



## The Prepare Ships Project

ANavs, SAAB, Telko, Lantmäteriet, RISE



European Global Navigation Satellite Systems Agency

## THE PREPARE SHIPS PROJECT

- develops a robust and accurate navigation solution based on the features of Galileo signals in combination with other in-ship sensors.

- reduces the risk for ship collisions,
- provide decision-support in fairway navigation,
- decrease environmental impact and emissions and
- provide a cornerstone for future automated navigation.





## WHY A SHARED DYNAMIC PREDICTOR?

Navigational casualties represent 54% of the accidents in the EU.

- Limited situational awareness is the single most contributing factor.
- Ships future movements can be predicted with high confidence.
- Information can be exchanged between ships and to/ from shore via VDES solutions increasing situational awareness.
- Environmental impact reduced by the predictor.



## HIGH ACCURACY AND INTEGRITY IN POSITION

Prepare Ships System will receive position, attitude and velocity data from the ANAVS GNSS receiver using the Galileo Open Service.

The ANAVS receiver use

- the signals from Galileo satellites
- the carrier-phase positioning corrections from Network-RTK supported from Lantmäteriet (SWEPOS)
- information about the integrity of the RTK corrections
- ANAVS provides a reliable positioning service using sensor fusion.



**Prepare Ships** 

## VDES COMMUNICATION – THE NEXT GENERATION SHIP2X COMMUNICATION SOLUTION

Communication via VDES ensures enhanced maritime safety (bandwith 32 times higher than AIS).

Share information with other ships based on the VDES standard (IEC 2092-1).

Three new advanced applications following a new AIS-ASM/VDES exchange format

- Ship predictions for a set time interval
- Network RTK corrections for high position accuracy
- Route information, i.e. the next set of waypoints and route leg parameters



## NAVIGATION DECISION SUPPORT SUB-SYSTEM & HMS

- Use Case, user needs and functional requirements
- UX Design and functional Specifications
- Kernel Development for S-100 products
- Implementation of support for exchange of Ships intentions and predictions using AIS/VDES
- Implementation of Prediction Modul
- Development of Decision support display and user functions
- HMI of the interface



## **SHIPS IN PLAN FOR TEST - 2021**



# Vrångö

Test ships Equipped with;

- **TECDIS G2** ٠
- Dynamic ٠ Predictor
- S-102/129 ٠ Data
- ANAVS GNSS •
- SAAB ٠ AIS/VDES



#### Pilot Boat



#### MY@Sea

+ Älvsborgs K:a



#### *M/S Stena Vinga*





## **MEASUREMENT SCIENCE AND TECHNOLOGY**

Identify accuracy of position and time

How good is a maritime positioning system?

Where is the centre of a vessel?

When sharing data between ships: how do we secure a common reference system with respect to position and time?



Terrestrial Reference System and Time



## MACHINE LEARNING OF THE SHIP PREDICTIONS



- Machine learning algorithms ensures accuracy of predictions
- Monitoring functions indicate to the operator the reliability of the information
- Continuous learning improves the model continuously





Call: Applications in satellite navigation – Galileo • Topic: H2020GSA-2018: EGNSS Transport applications

- *Budget:* ~3.5 *M*€
- *EU Grant:* ~3.0 *M*€
- Project start: 2019-12-01
- Project End: 2022-01-31

## **PREPARE SHIPS**

PREParE SHIPS aims to develop a robust and accurate navigation solution for coastal and open-sea navigation based on the features of Galileo signals in combination with other in-ship sensors.

PREParE SHIPS will define and validate an innovative navigation decision support concept based on four key elements; resilient EGNSS positioning; real-time dynamic predictor; geo-fencing; and ship2ship/ ship2shore communication.

### **Prepare Ships** Increased Safety and Efficiency in Shipping

The Prepare Ships project integrates a new precise positioning system based on the features of Galileo and EGNSS signals. It enables merchant ships to plan and execute safe ship passages of other vessels in challenging fairways by advanced decision support.



- EGNSS and RTK resilience positioning
- Real-time dynamic predictor based on machine learning
- Ship-to-ship / ship-to-shore communication (VDES)

LANTMATERIET

 Geo-fencing and "go" areas, all available in ECDIS for enhanced decision support

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prepare-ships.eu

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