requiring service	LTE-M, VDES, etc

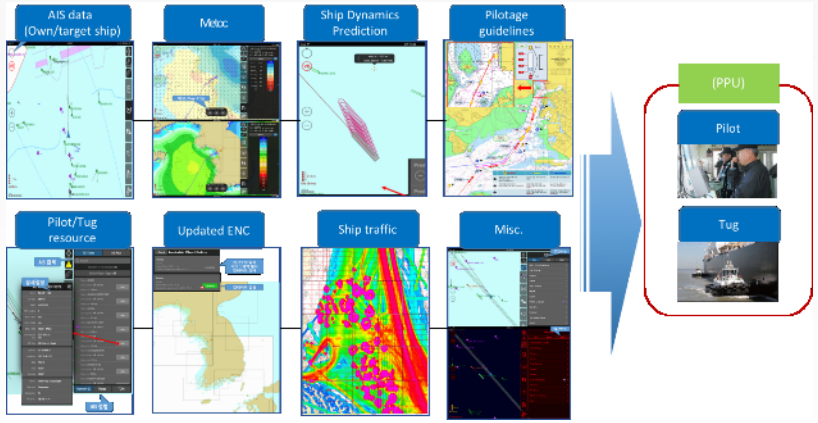


Service Name	Dedicated user/ship	Physical Link
Real-time Electronic Navigational Chart Distribution & Streaming Service(REDSS)	Non-SOLAS ships	LTE-M

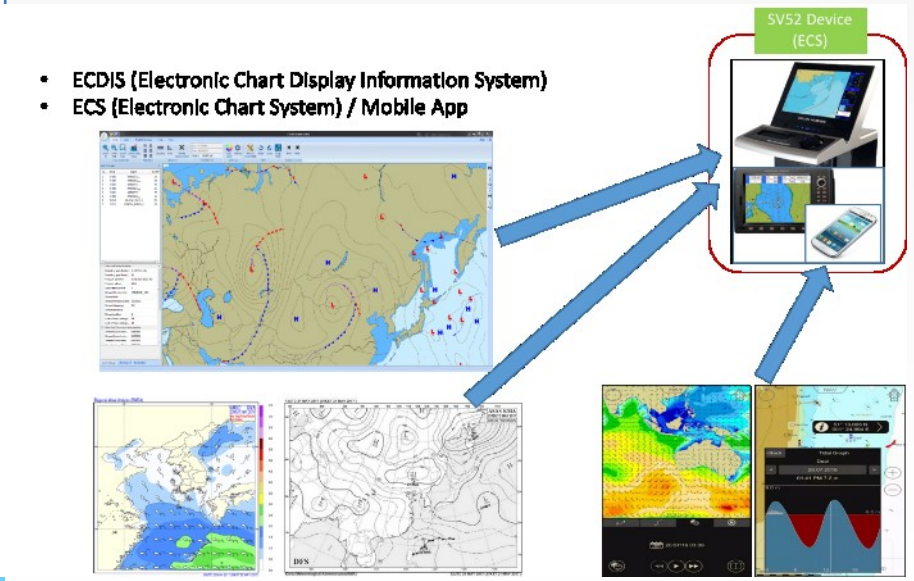


Service Name	Dedicated user/ship	Physical Link
Pilots/Tugs Assistance Service(PITAS)	Pilot / Tug boat	LTE-M

