

eFairway - eNav test bed

1. General information

Name of test bed:	eFairway: Enhanced and electronic fairway information
Location of test bed:	Fairway Trondheim – Kristiansund, Mid-Norway
Time and duration of test bed:	April 2016
Status:	Finished
Contact person(s):	Tony Haugen, tony.haugen@kongsberg.com (Project owner) Knut Torsethaugen, knut.torsethaugen@sintef.no (Project coordinator)
Organisation(s) involved	Kongsberg Seatex, Fugro OCEANOR, Semekor, SINTEF Fisheries and aquaculture, Fosen Namsos Sjø and the Norwegian Coastal Administration
Project name:	eFarled2020
Funding program and budget:	Norwegian Research Council, MAROFF-program; Kongsberg Seatex, Fugro OCEANOR. Total project budget, 3-year project: NOK 12 mill.
Last edited/updated:	2016-05-25

2. Executive summary

The goal of the eFairway project is to develop services that makes safety information in the fairway available for the users as an integrated part of the standard equipment onboard the vessel by using AIS communication from sensors on fairway objects directly to the bridge. The eFairway test bed demonstrates examples of such systems for environmental sensors in the fairway. The system presents only information that is relevant for the user's situation and can support his decisions.

The test bed addressed an identified need for enhanced information about the fairway that is relevant for the actual user and situation. This includes real time data and prognoses for sailing conditions, status for AtoNs and regulations, location of special risk factors in the fairway and areas connected to the fairway. This information combined with objective cancelling criteria for critical parameters like wind and waves, will reduce the pressure on the crew.

A test run was conducted on a high-speed vessel for the company Fosen Namsos Sjø on April 15 on a regular trip from Trondheim to Kristiansund and back. However, the infrastructure is available for use during a longer period, and it will be available for a period in order to gather more experience. The test infrastructure contains two technical elements using AIS as a communication link to get direct information onboard (within the range of the AIS). The sensors were a wind sensor and an oceanographic buoy that provided data for waves, wind and current in real time. In addition, the data is repeated to a greater area so that information also is available for planning purposes before vessel leaves the port. During the

Test bed: eFairway

test run, user needs and experiences was collected as basis for further development for new services in the fairway.

3. Test bed Information

The primary user involved was the navigators on the bridge of the High Speed Vessel. The e-navigation gaps considered in the test was information and data management and information integration on existing systems and equipment

Details of eNavigation solutions considered in the test bed were:

- S4: Integration and presentation of available information in graphical displays received via communication equipment
- S9: Improved Communication of VTS Service Portfolio

The category of e-navigation solutions considered in the test bed was both technical and operational

4. Test bed methodology

Procedure used in the test bed:

Test bed setup.

There were two navigators with many years' experience onboard the vessel. Personnel from the project followed the whole trip from the vessels bridge, and collected data and experience with the technical installation and how the information was used.

Technical solutions used.

The following technical installations was included in the test bed:

Wind sensor in Brekstad harbor with AIS broadcast of data.

SeaWatch Midi buoy with wave (height, direction and period), wind (speed, gust and direction), current (velocity and direction), water and air temperature, humidity and air pressure sensors. AIS Base Station for AIS data repeating over a greater area. Data was broadcasted via AIS modules made for this purpose.

Standards.

Real time data from wind sensor and oceanographic buoy was made available onboard according to the latest international AIS regulations.

Standard operating procedures.

The procedures onboard during the test, was according to the regular procedures for such a trip.

Analysis of data.

All data collection was based on direct observations on board and interviews with the crew.

5. Test bed results

Information from the wind sensor and an oceanographic buoy was transferred successfully directly to the vessel by the AIS unit installed. Information was broadcast in accordance with AIS regulations and displayed on the vessels navigation chart (ECDIS). The direct range of the AIS was too short for planning purposes. The range for the buoy data was about 6 nautical miles, while it was 13 nautical miles for the wind sensor. This can be improved by increasing the effect/antenna performance of the AIS-unit and by AIS repeating from AIS Base Stations covering the area of operation.

It was verified that ECDIS SW from different vendors could display real time weather data from the installations, but that the presentation form was very different from vendor to vendor. There was also noted that interpretations of the standard was different, and some details could be wrongly presented. An important action in the IMO eNavigation work is harmonization between vendors in HMI. Hence this will be addressed on a higher level in the future.

6. Conclusions and recommendations

The technology tested worked as planned, but the range of the AIS units on buoys and sensors must be increased. It is a great need for wind sensors in harbors and oceanographic buoys in special areas with difficult sailings conditions. Access to real time data onboard combined with operational limits for sailing conditions will enhance the safety; reduce the risk for cancelling ongoing trips; reduce the pressure on the crew and release time for focusing on the navigation. Extended use of AIS for virtual marking of lanes, information provider for real time data and communication in a fully developed eFairway should be developed further to be an integrated part of eNavigation. An eFairway is a prerequisite for unmanned vessels. Further developments are still needed to find limitations, reliable technical solutions and develop secure services.

eFairway as a new MSP in eNav. The eNav concept defines several Maritime Service Portfolios (MSP). Based on the project and Test bed we suggested that services provided by an electronic or interactive fairway should be defined as a new MSP or otherwise be defined in the eNav concept. Standardized interactive services in the fairway will be a premise for unmanned vessels and for enhanced fairway services in general in the future. Effective and safe communication between vessel and fairway should be an important element in eNav. Electronic fairways will also contribute to efficient coastal area management and reduce conflicts with other use of coastal areas.

7. Publications

N/A

Test bed: eFairway

8. Reference material

N/A