

## Meeting: 18<sup>th</sup> Mediterranean AIS Expert Working Group

**Place and date:** Videoconference, 10 December 2021

**Agenda item:** Status at the MAREΣ Member states

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**Submitted by** EMSA

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| Summary            | This document presents the status of AIS networks at the MAREΣ MSs, as reported at the Mediterranean AIS Expert Working Group meetings. |
| Action to be taken | As per paragraph 3.   |
| Related documents  | 1) MAREΣ 17/6/1.<br>2) 17 <sup>th</sup> Mediterranean AIS Expert Working Group Workshop report (AP10).                                  |

### 1. Introduction

The status of national AIS networks is regularly updated by the MAREΣ Member States. The 17<sup>th</sup> Mediterranean AIS Expert Working Group agreed to provide to EMSA by e-mail the necessary updates to the status summary document (MAREΣ 17/6/1), by mid-December 2020. Following that, additional inputs were submitted by Bulgaria, Greece, and France.

The summary of information which was collected during the EWG meetings and from the MSs replies is presented in paragraph 2.

### 2. Status of AIS networks

#### 2.1 Bulgaria

The national AIS network includes 9 BSs. The network can receive all messages (1-27), but AIS messages are not transmitted. The network has AToN virtual buoys transmission functionality since 2019. All received data are stored for 30 days online (without downsampling) and 3 months off-line (with 6 minutes downsampling) and archived since 2012 (with 1-hour downsampling).

The stored data formats are as follows: for 30 days - raw data, for 3 months - decoded data (with 6-min downsampling) after 3 months and up to 10 years - in a decoded format (with 1-hour downsampling). Data downsampling rate is configurable (1-300 sec., with 1 sec. step). Bulgaria provides AIS data to MAREΣ at a full data rate (without downsampling).

The applied throughput rate (for outgoing data) is appr. 100 msg/sec. The data filtering capability is supported, and the filtering is possible for each data element. Data buffering and retransmission is not available by the system, and Bulgaria relies to the MAREΣ NPR capabilities. The NPR hosting environment is 8G. The stored/archived data can be provided in XML, CSV, XLS or SQL formats, on demand. Installation of several NPR's is possible.

A contingency plan (24/7) is implemented, and the technical support (24/7) is available. Back-up servers to ensure the continuation of the service are available. The status of AIS BSs, communication links and NPR connections are monitored. The network has AToN virtual buoys transmission functionality since 2019.

## 2.2 Croatia

The AIS network consists of 26 shore-based stations and 2 independent servers. The system can receive all AIS messages (1-27) and also transmit the messages. The filtering capability is supported (including: the MMSI filtering, message filtering, downsampling filtering, data duplicates filtering, IEC sentence filtering and the data source and area filtering).

As per the actual downsampling policy in MAREΣ, Croatia is delivering AIS information without downsampling (at a full rate). The applied throughput rate is appr. 70 msg/sec. Data buffering and retransmission is not supported by the system, only by the NPR. The assigned capacity of the NPR hosting environment (a virtual server) is 200 GB. In case of unexpected communication breakdown between the base station and database server, all data are buffered locally by the base station.

After the connection is re-established, the buffered data are automatically retransmitted and stored in database. BSs can buffer data for 1 month. In case of unexpected communication breakdown between the database server and the national proxy server, all data are stored in the central database server. AIS data are stored in the central database on-line, for 12 months. After 365 days data are moved from the on-line storage and set in the off-line media.

A standalone tool can be used to retrieve the stored data manually. The retrieved data can be provided as a text file, in the text for XML format, or NMEA sentences encapsulated in comment block as defined in IEC 62320-1. Back-up servers to ensure the continuation of the service are available. A redundant AIS server was installed in 2018. The status of AIS BSs, communication links and NPR connections is monitored. Croatia has implemented 24/7 contingency plan, and the technical support service (24/7) is available. An integrated ICT tool for the management and broadcast of the Maritime Safety messages (AIS ASM) is planned for 2021.

### **To be updated:**

- a. *Is the data down sampling supported? If yes, then what settings are/ can be applied?*
- b. *The applied throughput rate is mentioned appr. 70 msg/sec. Does it relate to the outgoing data (at the server node)? If not, then what is the throughput rate (msg/sec) for outgoing data (at the server node)?*
- c. *What is the stored data format?*
- d. *Is the installation of multiple NPRs supported?*

## 2.3 Cyprus

The AIS network includes 7 AIS BSs. The system can handle AIS messages 1-21. The data filtering capability is not supported. By the actual downsampling policy adopted in MAREΣ, Cyprus is delivering AIS information to MAREΣ with 6 minutes downsampling. The data buffering and retransmission capability is not supported by the system, only by NPR. The system stores data in the DB, for appr. 3 months.