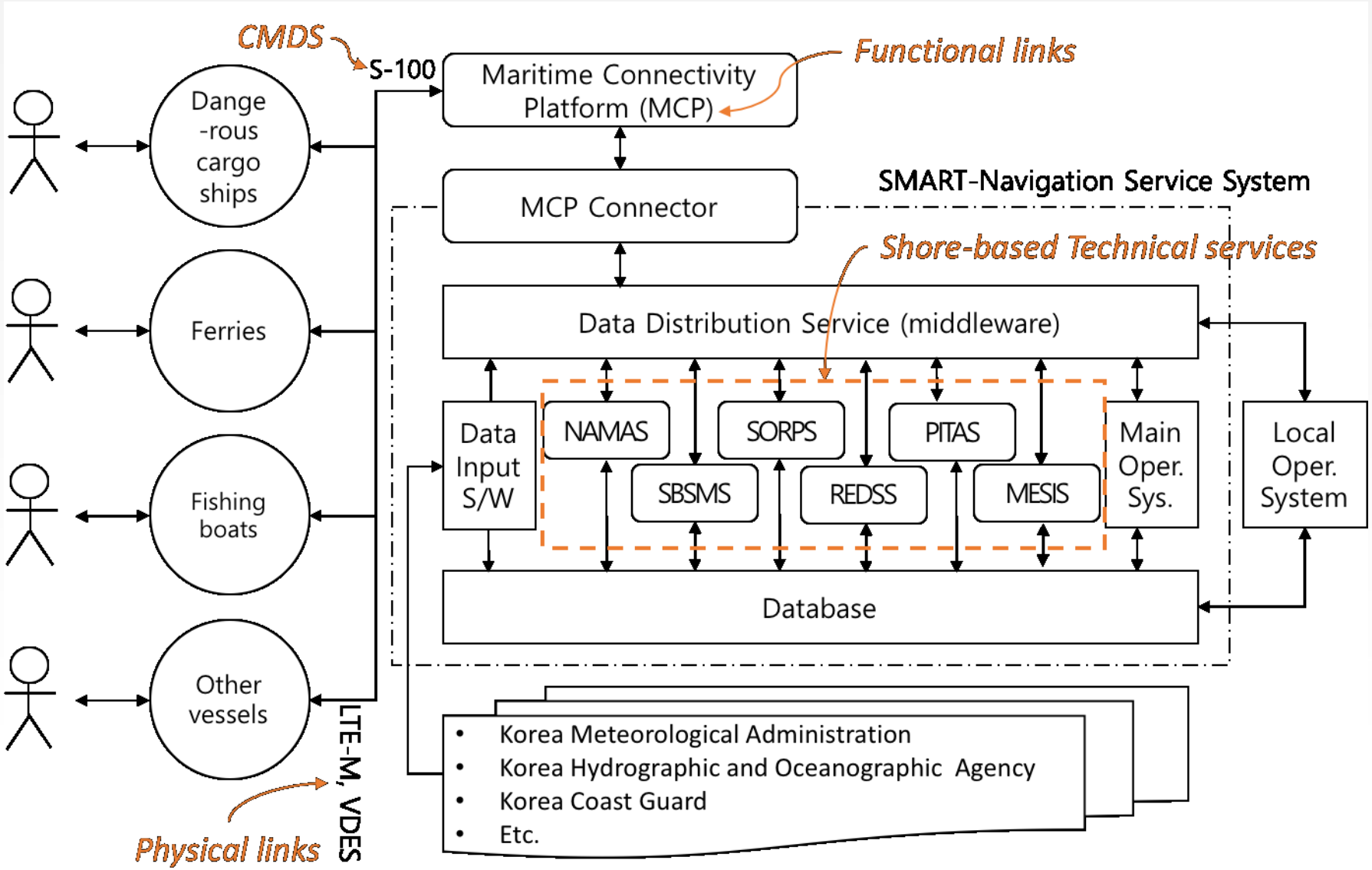




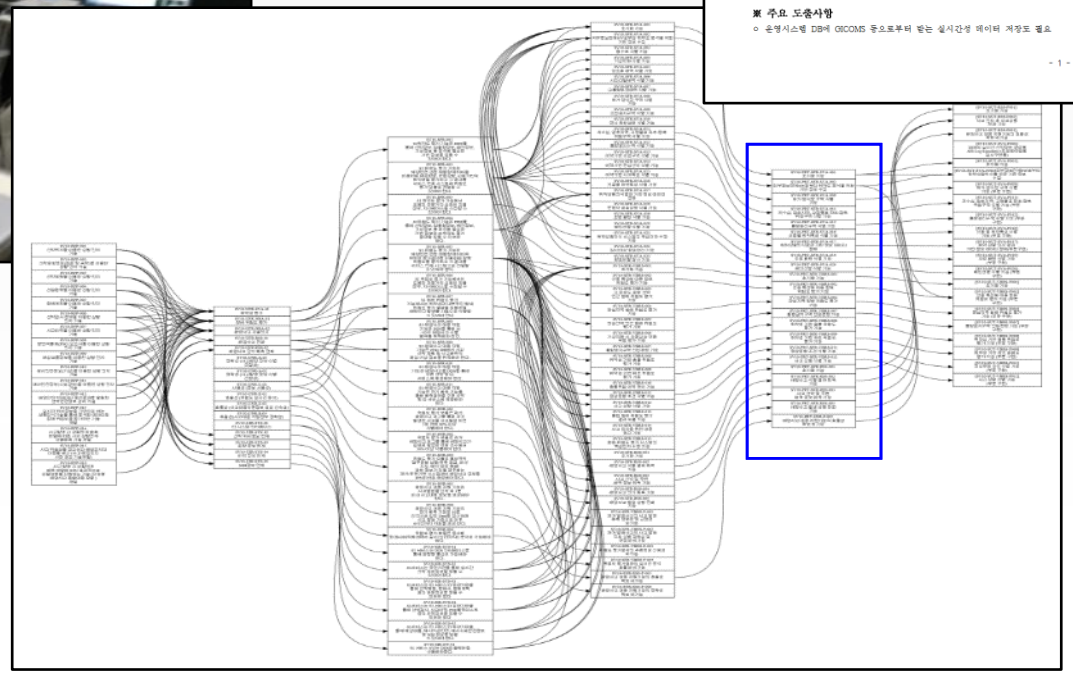
Service Name	Dedicated user/ship	Physical Link
Maritime Environment and Safety Information Service(MESIS)	Ships requiring the service	LTE-M, VDES, etc



Overall Architecture



Inspection on the 1st Prototype



2017년도 서비스 3차 통합시험 요구사항 점검 결과

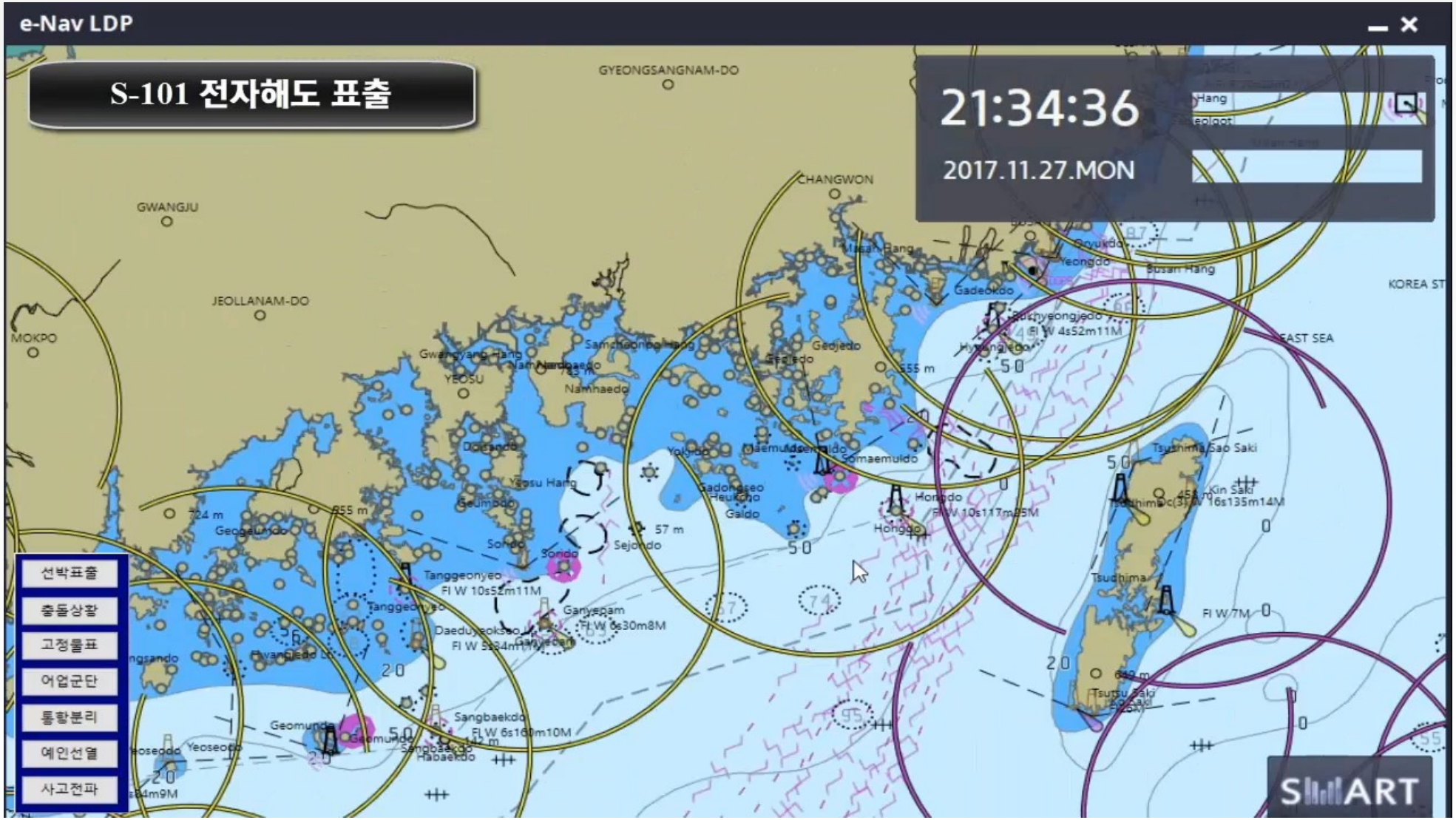
SV1. 사고취약선박 모니터링 지원서비스

점검일 : 11월 23일(목), 12월 6일(수)

