

Meeting Report

EMSA/ Italy/ Norway meeting on AIS Regional servers

Held in Lisbon on

07 February 2017

Final version:

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Introduction

EMSA invited representatives of the Norwegian Coastal Administration (NCA), which is responsible for the hosting of the North Atlantic, North Sea and Helcom AIS Regional Servers and the Italian Coast Guard (IGC), which is responsible for the hosting of the Mediterranean AIS Regional Server (MARES), and their contractors, to a technical meeting with the objective of the meeting to discuss how to harmonise and improve further the quality of the services provided by the AIS Regional Servers to SSN.

The meetings took place at EMSA (Praça Europa 4, Lisbon, Portugal) on the 7th February, from 09.00 to 16:00 (Lisbon time), according to the attached agenda (**Annex 1**). To prepare and support the discussions of the meeting, both Regional Servers (RS) hosting authorities provided to EMSA (in advance of the meeting) the technical documentation of the Regional Server hardware and software.

The list of participants is attached as **Annex 2**.

Meeting Programme

Agenda Item 1: Opening

Lazaros Aichmalotidis opened the meeting and introduced the main topics of the agenda and the meeting objectives. The participants agreed with the proposed agenda.

Agenda Item 2: Introduction

EMSA presented information extracted from the IFCD explaining the role of the AIS Regional Servers as elements of the central SSN as well as the relevant requirements of the SLAs.

Agenda Item 3: Presentations and discussions

Italy and Norway presented the Regional Servers architecture, configuration and monitoring capabilities, as well as the data buffering, archiving and storing capabilities.

3.1. RS technical documentation

EMSA noted that the technical documentation of the Regional Server hardware and software is essential for the Agency because the RSs are considered as part of the existing SSN system. EMSA stated that the obligation to share the technical documentation of the RSs and procedure on how to maintain and update it needs to be reflected in the SLAs.

The meeting agreed to include a relevant clause in the next SLA¹ (Action point 1).

3.2. General presentation of the AIS Regional Servers

The **ICG** presented the Mediterranean AIS Regional server (MARES) which allows sharing AIS information among the participating MSs (Portugal, Spain, France, Italy, Malta, Slovenia, Greece, Cyprus, Romania and Bulgaria) as well 3rd countries participating in specific regional agreements (Montenegro, Jordan and Morocco).

A back-up server is installed to warranty the service continuity. In case of the internet disconnection or technical malfunctioning on the main server, an automatic “switch-over” ensures operations continuity from the back-up server, without human intervention.

The **NCA** and its contractor (Kongsberg Norcontrol) presented the North Atlantic, North Sea and Helcom RSs. Following the service hand-over from Denmark to Norway, two systems have been developed – one for the

¹ The current SLAs terminate on 25 October for MARES and on 20 December for the North Atlantic, North Sea and Helcom RSs. The revised text should be agreed well before the SLAs termination.

Helcom region (interconnecting Finland, Estonia, Latvia, Lithuania, Poland, Denmark, Germany, Sweden and Norway) and the second for North Atlantic/North Sea regions (interconnecting France, Belgium, Netherlands, Norway, Iceland, Faroe Islands, Ireland and the UK). The latter is also used for providing S-AIS data.

The RSs are located in separate server rooms, in different locations and an automatic switch-over ensures operations continuity in case of malfunctions. **EMSA** noted that the current SLA the Agency signed with Norway needs to be amended to reflect the applied technical solution (two servers instead of three RSs - North Atlantic, North Sea and Helcom RSs).

EMSA and Norway will discuss amending the SLA during its next revision to reflect the applied technical solution (Action point 2).

Considering that the North Atlantic and North Sea systems are hosted at the same server and that the two areas overlap to a big extent, EMSA proposed that the NCA discusses at the next Experts Working Groups (EWG) the integration of the two EWGs.

The NCA will assess the possibility of integrating the North Atlantic and North Sea Experts Working Groups and propose merging the two groups at the next meeting of the EWGs (Action point 3).

3.3. RS configuration, data buffering, archiving and storing capabilities

The **ICG** informed that the MARES RS is tested for connecting up to 80 NPRs. The MARES software supports a configuration for both the incoming and outgoing data streams. One or more criteria can be configured by MARES Administrator for each of recipients (i.e. messages to be sent, down sampling rate per message type, "geographical" constraints (arwa polygons), flag state filter, AIS device, ship type, MMSI, originator of the message, data age etc.).

The incoming data with associated time stamp and the proxy stamp is stored into a temporary database. In case of MARES, the configuration possibilities exist for applying an additional downsampling rate (on top of the downsampling applicable to the normally streamed data). The data is stored for one year, but the RS administrator can modify the data storage period. MARES configuration of the real-time stream allows providing several AIS data flows for different areas, and with different rates of down sampling.