Retransmission of data is not supported. All stored/archived data can be retrieved and provided manually, on demand. The status of AIS BSs, communication links and NPR connections are monitored. Back-up servers to ensure the continuation of the service are unavailable. The 24/7 contingency plan is not maintained, but the

technical support service (24/7) is available. In 2019, Cyprus has started upgrading the national VTMS system, including the SafeSeaNet and the AIS Network servers.

***To be updated:***

- a. *What is the data throughput rate (msg/sec) for outgoing data (at the server node)?*
- b. *What is the assigned capacity for the buffered data storage (i.e. the NPR hosting environment)?*
- c. *What is the stored data format?*
- d. *Is the installation of several NPRs supported?*

## 2.4 France

The Mediterranean AIS network of France is composed by 18 BSs (10 are in the continental France and 8 in Corsica). All AIS messages (1-27) can be operated through the national system. The applied throughput rate (at the central node) is appr. 500 msg/sec., but the system is designed for 1000 msg/sec.

The Unix format time stamp is used for a live transmission (time stamped at the NS node). The data buffering and retransmission capability is not supported by the system, but by NPR. The data filtering capability (i.e. filtering by sentences and the message type), the downsampling capability (i.e. to sample by geographical area or to increase/decrease the number of messages received from the same MMSI) and the data buffering capability are planned to be implemented. Back-up servers to ensure the continuation of the service are available at the central node.

The 24/7 contingency plan is maintained, and the technical support service (24/7) is available, but at the central node. Data is archived from 2013, but the data archiving system should be changed in 2020 (due to the huge amount of stored data). The data repository text files contain the raw IEC messages with no comment blocks. The provision of archived data is not supported by the system. The stored/archived data can be retrieved and provided manually. Installation of several NPRs is not supported (if without any modifications).

From 2019 to 2022, all base station will be replaced and upgraded to ensure all capabilities to monitor, operate and manage AIS data. The new AIS program that is in progress will provide capabilities to monitor all parameters from the base station to the national node.

***To be updated***

*What is the assigned capacity for the buffered data storage (i.e. NPR hosting environment)?*

## 2.5 Greece

The AIS network is based on 93 shore-based stations. BSs can handle all ITU messages. By the actual downsampling policy adopted, the national system is delivering AIS data to MAREΣ with 6 minutes downsampling. The data throughput applied is 35-60 msg/sec. for incoming messages and 4-8 msg/sec for outgoing messages.

The data buffering and retransmission capability depends on the MAREΣ NPR. The NPR software is installed and running in a Virtual Machine environment with a total capacity of 80 GB. The buffered data storage capacity has been set to 12 hours, according to the current NPR settings. The data filtering capability is supported by the national system (filtering of duplicate messages, the data recipients filtering, etc.). The

national AIS server has practically unlimited capabilities for the reception and storage of data (IEC 62320 standard is used as a reference).

The system stores all data for more than 1 year online. Data is archived on hard disks for practical unlimited time. A full daily archive requires 250-500 MB. The capacity of the server can easily be increased. The provision of archived data is supported by the system in the NMEA, NMEA/Comment Block and XML formats. Data retransmission could be achieved only manually by the administrator, feeding the program "NMEA Router" with the extracted data and directing them to the NPR.

Installation of several NPRs is supported. The contingency plan is in place and the technical support service (24/7) is available. Existing capabilities of the national AIS system allow monitoring of most of the individual AIS devices and of the communication links. The continuation of the service is ensured through the redundancy of components run on virtual machines. In 2017, the AIS receivers were upgraded to improve the coverage. In the framework of project for upgrading AIS network by the end of 2020, 90 new stations were installed in new locations or replacing the existing BSs of this project. Also, the status monitoring of the BSs, receivers and connections will be improved.

## 2.6 Italy

The Italian AIS network consists of 64 shore-based stations. The system is fully compliant with all ITU&IEC technical standards and achieves a good overlapping in coverage as well as a high availability. The network is able to support some new AIS binary messages as defined by IMO Circular SN/ 236 and the revised /new AIS Application Specific Messages (ASMs) contained in the IMO Circular SN.1/289.