CODE	요구사항	점검 결과	비고
SV10-PRT-SFR-SVA-001	초기화 기능	○	
SV10-PRT-SFR-SVA-002	외부정보연계SW로부터 취약도 분석을 위한 기반 정보 수집	○	
SV10-PRT-SFR-SVA-008	허가 양식장 구역 식별 기능	△	지적 데이터로 통합 수행함. DB 분리로 통합시험환경 연계 테스트는 미수행
SV10-PRT-SFR-SVA-011	저수심, 암초지역, 조정불로 좌초/접촉 위험구역 식별 기능	○	
SV10-PRT-SFR-SVA-012	통항분리수역 식별 기능	○	
SV10-PRT-SFR-SVA-016	선종별 취약특성 식별 기능	△	선종별 취약도를 Parameter로 구분하였다고 하였으나 확인 불가
SV10-PRT-SFR-SVA-017	취약상황인식결과 기반 정보 데이터 정제	△	필요, 불필요 데이터를 구분한다고 하였으나 확인 불가
SV10-PRT-SFR-SVA-019	조업 패턴 식별 기능	○	
SV10-PRT-SFR-SVA-020	예인선열 식별 기능	○	
SV10-PRT-SFR-VBRS-001	초기화 기능	○	
SV10-PRT-SFR-VBRS-002	선종 특성에 따른 항해 위험도 평가 기능	△	선종별 특성을 항해 위험도 평가 시 Parameter로 구분하였다고 하였으나 확인 불가
SV10-PRT-SFR-VBRS-004	관심지역 항해 위험도 평가 기능	○	
SV10-PRT-SFR-VBRS-007	통항금지구역 진입판정 기능	○	역주행 정사 위주
SV10-PRT-SFR-VBRS-008	취약성 기반 충돌 위험도 평가 기능	○	
SV10-PRT-SFR-VBRS-009	취약성 기반 좌초 위험도 평가 기능	○	
SV10-PRT-SFR-VBRS-011	정상운항 조건 식별 기능	○	
SV10-PRT-SFR-VBRS-012	사고 상황 식별 기능	○	
SV10-PRT-SFR-RSS-001	초기화 기능	○	
SV10-PRT-SFR-RSS-002	해양사고 식별 결과 취득 기능	○	
SV10-PRT-SFR-RSS-003	사고 선박 및 주변 해역 정보 취득 기능	○	SV52로부터 주변해역 정보 수집은 3차년도 고려
SV10-PRT-SFR-RSS-005	해양사고 발생 상황 전파 기능	○	
SV10-PRT-SNR-P-005	해양사고 대응 지원기능의 효율성 확보 비기능	○	

