THE E-NAV ZONE
INCREASED EFFICIENCIES THROUGH USE OF E-Navigation Services AND SMART CONNECTED SHIP A PILOT PROJECT IN GULF OF FINLAND (EASTERN PART)

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E-Navigation Underway 2017
THESIS is a cloud-based platform that brings together

**FLEET OPERATIONS, SHIP SOLUTIONS, ACADEMY** functions,

and **SHIP TRAFFIC CONTROL** solutions on one interactive,

flexible platform with unparalleled functionality.
ADDRESSING THE USER NEED

MOVING FROM “P” TO “E”

What are the user need?
How can we address them?
Can we provide a solution to the user need using “e-nav technologies” ........

Is the customer ready to pay for it

- Planning and Optimization
- Data Supply
- Monitoring
  - Tracking & Navigation safety
  - Voyage Performance
  - System performance & Alarms
  - Crew performance
- Decision Support and Control
- Remote service and Support
- Reporting and documentation
- Data collection and Analytics
THESIS DATA ECOSYSTEM

Ship
- Sends monitoring data, voyage plan and reports
- Optimizes the voyage plan and sends confirmation
- Coordinates a fleet of vessels sailing globally
- Improves the decision-making process
- Sends voyage plans and positioning reports
- Provides real-time decision support
- Monitoring, control and support
- Sends voyage plans and positioning reports
- Access to online training content at any time
- Decision support in real-time or in preparation
- Carries administrative tasks on behalf of the ship
- Simulates real-time sensor data for the operators training
- Shares a common operational picture for training in realistic environment

Ship Traffic Control Centre

Fleet Operations Centre
- Analyzes the Ship crew performance and creates a Recommended Training Plan
- Ship crew performance reports
- Confirms new ETA
- Reports, e.g. in case of danger or lost AIS signal

Academy
- Shares a common operational picture for training in realistic environment
- Provides real-time decision support
E-NAV SERVICES

VOYAGE INFORMATION SERVICE

INFORMATION DELIVERED

- Individual vessel route
- Estimated time of arrival
- Recommended time of arrival
- Alternate route if necessary

Routes and Components:
- Vessel
- Route
- Cross Check
- Route Management System
- Monitoring route
- Alternate route
- VTS
- Port Terminal
- ETA
- RTA
E-NAV SERVICES

SAFETY INFORMATION DELIVERY

Addressed delivery to vessel entering the VTS area

Regular broadcasts to all vessels

VTS

INFORMATION DELIVERED

Amendments and changes in information concerning the VTS area such as boundaries, procedures, radio frequencies, reporting points

Meteorological and hydrological conditions

Any information concerning the safety of navigation

No Go areas, Navareas, SAR Areas

Notices to Mariners

Weather information
The system informs operator (shore & Ship) about dangerous situations.

Operator receives route suggestions (alternative) from the DSS that avoid close situations and increase CPA.

Operator approves the decision.

The decision is automatically delivered to the on-board ECS / ECDIS or pilot device as a VTS recommendation.
E-NAV ZONE

PROJECT GOALS

• Development of E-NAV technologies that allow optimization of processes and information sharing between vessels, operators, service providers and authorities in the test bed area.

• Deploy the technologies into Transas products

• Prepare test platforms for live testing of the solutions.
E-NAV TESTBED PROJECT

PROJECT STAGES

• Stage 1 - Dec 2016
  • Developing of the e-Nav architecture
  • Implementation of e-Nav functions: route exchange, AIS binary data exchange text chat
  • Validation in the simulation environment

• Stage 2 - July 2017
  • Implementation of e-Nav functions: remote support, S-124 areas, route validation
  • Validation in the simulation environment

• Stage 3 - Dec 2017
  • Implementation of e-Nav functions: hydrographic data delivery, active decision support system, route optimization
  • Validation in the simulation and real environment

• Stage 4 - July 2018
  • Implementation of e-Nav functions: reporting, port information messages, telemetry
  • Validation in the simulation and real environment
E-NAV ZONE PROJECT

Project Stakeholders
- Ships
- VTS / STC operators
- Ship owners
- Ship operators
- Pilots
- Coastal services

Testbed e-Nav zone in Great Port of Saint-Petersburg
THESIS E-NAV STRUCTURE

INFRASTRUCTURE FOR COMMUNICATION AND INFORMATION EXCHANGE

- Ships
- Ports
- Pilots
- Agents
- Service providers
- VTS
- Other stakeholders
SAINT-PETERSBURG TESTBED FOR E-NAVIGATION

SIMULATION CENTER

- 2 vessels bridge
- 1 STC operations station
- 1 FOC operators station
- 2 Pilots mobile set
- Simulator instructor place
MILESTONE 1- DECEMBER 2016

- Test using Simulator that involves
  - STC: Transas VTS/STC
  - Ships: Transas ECDIS
  - Pilot: Transas Pilot Pro (iPad)

- Arrival/departure to/from the port of Saint-Petersburg

- Same exercises was run twice:
  - #1 e-Nav services was not used
  - #2 e-Nav services in use

- What did we study and measure
  - Comparison of the volume in VHF communication
  - Accuracy in information exchange
  - User Feedback - perception
SCENARIO DESCRIPTION

SAMPLE OF SCENARIO

- Vessel 1
  - Inbound to Port of Saint-Petersburg
  - Pilot onboard at PBP

- Vessel 2
  - Outbound from Port of Bronka Pilot onboard
  - Leaving pilot at BPP

Vessels meeting during the during passage of the Saint-Petersburg Maritime Channel.
E-NAVIGATION SERVICES USED

- Voyage Information Service – Route Exchange ship-shore-ship
- Route Exchange Ship to Ship AIS ASM
- Text communication (AIS Binary)
- Vessel route and safety monitoring (STC)
- Routes and intentions of other vessels in the area
- Weather station information via AIS ASM

Other achievements,

- Test of Lightweight PPU equipment with WIFI Connection
MILESTONE 1 RESULT

• VHF Communication reduced by 30%
• Clarity and accuracy in information exchange improved
• Situation awareness - Pros and Cons
  • Ship to Ship route exchange – good prediction of meeting points
  • All actors can have the same picture of the situation
  • Reduced VHF traffic - some users missing part of the “Big Picture”
• Benefits for the users
  • Less stress and reduction of workload
  • Improves safety of navigation (Ship to Ship)
  • Simplifies planning of port operations and allied services
  • Minimizes amount of routine VTS operations
  • Reduces the VTS operators load
  • Speed-up delivery of correct information
FUTURE SERVICE TO BE TESTED PHASE 2-4

- Auto routing and Route Validation
- Route optimization Service
- Shore based performance monitoring
- Decision Support and post-analysis of near-miss situations
- Maritime Safety Information (MSI) – MSP5
- Data delivery
  - Navigational warnings – S124
  - Bathymetric Services – S102
- Vessel Shore reporting – MSP8
- VTS Navigation Assistance Service (NAS) – MSP2
- Remote Service and Diagnostics
- Port Arrival (Service ordering – Time of Arrival Support)
- Exchange of Sea Traffic Information between several STC/VTS
Thank you!

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