If the internet connection between the RS and a NPR is lost, the NPR stores the AIS messages together with the timestamp in a temporary database. The stored messages are delivered to the RS as the connection is recovered according to the FILO principle. It was changed from FIFO to FILO according to the MARES EWG decision to assign the higher importance/urgency to more recent AIS messages. The NPR delivers the stored messages to the RS requesting an acknowledgment for each message; for this purpose the data is resent including a special mark. The stored messages can be relayed to all participant Countries and to SSN if they have the capacity to handle old data. EMSA noted that SSN-SI SIG does not foresee such a special mark.

EMSA will gather information from ICG to assess if it would be necessary to introduce to the SSN-SI the special mark indicating the buffered data (Action point 4)

The **NCA** informed that any number of users can be configured. The RS supports a variety of filters which can be configured per user (for both, the incoming and outgoing data streams). Data resending order /priority follows the FIFO principle. Every 10 seconds a "heartbeat" message is sent to each user's proxy. The same "heartbeat" message is sent also by NPRs. If three messages are missing, the server closes the connection. The data caching is not supported (if a user is off-line, the data will not be resent after re-establishing the connection).

EMSA asked the participants about the need to maintain a TCP "keep alive" character level. The **ICG** informed that MARES also uses this character, and stated that this "keep-alive" mechanism is essential for the RS performance. The **NCA** informed that all users' data is stored in SQL Server for 2 months. The timestamp is provided by the user proxy (through IEC comment block). Every day all the previous day data is exported to the NMEA file and stored. A full backup is provided once a week, and a full dataset for every 6 months is stored for 5 years.

The NCA informed that they didn't receive any database from the DMA and therefore they do not have the capability to process and produce historical data.

The NCA should request the historical AIS database of the Helcom and North Sea region from Denmark through the Helcom Secretariat (Action point 5).

The meeting discussed the available options for configuring the temporary storage (at national proxy level), for data buffering in case of unexpected interruptions in data flow, and the options available for exchanging the archived data. Exchange of data via ftp was considered as an option for the data delivery in case of failure in the data caching/ buffering functions of NPRs. However, it requires further agreement on the format/ structure (storing messages as VDM sentences, exactly as received by the proxies, is a potential format option). It was mentioned that no additional down-sampling should be applied to MS buffered data, so all the data delivered by a MS during an interruption are made available after the connection is restored.

Concerning the archived data exchange, several options were identified such as:

- via ftp on the basis of a format to be agreed by EMSA and the regional servers;
- via a web-service on the basis of an interface control document that will be agreed by the three parties;
- via a “secondary” channel (“archived” data stream).

The meeting discussed the procedure for data resending by RSs after a recovery of a lost connection between the RS and the central SSN. According to the current SLAs the initiating of resending shall be done automatically or manually. **EMSA** invited the Participants to keep the automatic data retransmission as the basic option.

Italy and Norway agreed to maintain the automatic data retransmission approach as the basic option and the manual retransmission as an alternative option utilised for specific cases. This will be reflected in the next SLAs (Action point 6).

EMSA will further evaluate and propose if any additional method and procedures for the data retransmission/ uploading need to be introduced (Action point 7 - performed on the best effort basis).

3.4. NPRs configuration

EMSA reminded that currently three versions of the software for the AIS data exchange exist (the SSN SI developed by EMSA - for the RS connection to the central SSN and for AIS data streaming to users; the NPR software developed by the ICG - for the MARES participating countries), and the NPR software developed by the NCA - for the North Atlantic, North Sea and HELCOM RS participating countries) and invited the meeting to discuss how to harmonise the functionalities of the software.

The **ICG** informed that NPRs of the participating States are installed at national level, by the NPRs administrators. The RS administrator has a possibility to control NPRs remotely; however the NPR configuration is provided by the administrators of participating states. The NPR software is built to be easy to install/maintain and provides down sampling/ area filtering functionalities. NPRs include a capability to disable the Comment block by MSs Administrators (for communication between NPR and MARES). This capability was implemented to support the AIS systems not supporting transmission of CBs.

The **ICG** informed that one of the problems encountered in the RS management is the time synchronization of the AIS messages delivered by the participant Countries through the NPR. If the time stamp is not provided in the comment block by the national network, it is added by the NPR using the clock of the hosting environment. In this case, if the clock is not correct (i.e. during the disconnection from a NTP server) the NPR adds a wrong time stamp.

Italy agreed to present the time synchronisation issue at the MARES EWG and will request MSs to use a commonly agreed method for time-synchronisation of their systems (Action point 8).