※ 주요 도출사항

○ 운영시스템 DB에 GICOMS 등으로부터 받는 실시간성 데이터 저장도 필요


e-Nav LDP
S-101 전자해도 표출
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2017.11.27.MON
선박표출
충돌상황
고정물표
어업군단
통항분리
예인선열
사고전파
GYEONGSANGNAM-DO
GWANGJU
JEOLLANAM-DO
CHANGWON
MOKPO
YEOSU
Namhaedo
Geojedo
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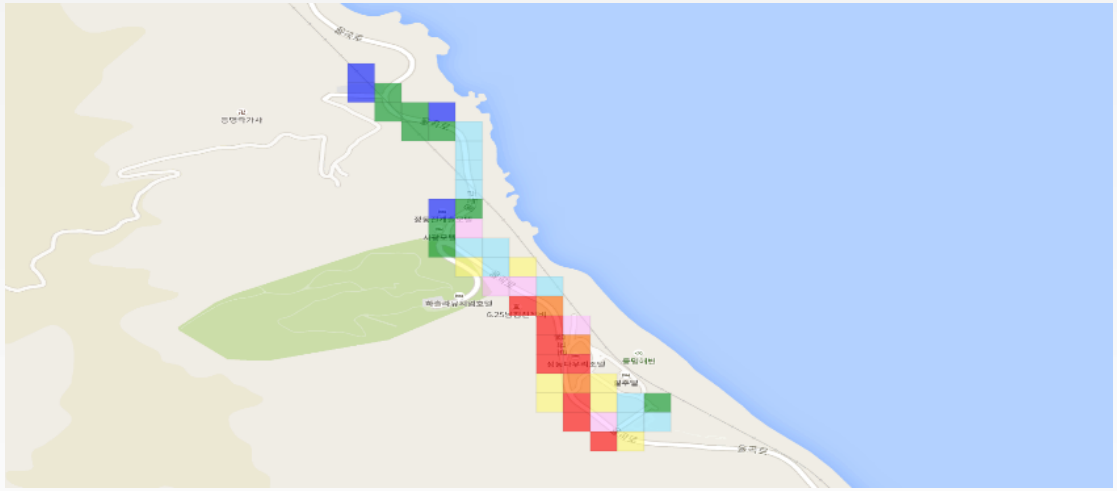
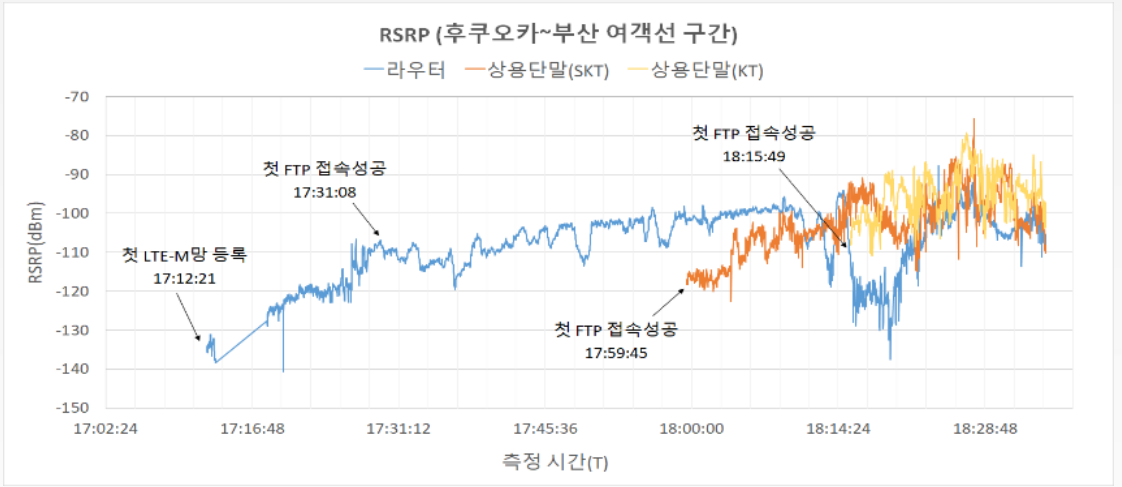
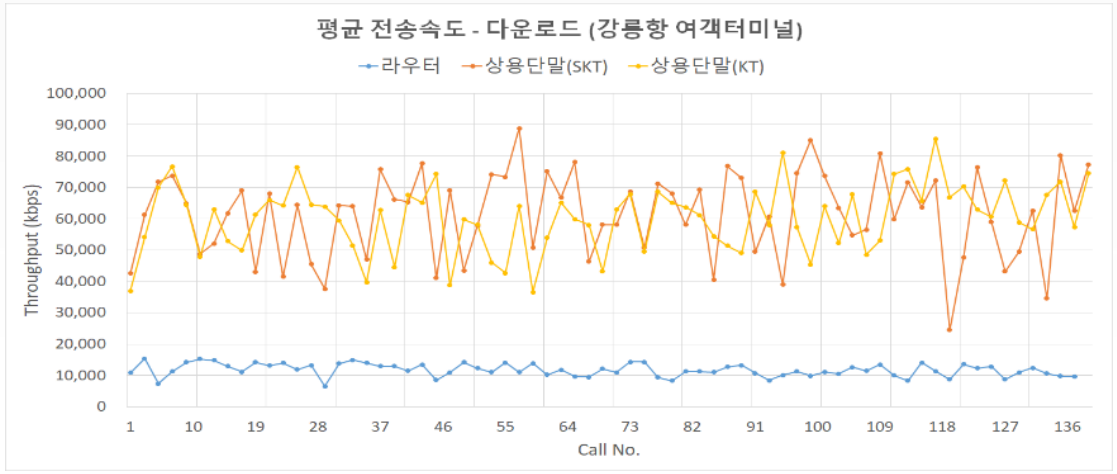
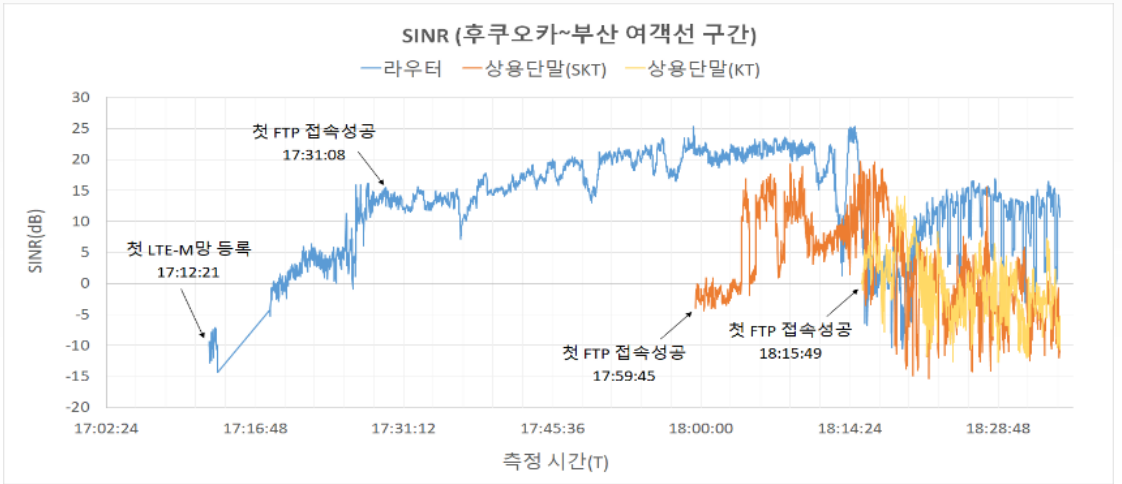
Geomundo
Tsushima
EAST SEA
KOREA ST
SMART

LTE-M Testbed









Drafting S-10x PS for SMART-Nav Svcs.

[Voyage Risk]

Type	Class Name	Description	위치정보 포함여부 및 내용
Feature Type	Ship	자선과 타선의 위치와 방향등을 관리하며, identifier로 자선과 타선을 구분함	O (선박의 위치)
	Voyage Risk	자선과 타선의 충돌위험도 계산 결과를 관리하기 위한 정보	O (예상충돌지점의 위경도)
Information Type	Ship Spec	선박의 일반적인 정보를 모은 것으로, 확장을 고려하여 포함되어지며, 필수정보(MMSI, IMO No, Ship Name 등)을 제외한 나머지정보는 nullable함	X

[Accident Management]

Type	Class Name	Description	위치정보 포함여부 및 내용
Feature Type	Accident	사고난 선박의 위치정보를 비롯한 상황파악에 필요한 정보를 관리	O (선박사고 위치)
	Route Prediction	사고 후, 사고선박의 이동경로와 유출유의 이동경로를 관리함	O ((하위 클래스가 위치를 가지며, 표현하지 않음)
	Vessel Route Prediction	사고 선박의 이동경로를 관리	O (사고선박 예상 위치)
	Spilt Oil Route Prediction	유출유의 이동경로를 관리	O (유출유 예상위치)
Information Type	WeatherInfo	사고해역에 대한 기상정보	X
	Ship Spec	선박의 일반적인 정보를 모은 것으로, 확장을 고려하여 포함되어지며, 필수정보(MMSI, IMO No, Ship Name 등)을 제외한 나머지정보는 nullable함	X

