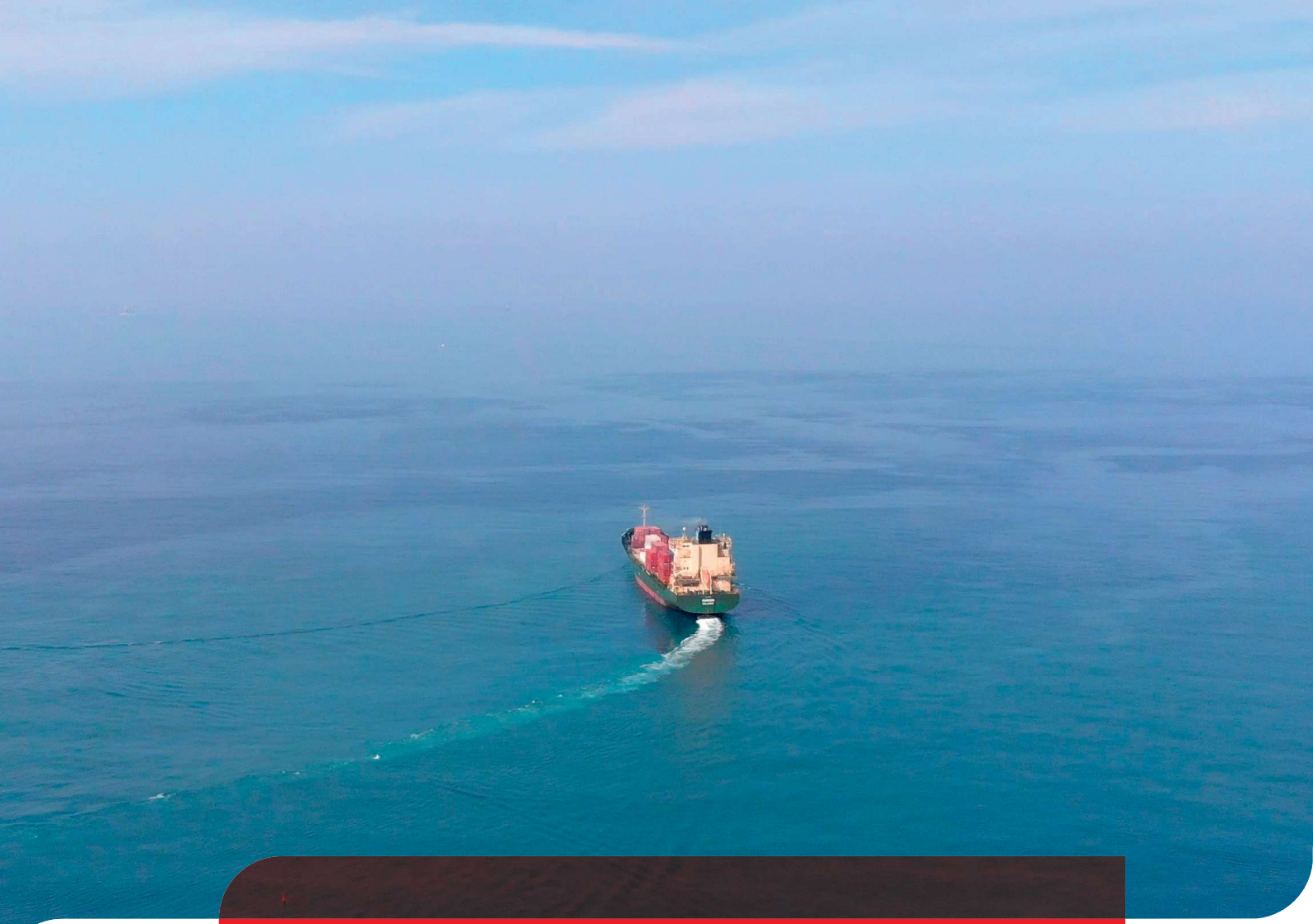


ASGARD

Shipborne double frequency multi-constellation Galileo receiver (E1/E5)

ASGARD

This action has received funding from the European Union under grant GSA/GRANT/02/2019/ASGARD

Securing positions

What is ASGARD?

ASGARD (Advanced Shipborne Galileo Receiver Double Frequency) kicks off a project in which GMV is collaborating with Saab to develop a new maritime GNSS receiver based on the open service of Europe's Galileo satellite navigation service. The multi-constellation, double-frequency receiver will comply with European and international legislation and use Galileo's OSNMA authentication mechanism. Co-funded by EUSPA (former GSA), **ASGARD** aims to boost Galileo take up in maritime transport by developing shipborne EGNSS (European GNSS) data-processing receivers.

Image source: Meyer Werft

Why OSNMA?

