Intelligent Fairway Smoothening Path for Autonomous Vessels

Jorma Timonen, e-Navigation Underway 2017

31.1.2017
Topics

- Intelligent fairway project
- Products and services
- Co-operation
- Autonomous vessels
FTA’s Digitalisation Project 2016 - 2018

1. Traffic and information about traffic
2. Capacity management of railroad network
3. Predictive maintenance of road network
4. Predictive maintenance and supporting systems for railroad network
5. Intelligent maritime fairway
6. Digitalisation of interaction with customers

We don’t want to wait for the future – we want to create it!
Sub-project 5: Intelligent fairway

- Finnish Transport Agency’s project which aims to develop new services for mariners and other actors of the maritime industry

- **Phase I**
  - Description of products
  - Methods to collect data
  - Description of interfaces

- **Phase II**
  - Testbed(s)
  - To test and validate tools and services developed in Phase I
    - For example data transmission
      - Sea – shore – sea
  - Currently we do not known exact results of the project – will be defined based on upcoming ideas and discussion – *what the user needs?*
Goals of the Intelligent Fairway

**N2000 vertical datum**  
/Jyrki Mononen  
Define and plan the transition to use of N2000 vertical datum in hydrography and hydrographic products in Finland.  
Not to be included to Phase II

**Bathymetric Models**  
/Stefan Engström  
Define product specifications of the bathymetric models and simulation systems to validate them. Develop maintenance of the bathymetric models produced by other bodies (e.g. harbour authorities)

**Dynamic Under Keel Management**  
/Stefan Engström  
Define product specification for under keel clearance management. IHO’s project, FTA participates and follows work of the group.

**Maritime Safety Information**  
/Jouni Patrakka  
Define and implement standard procedures for use of the AIS ATON messages.

**Digital Saimaa Channel**  
/Seppo H. Mäkinen  
Collect digital information for models of Saimaa Channel both on dry land and below the surface.  
Not to be included to Phase II

**Water level and weather**  
/Jouni Patrakka  
Develop collection and distribution of water level and weather data using AIS.

**Remote Control of Navaids**  
/Sami Lasma  
Develop mechanisms and processes for remote control of navaids.

**Phase II: Test beds**  
/Jorma Timonen  
Testbed for products and processes defined in Phase I.
Vision of the Intelligent Fairway Project

- In the project FTA will **develop** and **test** information products for mariners to be used in navigation keeping both safety and efficiency in mind.
- Products will be tested in real use – first in simulators and then on board
- New bathymetric products together with real-time water level information will improve transport efficiency
- Better situational awareness about weather and water level will improve safety of navigation

Hand in hand – safety and efficiency
Production of sea level data and other weather data Q1/2017, distribution Q2/2017

- FMI produces forecasts for water level (under construction) and confirmation of forecasts in real time. Information will be distributed as AIS messages through national AIS network and AIS GW-service. In the future also other weather data will be distributed using same methods.

- A testbed installation (by Luode Consulting) will produce other data form fairway areas using ADCP. Data to be produced; e.g. currents, ice, wave height and direction of waves.
Lanterns produced by Estonian company Cybernetica are equipped to measure inclination of the buoy.

Analysis of 5 buoys' measurements has been made and compared to FMI's wave height and wind records in 2013-15.

Improved lantern has been produced; new model is more robust to resist forces of ice conditions.

8 new buoys has been installed and new test phase started. Collected data will be analyzed when there is enough data available.
Precise bathymetric model of the fairway
Test areas

- Testbeds in three geographical areas
  - Porvoo Sköldvik – Gulf of Finland
  - Uusikaupunki – West coast
  - Rauma – West coast
- All three ports are interested in development of new tools
Consortium of Interested Bodies

● January 24th was the first discussion forum for all interested bodies
  • There were 40+ participants including
    • Other public sector organisations
    • Private sector
    • Third sector
    • Presentations and news about digitalisation and networking in development of new services

● Idea of network of interested parties (consortium) was raised and will be created
  • Lead by FTA
  • All interested organisations are welcome
  • Free of charge
  • Meetings, workshops, networking, new ideas: together we are stronger
1. Arctic testing for intelligent transport automation
   Technology test sites in real winter conditions with broad selection of services

2. Digital transport infrastructure and connected cars
   Accurate mapping of road infrastructure and signage enabling connected driving and analytics for traffic management

3. Intelligent infrastructure asset management
   Data collection and refined traffic management and maintenance processes in the era of automation

4. Mobility as a Service
   Flexible and affordable mobility services for tourists and locals without car dependency

THE ARCTIC INTELLIGENT TRANSPORT TEST ECOSYSTEM
AURORA  - Arctic challenge 2017-2018

- Call for intelligent infrastructure and road vehicle automation solutions and their performance and impacts in Arctic conditions
- Bases on Road transport automation Road map and action plan 2016 – 2020
- 5 categories of research questions: physical infrastructure, communications, location data and positioning, impact assessment and data
- Technical performance of the solutions is to be verified with field trials using automated vehicles in the Aurora corridor (E8)
- Call budget around 1 – 2 million euros
- Call to be published in January 2017
Intelligent Fairway Project: Funding

- Budget for testbed phase is 1,2 M€ for 2017 and 2018
- FTA can provide some funding and partners should also use their own R&D budget
- Application for funding, ref. Aurora?
  - Maritime Challenge?
Ecosystem for Autonomous Ships

Finland aims to operate world’s first autonomous ship system in 2025
Intelligent Fairway and Autonomous Maritime Traffic

Intelligent fairways
A step towards autonomous vessel traffic

The VTS Centre ensures electronically that vessels’ routes are safe and efficient.

The vessel receives up-to-date digital weather reports and forecasts.

The vessel receives up-to-date digital water level data and forecasts.

Benefits
- Facilitated route planning and navigation.
- Improved cost-effectiveness and optimised cargo volumes.
- Enhanced safety through reduced risk of groundings and collisions.

The vessel receives seabed data.

Add to navigation adapt to conditions and vessel movements.

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