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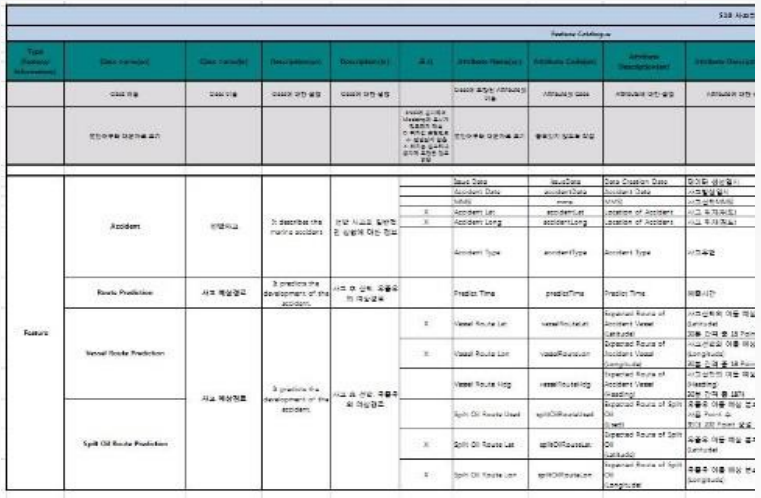

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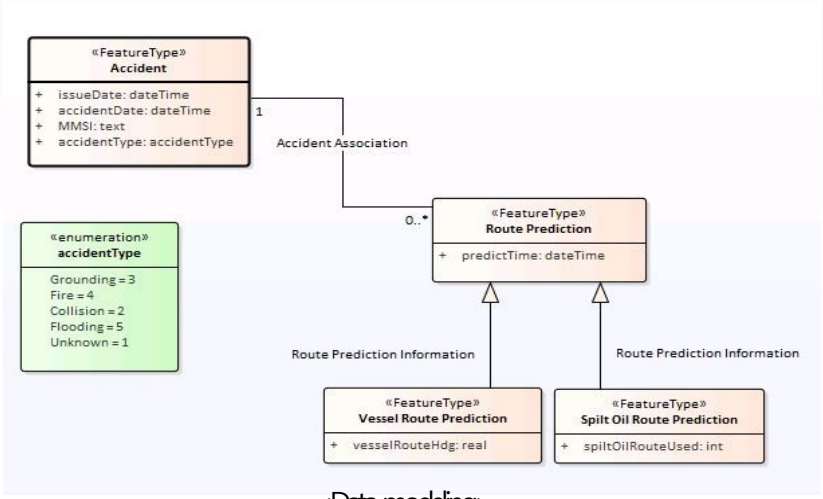

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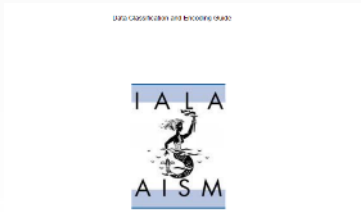

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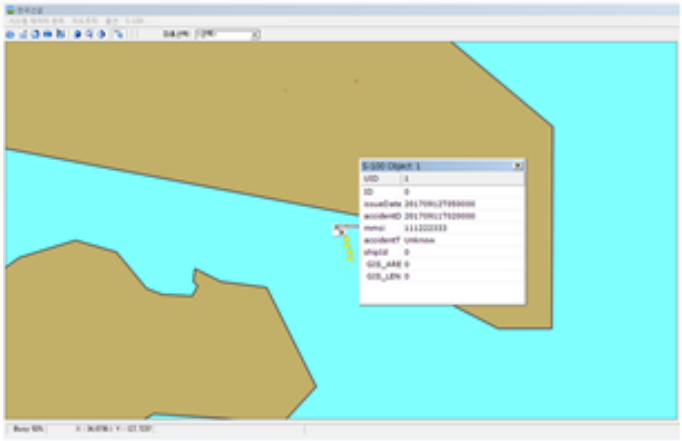
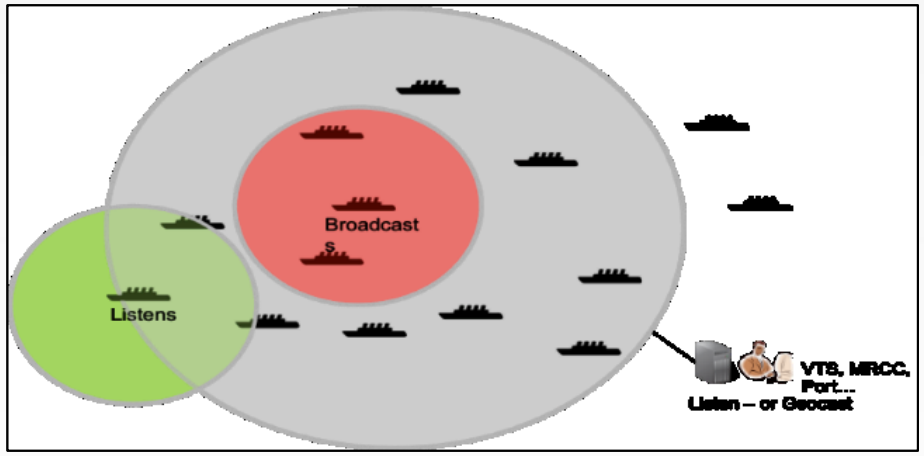
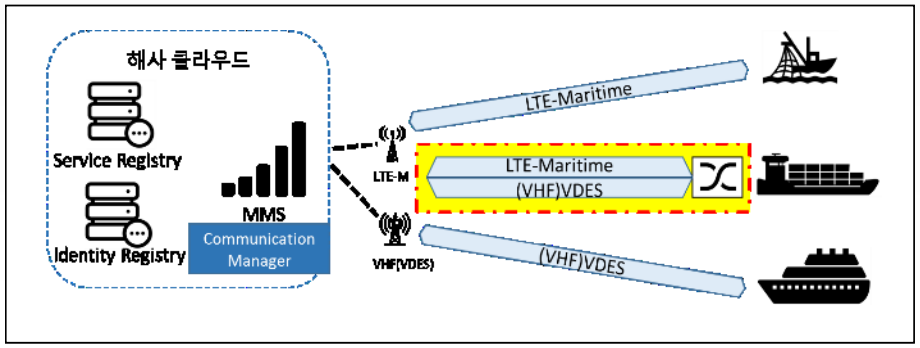
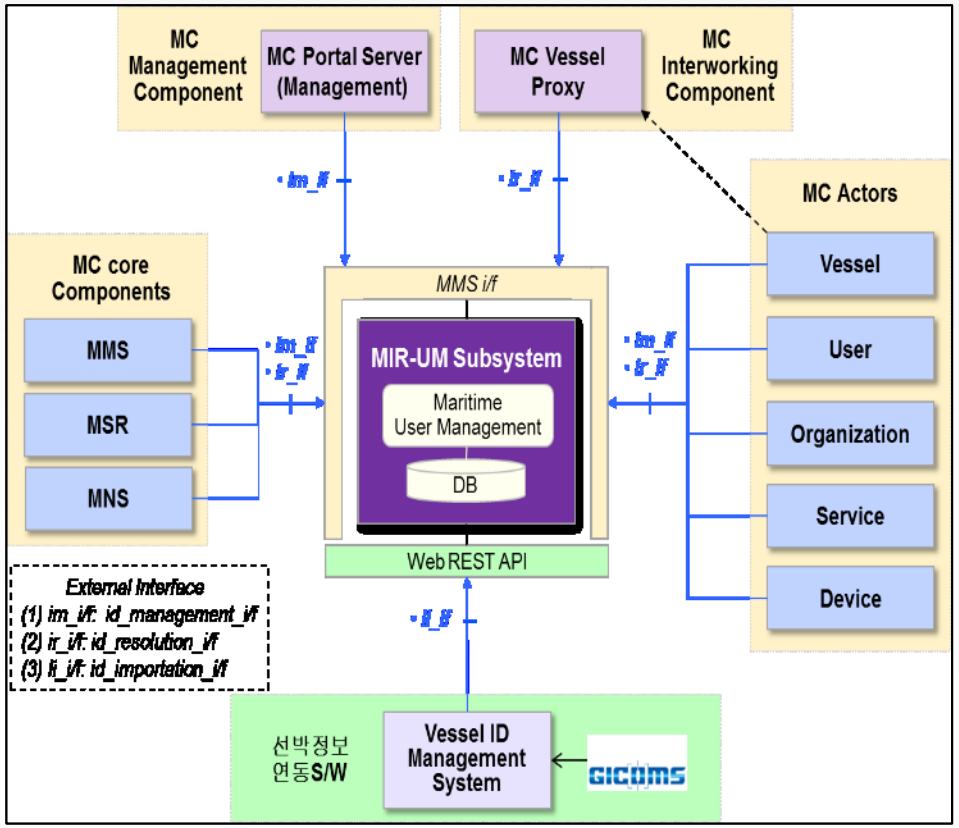