Open Service Navigation Message Authentication is a part of Galileo Civilian End-to-End authentication of navigation signals. Galileo satellites transmit a key and a digital signature that is used by the ASGARD receiver to authenticate the Galileo signal with the receiver's Public key. If the ASGARD receiver detects a satellite that can not be authenticated, the operator will be informed of the spoofing situation. This assures the Captain and crew can secure the validity of the GNSS postion.

OSNMA principle of operation

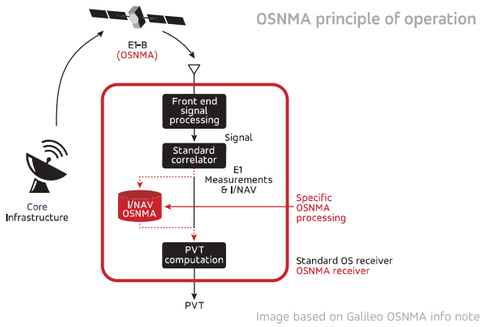


Image based on Galileo OSNMA info note

Multi GNSS Receiver

Multi GNSS Receivers can take advantage of more than one GNSS constellation. If one constellation is jammed, spoofed or not usable, a redundant GNSS position option is possible. The ASGARD receiver uses both GALILEO and GPS constellations to secure the position.

Spoofing alert

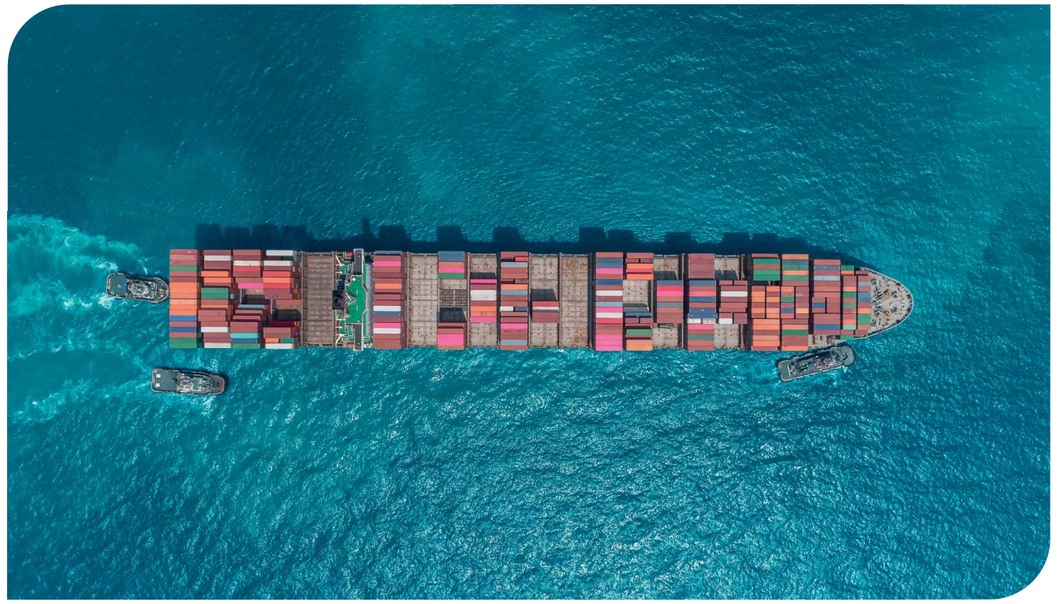
With the advantage of OSNMA, the receiver can detect a spoofing attack of the GALILEO constellation.

Multi frequency

Uses the difference in ionic effect for frequencies so the lead time can be compensated for, resulting in higher performance.

Reliable

Due to the use of an already proven platform by SAAB ang GMV the receiver is highly reliable.



- **In this context GMV and Saab are committed to develop a double frequency maritime receiver navigation system which:**
  - Includes a Multi-constellation feature capable of receiving signals simultaneously from Galileo and other satellite positioning systems.
  - Complies with European and international legislation coming from IMO, IEC and MED.
  - Provides an additional layer of system safety using Galileo's Open Service Network Message Authentication (OSNMA) which adds digital signatures to the Galileo Open Service Navigation Messages.

Galileo OSMNA capable receivers may verify that Galileo navigation data received is coming from a Galileo satellite and has not been falsified/spoofed. This verification method provides the Galileo constellation with strong protection, turning it into a more secure and solid GNSS.

- **GMV and Saab will test the receiver:**
  - According to the requirements of the European Maritime Equipment Directive for GNSS receivers.
  - Exposing it to sophisticated spoofing tests, before being put through a shipborne field test campaign.

The new maritime receiver represents a new generation of GMV's Galileo receivers and will be integrated into a Saab navigation system in a format that is already well known by the maritime industry.

For more information:
https://asgard.gmv.com/ asgard-gnss@gmv.com
Twitter: @AsgardGnss
LinkedIn: ASGARD GNSS project

ASGARD

This action has received funding from the European Union under grant GSA/GRANT/02/2019/ASGARD