The system is linked with the ICG patrol vessels (in active, passive and crypto mode), allowing to increase the monitoring capabilities. The network can handle all messages defined by ITU-R M. 1371-5. The data throughput for national server has been tested for up to 1000 msg/sec delivered by the BSs. The data filtering capability is supported (incl. filtering by messages; areas; country; AIS device type; ship type; MMSI; data provider). The downsampling capability is supported - the system can sample the outgoing AIS message using any downsampling rate (configurable).

The data buffering capability is unsupported by the system and depends on the MAREΣ NPR. When either a breakdown in the connection between NPR and the national system or an incident involving the NPR occur, no data buffering is performed. The default value applied for the buffered data storage capacity of the NPR application is 1 day before data purging, but it can be increased changing the configuration file attributes and considering the disk capacity.

AIS data is stored in three layers: on-line storage for the data received in the last 12 months; the definitive storage of AIS information acquired by the network; and the permanent storage (tape drives). The national AIS system supports the provision of archived data. They can be provided manually, in daily archived files (in TSV format), containing decoded AIS data and raw IEC AIS Strings. Monitoring of the AIS BSs, the communication status and the connection with NPR is provided. To ensure the service continuation, the national system is based on a cluster of servers.

The contingency plan is established. A 24/7 operational and technical support is available. A full upgrading of the whole hardware serving the national AIS system (Core servers, Web servers, WMS servers and the SAN) is ongoing since 2018. Italy plans to install 3 more BSs (2 in Adriatic and 1 in Northern Tyrrhenian Sea). A new VDL monitoring tool was implemented in 2019. Italy also plans to integrate a "VDL Monitoring", to upgrade the configuration of data bases and to integrate further external BAS (i.e. ASMs, DGNS corrections and Report rate assignment) to be provided by the AIS national network.

## 2.7 Malta

The AIS network is based on 4 shore-based stations. The system can receive messages 1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 14, 15, 17, 20, 21, 22. No messages are transmitted. The data throughput applied is appr. 65 msg/sec. The filtering capability is supported (i.e. filtering by message type and duplicate messages). By the actual downsampling policy adopted, Malta is delivering AIS information to MAREΣ with 6 minutes downsampling.

Data buffering and retransmission is unsupported by the system, but NPR. The assigned capacity of the NPR hosting environment is 20 Gb. The system stores raw AIS messages for 50 days. A daily backup for the server and a full backup weekly is ensured, in the IEC 62320 format. Data automatic retransmission is unsupported. Data extraction is manual by special DB client in the format according to the IEC 62320 international standard.

A contingency plan is in place and the technical support service (24/7) is provided by an external contractor. The status of the AIS BSs/ communication links/ NPR connections can be monitored. A back-up server to ensure the service continuity is not available but is planned to be installed. Consultations regarding upgrading the system, i.e. installation of 2 new BSs and upgrading of servers have been started.

### **To be updated**

*Does the mentioned data throughput rate relate to the outgoing data (at the server node)? If not, then what is the throughput rate (msg/sec) for outgoing data (at the server node)?*

## 2.8 Portugal

The AIS network includes 24 BSs ((11 dual BSs (active + hot-standby) are located at the mainland, 3 BSs in Madeira and 10 BSs in Azores. The system can receive messages Nr. 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 18, 19, 21 and also transmit the messages.

The data throughput rate for the transmitting is: 9 msg/sec for the mainland network and 8 msg/sec for the networks on islands. The AIS data (including data from Madeira and Azores) are exchanged via the MAREΣ server and made available to the national users. By the actual downsampling policy adopted, Portugal is delivering AIS information to MAREΣ with 1-minute downsampling. The filtering capability is supported (filtering by MMSI, area and the course/speed rate).

The data buffering and retransmission capability is unsupported and depends on the MAREΣ NPR. All data are stored on a forever lifespan basis, according to physical backup support. Older AIS data is stored offline and can be retransmitted manually. The archived data provision is supported, where AIS messages in NMEA format are stored in text files (DAT extension). Data automatic retransmission is unavailable. Installation of several NPRs is supported. A contingency plan is in place and the technical support service (24/7) is available.

The status of the AIS BSs/ communication links/ NPR connections can be monitored. A back-up server to ensure continuation of the service is available in a redundant back-up centre. Portugal plans to change the data provision from islands, by introducing a separate proxy for each network.