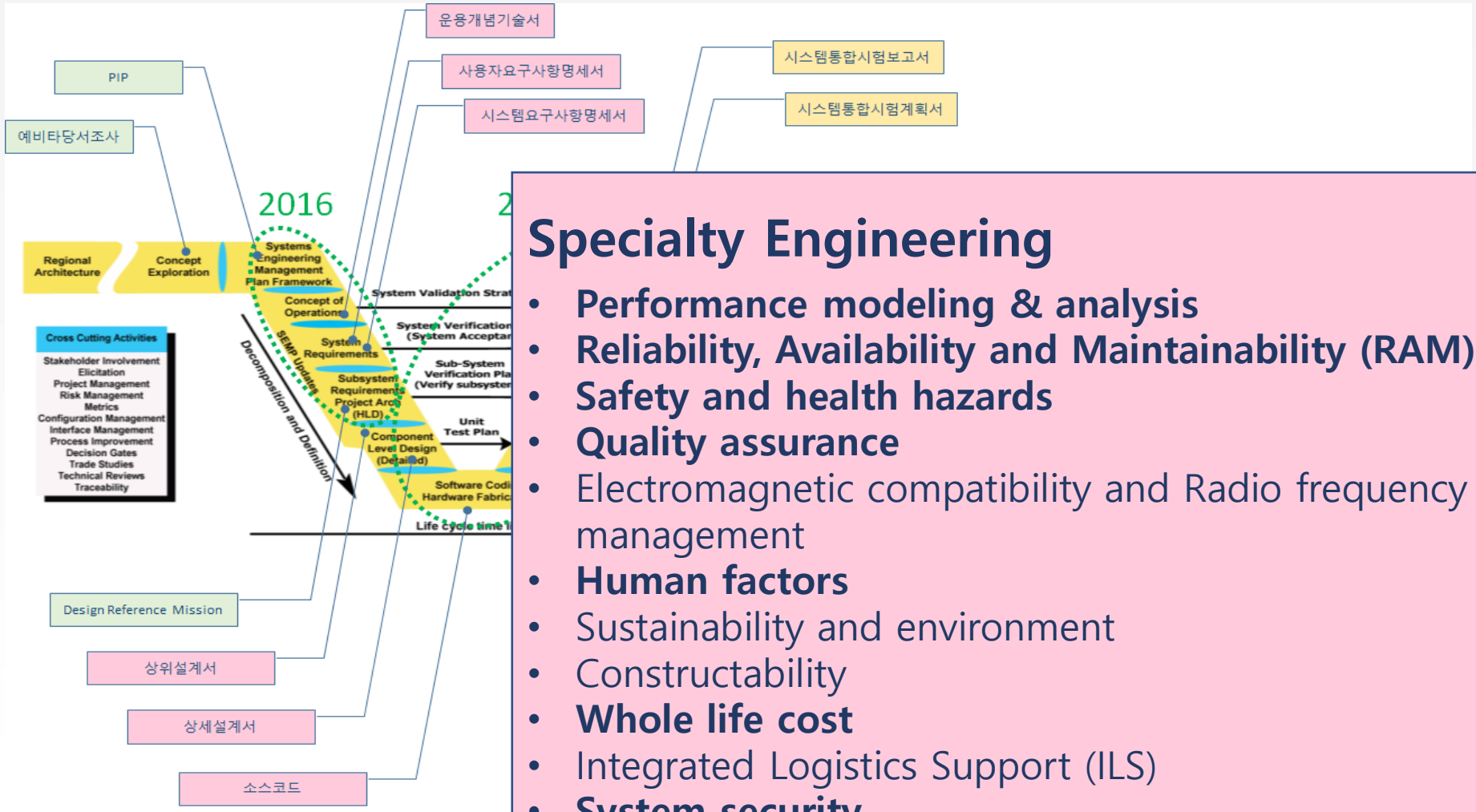
Maritime Messaging Service in MCP







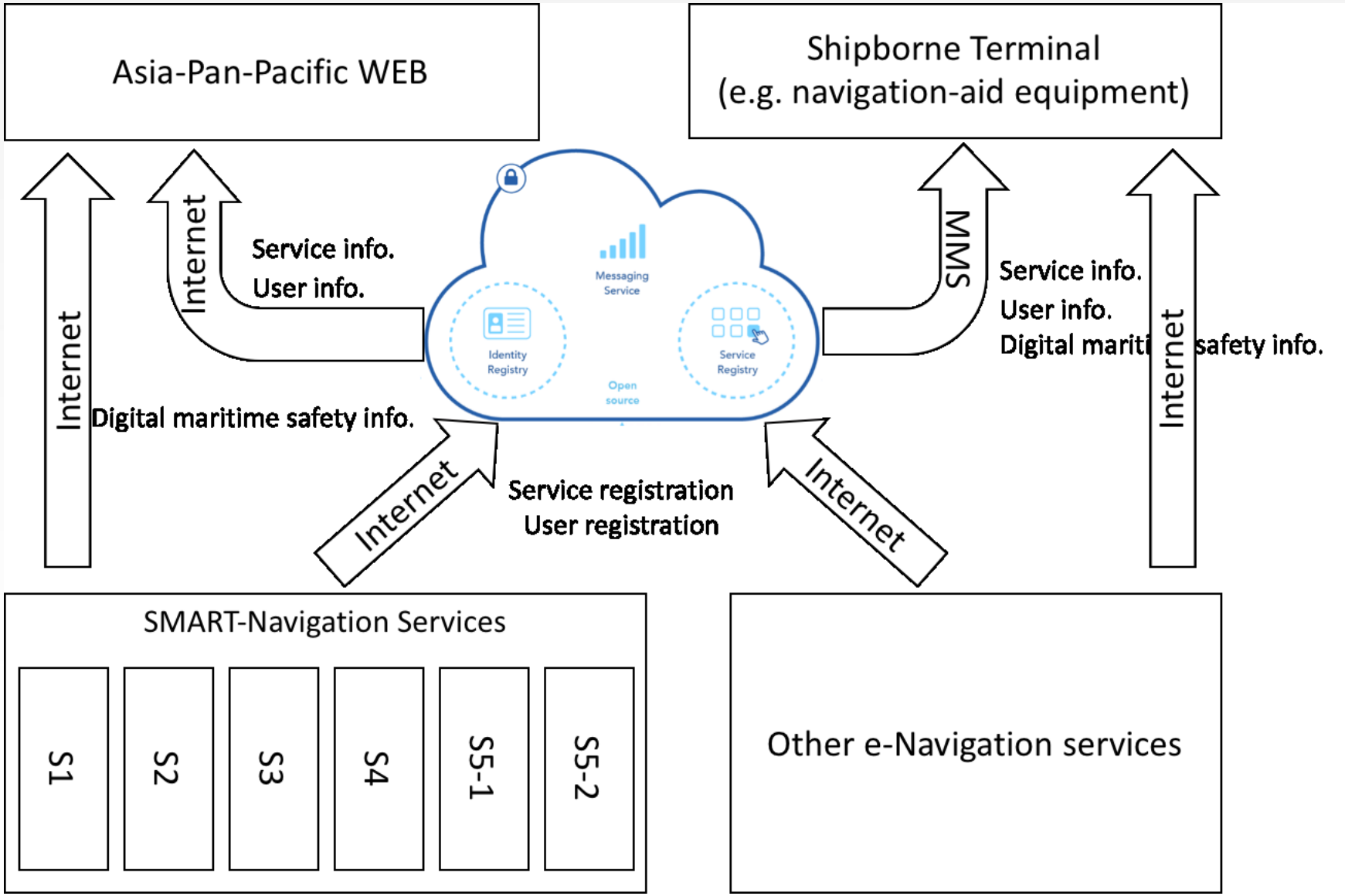
Specialty Engineering



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."


Asia-Pan-Pacific WEB
Shipborne Terminal
(e.g. navigation-aid equipment)
Internet
Internet
Service info.
User info.
Messaging Service
Identity Registry
Service Registry
Open source
MMS
Service info.
User info.
Digital mariti
safety info.
Internet
Digital maritime safety info.
Internet
Service registration
User registration
Internet
SMART-Navigation Services
S1
S2
S3
S4
S5-1
S5-2
Other e-Navigation services

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 status of specification
