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# Table of Content

Table of Content ..... 1
1. Executive Summary ..... 1
2. Introduction ..... 1
3. AIS ..... 2
3.1 Information about the database ..... 2
4. Conclusions ..... 4
References ..... 4

## 1. Executive Summary

The Croatian Ministry Of The Sea, Transport And Infrastructure (MMPI) collected and pre-processed AIS data, sharing them with the GUTTA partnership for the sake of the project's objectives.

## 2. Introduction

According to the AF The GUTTA project´s SO 2 is to facilitate the implementation of the MRV by interfacing between and private actors. However, this objective is partly obsolete due to the the delayed start of the IT-HR Programme. In fact, the MRV is already fully in place and EMSA has been publishing related data since June 30, 2019. [1]

Therefore, in the GUTTA Major Amendment (currently under preparation) it will be proposed that SO2 deals with assessment of MRV data and process already in place. Ferry trajectories recorded through the AIS system may help this task. Also, the tool for computation of least-CO2 ferry routes in the Adriatic pertaining to GUTTA SO1 and which preliminary results were documented in [2] might benefit from AIS data for the sake of validation (WP5). Therefore, the present deliverable is renamed and focussed on supporting this new activity.

For Croatia, the system analysing and processing AIS data is the SEG (**S**afeSeaNet **E**cosystem **G**rafical User Interface). MMPI started in project RP4 the process of extracting AIS data via common Grafical User Interface from EMSA´s SafeSeaNet (SSN) server for providing them to the LP of the project. This report documents such activity.

Note: for shortcuts, please refer to GUTTA Glossary available at: https://zenodo.org/record/3676344

# 3. AIS

According to the IMO-SOLAS Convention, an Automated Identification System (AIS) must be operational on all ships of more than 300 GT operating on international voyages. The AIS system consists of an automatic transmitter-receiver device ("transponder1") installed onboard and base stations located on islands and mainland or satellite. It allows vessels mutual exchange of various types of identiffication data in determinated geographical area and with base stations located in islands and mainland. The information transmited by vessel is of three different types:

static information (such as: IMO number, call sing & name, type of ship, lenght and beam);

dynamic information (such as: ship´s position, time in UTC, heading, course, speed, navigational status);

voyage related information (such as: ship´s draught, type of hazardous cargo, destination and ETA, route plan);.

This report contains dynamic information data, collected via AIS for six Ro-Pax vessels (Table 1) that sailed in the Adriatic sea between Croatia and Italy in a selected period of one year.

More details about data provided by MMPI to the GUTTA LP is described in the Section 3.1

Table 1 Basic information about ships

| | Vessel name | Operator | IMO number | MMSI |
|---|---|---|---|---|
| 1 | Aurelia | SNAV | 7602120 | 209510000 |
| 2 | GNV Azzurra | Grandi Navi Veloci | 7826790 | 247237700 |
| 3 | Dubrovnik | Jadrolinija | 7615048 | 238143000 |
| 4 | AF Francesca | Adria Ferries SpA | 7602089 | 247312600 |
| 5 | Marko Polo | Jadrolinija | 7230599 | 238144000 |
| 6 | Zadar | Jadrolinija | 9021485 | 238201000 |

## 3.1 Information about the database

The database is in xslx. form and contains AIS datasets with information about:

- geographical position of the ship displayed in [latitude, longitude] coordinates

[1] https://www.imo.org/en/OurWork/Safety/Pages/AIS.aspx

- time stamp in [yyyy-dd-mm; hh:mm:ss] format
- ship speed in [m/s]

- ship heading as an angular distance relative to north [° N]

All parameters mentioned above are provided at a minimum update frequency of minutes or hours, depending on the capabilities of transmitter device installed on ship. The period considered ranges from 14.12.2019 to 14.12.2020. In Table 2 a sample is provided.

Table 2 AIS dataset sample.

| Timestamp,Latitude,Longitude,Heading,Speed (m/s) |
|---|
| 2020-06-14 01:54:00,4108.25N,01652E,173,0 |
| 2020-06-14 02:00:01,4108.25N,01652E,222,0.051444 |
| 2020-06-17 10:00:28,4108.25N,01652.03E,131,0.205778 |
| 2020-06-17 10:12:30,4108.34N,01651.49E,121,1.646222 |
| 2020-06-17 10:24:40,4108.14N,01651.97E,92,0.874556 |
| 2020-06-17 23:27:31,4108.68N,01651.01E,311,4.990111 |
| 2020-06-17 23:39:40,4110.18N,01652.36E,88,6.019000 |
| 2020-06-17 23:45:50,4110.21N,01653.85E,88,5.453111 |
| 2020-06-18 00:52:19,4109.43N,01713.24E,86,6.842111 |
| 2020-06-18 00:58:19,4109.59N,01715.01E,83,6.996444 |
| 2020-06-18 02:17:41,4111.81N,01738.58E,86,6.996444 |
| 2020-06-18 02:23:50,4111.89N,01740.42E,87,7.047889 |
| 2020-06-18 04:37:20,4113.24N,01819.85E,86,6.893556 |
| 2020-06-18 04:43:21,4113.34N,01821.64E,86,6.790667 |
| 2020-06-18 06:32:30,4115.13N,01853.29E,87,6.739222 |
| 2020-06-18 06:50:41,4114.81N,01858.51E,86,6.790667 |
| 2020-06-18 06:56:49,4114.98N,01900.29E,82,6.842111 |
| 2020-06-18 08:21:50,4116.03N,01925.11E,86,6.636333 |
| 2020-06-18 08:34:01,4116.98N,01927.2E,19,3.704000 |
| 2020-06-18 08:38:10,4117.41N,01927.43E,21,3.395333 |
| 2020-06-18 08:41:52,4117.8N,01927.58E,358,3.395333 |
| 2020-06-18 08:46:12,4118.28N,01927.31E,342,3.858333 |
| 2020-06-18 08:46:36,4118.33N,01927.31E,354,3.652556 |
| 2020-06-18 09:04:20,4118.79N,01927.24E,148,0.051444 |
| 2020-06-18 22:19:27,4118.76N,01927.25E,157,0.257222 |
| 2020-06-18 22:31:47,4118.52N,01927.22E,172,2.829444 |
| 2020-06-18 22:49:47,4116.4N,01926.56E,255,4.064111 |
| 2020-06-18 23:01:56,4116.12N,01924.8E,264,4.630000 |
| 2020-06-18 23:07:58,4116.03N,01923.53E,266,5.401667 |

## 4. Conclusions

MMPI has started providing the GUTTA partnership with AIS data information. This activity will continue with 2021 data and will be useful for the validation part of the project (WP5).

## References

[1] G. Mannarini, L. Carelli, and A. Salhi. EU-MRV: an analysis of 2018's Ro-Pax $CO_2$ data. In 21st IEEE International Conference on Mobile Data Management (MDM), pages 287–292. IEEE, 2020.

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[2] G. Mannarini, L. Carelli, J. Orović, C. P. Martinkus, and G. Coppini. Towards Least-CO2 Ferry Routes in the Adriatic Sea. Journal of Marine Science and Engineering, 9(2), 2021.

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