### **To be updated:**

*What is the assigned capacity for the buffered data storage (i.e. NPR hosting environment)?*

## 2.9 Romania

The national AIS network consists of 6 sites, fitted with AIS BS in 1+1 configuration. BSs can receive all ITU messages (1-27) and also transmit the messages. The average data throughput is set to 33 msgs/second. The throughput depends on the available bandwidth. Data filtering is available for any user that receives data from the AIS network (i.e. filtering by MMSI or geographic areas). Data downsampling is supported.

For the national system, the downsampling rate can be set in steps, by seconds (from 1 second and upwards). Data downsampling can be handled per the connection and output (e.g. position reports: msgs 1, 2, 3, 4, 9, 11, 18, 19, 21, 27. Other messages are not downsampled). AIS information to MAREΣ is delivered without downsampling (at a full rate). Data buffering and retransmission is unsupported by the system, but at the NPR level. The national system does not provide any data buffering for clients (the NPR / MAREΣ server is connected as a client to the system). NPR is installed on a virtual machine (server) and the buffered data storage capacity is assigned to appr. 90 Gb.

The system stores all messages received from the shore base stations in a central database (Microsoft SQL Server), for 9 months with the existing storage capacity (upgradable), without automatic retransmission capability. Data are stored in a "rough" format according to the IEC 62320 international standard. It is possible to use a standalone tool to retrieve the stored data. The retrieved data can be provided as a text file, in different formats (including NMEA sentences encapsulated in comment block as defined in IEC 62320-1). Installation of several NPRs is supported. Monitoring of the NPR connection is available within the NPR web interface.

The BSs communication and status monitoring is available through the AIS software application installed by the national AIS provider. A back-up server to ensure the continuation of the service is unavailable, the hardware high availability is assured by the virtualisation of the Database and AIS Central processing server. Romania plans to create "a cold-standby" instances of these servers. The technical support service is available (8/5) but with the remote access capabilities for technical matters. A contingency plan is not developed. In 2018, the core AIS system (servers) have been upgraded in terms of hardware and software allowing the creation of virtual ATONs.

### **To be updated:**

*Does the mentioned data throughput rate relate to the outgoing data (at the server node)? If not, then what is the throughput rate (msg/sec) for outgoing data (at the server node)?*

## 2.10 Slovenia

The Slovenia coast is covered by 4 shore-based stations (doubled). In addition, the base stations provide dGPS and AtoN services to the mariners. The national system has the data buffering capability (in addition to the MAREΣ NPR). 24/7 technical support is available. Since 2019, Slovenia is upgrading of the national system's software and plans also to substitute the AIS network.

### **To be updated:**

- What types of AIS messages are/can be received and transmitted by the system?*
- What is the throughput rate (msg/sec) for outgoing data (at the server node)?*
- Is the data filtering capability supported? If yes, then what settings are/ can be applied?*
- Is the data downsampling capability supported? If yes, then what settings are/ can be applied?*

- e. *What is the assigned capacity for the buffered data storage (i.e. NPR hosting environment)?*
- f. *Is the status of AIS BSs, communication links and NPR connections monitored? If yes, then how?*

## 2.11 Spain

The national AIS network consists of 38 shore-based stations. The system can handle all AIS standard messages (1-27). The data throughput rate is 220 msg/sec. The data filtering capability is supported by the system. Spain is delivering AIS information to MAREΣ with 1-minute downsampling. The data buffering and retransmission capability is not supported and depends on the MAREΣ NPR.

The AIS data are stored for 5 years in DB. The provision of archived data is available, in proprietary format. Installation of several NPRs is supported. Capability to monitor the status of the AIS BSs/communication links/NPR connections is supported and a back-up server to ensure the service continuity is available. 24/7 technical support is available. A contingency plan is implemented, through the “fault tolerance architecture” and the SLA with an external contractor. In 2018, a contract has been signed to rebuild the network. The BSs upgrading was finished in 2019.

### **To be updated**

- a. *The data throughput rate is mentioned 220 msg/sec. Does it relate to the outgoing data (at the server node)? If not, then what is the throughput rate (at the server node) for outgoing data (msg/sec)?*
- b. *What the data filtering settings are/ can be applied?*
- c. *What is the assigned capacity for the buffered data storage (i.e. NPR hosting environment)?*
- d. *What is the stored data format?*

## 3. Action required

Member States are invited to **update** information on the status of their national AIS networks.