- Fixed error 400 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
- Bumped 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:

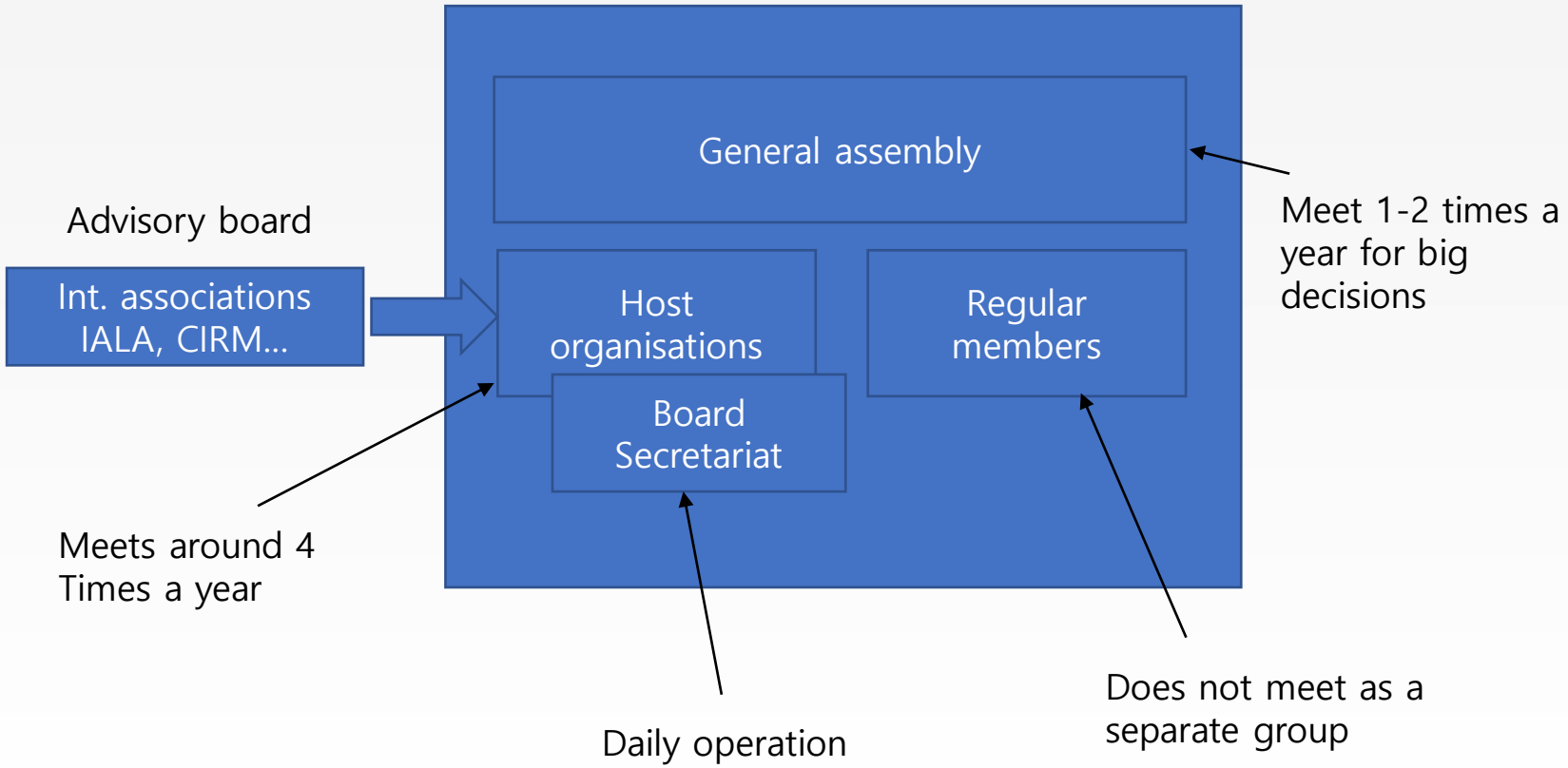
- URIs for OIDC redirects are no longer validated as URL
- Added functionality to issue certificates in other formats than PEM
- Added functionality to link a vessel to a service instance
- Added functionality to add an image to a vessel
- Better checking for if a user already exists
- Bumped some dependencies
- Fixed bug where only one permissions was copied from Keycloak
- Fixed bug where default sub ca 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

