Estimation of maritime vessel traffic using Automatic Identification System (AIS) data

Developing timely maritime statistics on vessel traffic at EU level

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The project

As the data world continues to transform, the European Statistical System (ESS) Innovation Agenda aims to meet the demand for timely and more detailed statistics.

As part of the agenda, the New Data Source for Maritime Statistics (NDS4MS) project aims to develop timely maritime statistics on vessel traffic (port calls) at EU level. This is achieved using the maritime vessel Automatic Identification System's (AIS) data of the European Maritime Safety Agency (EMSA).

Using AIS data, the project aims to develop experimental statistics on early estimates on the number of maritime vessels entering EU ports (port calls).

The motivation

Several EU Member States have successfully developed statistics on maritime transport based on AIS data. Now, Eurostat aims to develop a method for producing representative statistics at EU level.

The ESS' quarterly statistics on port calls are produced around one year later than the reference period of the data. To produce more timely statistics on port calls, this project has developed a method for producing experimental statistics at EU level at an earlier stage.

Using AIS data, these experimental statistics aim to provide early estimates of port calls at the end of the quarterly reporting period. With this approach, representative statistics could be made available much sooner than they otherwise would be.

⚙ The methodology

Eurostat and the EMSA signed a short-term cooperation agreement in 2022 to obtain aggregated and anonymised AIS vessel data and technical support. Using this data, NDS4MS:
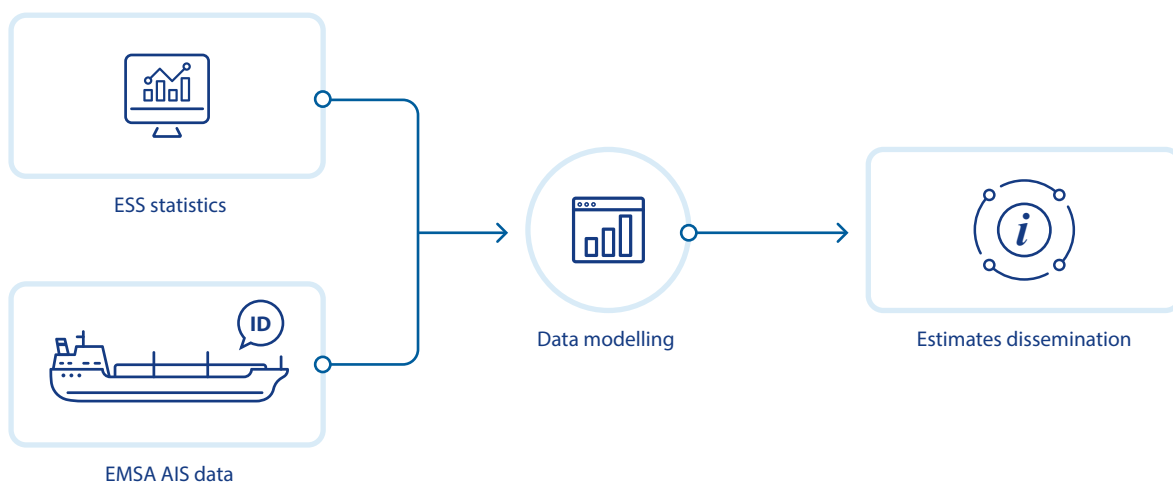
- compares data and methodological processes;
- analyses the observed deviations;
- tests different estimation methods.

In 2023, Eurostat produced its first experimental statistics at EU level on quarterly maritime vessel traffic for the 2015–2019 period, based on EMSA data. The 'autoregressive integrated moving average model with exogenous variables' (ARIMAX) model is used to combine the input data and estimate the statistics for the most recent time period. The input data are the statistics of previous quarters and the recent AIS, as well as other administrative data from the EMSA.

In July 2024, Eurostat and EMSA signed a service legal agreement for regular data transmission, aiming to regularly produce early estimates of maritime vessel traffic.

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Description of the process:

ESS statistics

EMSA AIS data

Data modelling

Estimates dissemination

👥 The team

- Eurostat
- European Maritime Safety Agency (EMSA)

Contact

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📅 The timeline

- **Project initiation:** 2023
- **Estimated time to deliver impact:** 2025

ⓘ More information

- Maritime vessel traffic estimates
- News item: Monitoring port traffic

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