- Renamed 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 "simulated"
- The list of Instances can now be filtered for simulated or non-simulated Instances
- Instances now shows 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 the a Vessel
- It is now possible to add a link between a Service and a Vessel. This is done through the Service Register/Update page. The the 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 JKS
- 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

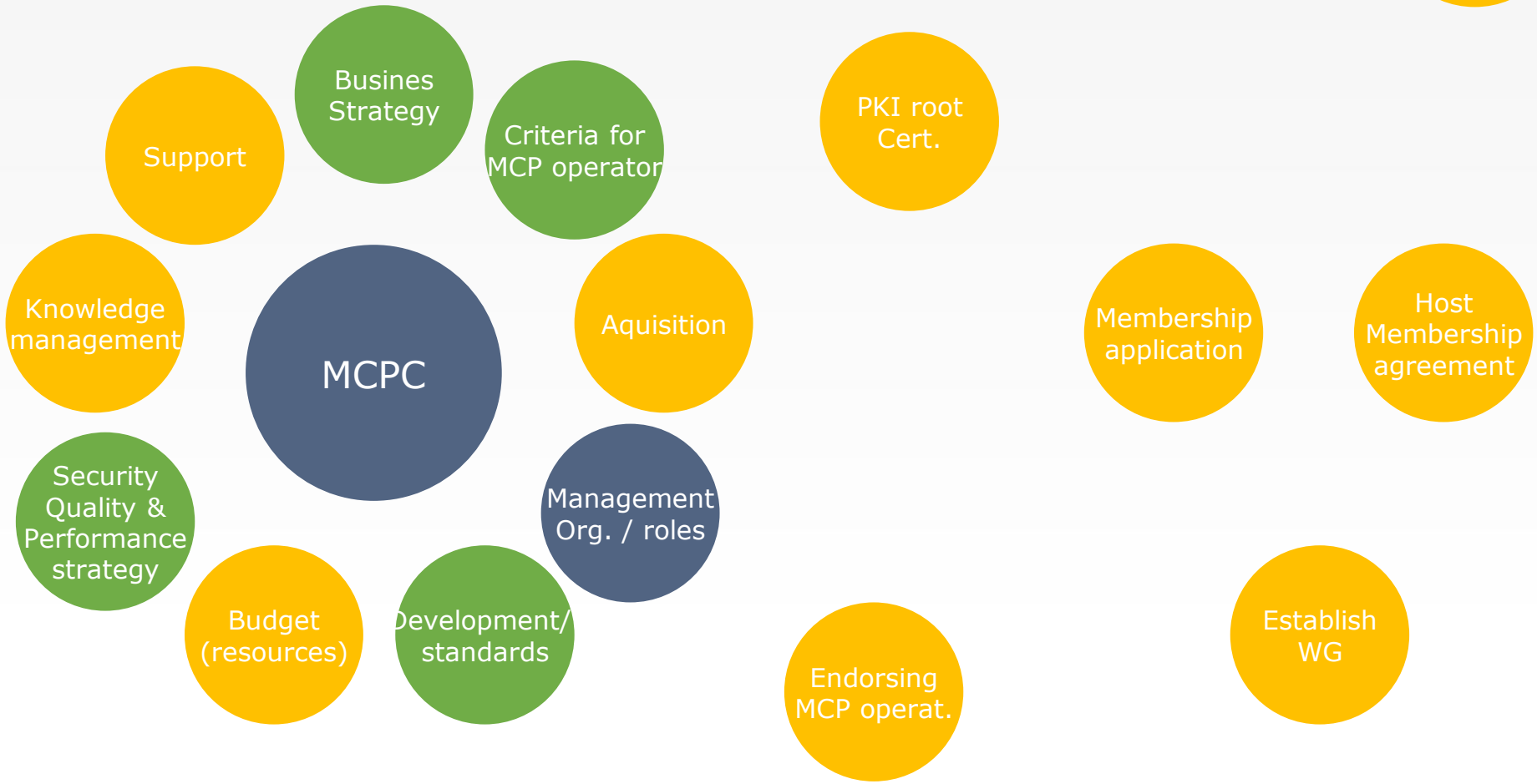
The Last "Season 1" MCDF Meeting

MCP “Consortium”: MCPC



MCPC D&R Model

Decision & Responsibility Model



Waiting for MCDF “Season2”

Converging initiatives!

SESAME Straits

e-Navigation
Intelligent Ship
Traffic Management

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

Co-financed by the European Union
Connecting Europe Facility

Converging initiatives!

International Taskforce Port Call Optimization

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

- Interoperable
  - ETA from STM ships
  - PTA to ships
  - Static port data to ships
- Coordinating efforts
- Planning for projects

Co-financed by the European Union
Connecting Europe Facility

Converging initiatives!

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

Co-financed by the European Union
Connecting Europe Facility

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!

SMART
WIDER CONNECTION SAFER NAVIGATION

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

Co-financed by the European Union
Connecting Europe Facility

SMART

Lasting results, collaboration!

SESAME Straits e-Navigation Intelligent Ship Traffic Management

International Taskforce Port Call Optimization

SMART NAVIGATION PROJECT WIDER CONNECTION SAFER NAVIGATION

EFFICIENSEA 2.0 GETTING CONNECTED

Co-financed by the European Union Connecting Europe Facility

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

Co-financed by the European Union
Connecting Europe Facility

Ministry of Oceans and Fisheries

Co-financed by the European Union
Connecting Europe Facility

STM
SEA TRAFFIC MANAGEMENT

SIMART
WIDER CONNECTION SAFER NAVIGATION

고맙습니다!