The **NCA** presented their NPRs solution which provides a basic data filtering functionalities (checking if the AIS data content and the time stamp are valid as well as if the origin is included), and supports AIS data transmission as per IEC 62320-1 standard and SSN SIG V.1.21.

NPRs software is installed by the MSs Administrators; however, the NCA is evaluating the possibility to implement a solution for a remote NPRs deployment, allowing the upgrade of the NPRs by the RS administrator. The NCA informed that they plan to present the above proposal to the Helcom RS participating

States at the next meeting of the EWG in Sweden (planned for June 2017), and to the North Sea EWG participating States at the meeting in France (planned for April 2017).

EMSA asked if Italy intends to implement a similar solution in MARES. The ICG stated that NPRs remote installation fully depends on the security and the access rights management policy of the participating states. The ICG plans to keep the existing procedure, where the NPR software is installed by the MSs Administrators, when necessary.

The Participants discussed the NPRs down sampling configuration. Both RSs maintain the policy that “in-data” down sampling is configured by the NPR administrator, but “out-data” down sampling is configured by the RS administrator.

The **NCA** proposed to introduce the system where a full dataset (non-downsampled data) is provided by RSs to EMSA, and then EMSA should filter out the needed data. **EMSA** stated that this proposal is reasonable; however it requires further evaluation of the EMSA capacity to handle the full data set.

EMSA summarised the discussion and concluded that systems are quite configurable, but the configurations need to be harmonised and the technical requirements of the RSs and NPRs shall be aligned.

Participants agreed to work further defining a standardised requirements for the NPRs maintenance (e.g. the configuration parameters, data buffering/archiving, down sampling, data age filtering and data storage), and also requirements for the RSs allowing their further harmonisation (e.g. data buffering / archiving policies, the methods for exchanging information, the monitoring procedures). The agreed solutions will be reflected in the future amendments of SLAs (Action point 9 - performed on the best effort basis).

Agenda Item 4: Monitoring capabilities

EMSA presented the connection monitoring tool used by the MSS duty personnel, and introduced the monitoring procedures. A proposal on how to improve the monitoring functionalities by implementing the “high/low data threshold” was presented. The participants agreed that such a proposal could be useful at EMSA level, but not at regional level, as the amount of data transmitted to RS by MSs is not constant and might be impacted by varying down sampling requirements. **ICG** presented their idea to implement the data coverage maps distribution service, which could also be also used for monitoring purposes.

Italy agreed to present the “data coverage maps” service to the next MARES EWG (Action point 10).

EMSA mentioned that the quality of the data received by AIS is not always fully warranted. The **NCA** proposed to exploit the “data quality indicator”. In this respect EMSA informed the participants that the SSN-SI SIG already includes the possibility of transmitting a quality indicator (as a comment block tag for the “I” comment block).

EMSA, Italy and Norway agreed to assess further the need of making available a quality indicator in the comment block (and any other indicator) (Action point 11- performed on the best effort basis).

EMSA presented the results of evaluation of the RS monitoring tools and indicated differences (e.g. number of the amount of data received/distributed and recording of the downtime).

The meeting agreed to assess the possible monitoring implementations tools to improve and harmonise the relevant functionalities. EMSA will provide the MSS monitoring procedures to RSs (in March) for their assessment and possible implementation (Action point 12 - performed on the best effort basis).

Agenda Item 5: New SSN SI

EMSA presented the new SSN SI version (V.1.1.) and introduced its capabilities. EMSA also introduced the next steps planned for the SSN SI upgrading.

Italy said that the proposed solution is complex and asked EMSA about the reasons for upgrading the proxies. **EMSA** stated that the planned upgrade of an existing version V1.0 to version 1.1 is important for EMSA, because of related technical projects. **Italy** stated that there is no need for maintaining the proxies between SSN and Regional servers. Instead, a direct M2M connection could be implemented and maintained.

EMSA agreed that the proposal of developing a M2M interface between the central SSN and the regional servers looks practical; however it requires further detailed evaluation.

Agenda Item 6: Incident management / reporting / service continuity

EMSA presented the SLA requirements for incident management, incident reporting, service continuity, the latest observations regarding incident reporting, availability of MSs 24/7 contacts, and the RS 24/7 services. **EMSA** reminded that all incidents should be reported by RS, including incidents involving the Regional server, the SSN SI, the Member States and also 3rd countries. Currently, only the RSs and MSs incidents are stated in the SLAs.

The meeting agreed to include all types of incidents to be reported by RSs in the SLAs amendments during its next revision (Action point 13).

The meeting discussed about the availability of MSs 24/7 contacts. **EMSA** reminded about the Member States obligation to maintain 24/7 operational contacts. However, it is observed that the SSN 24/7 operational contact and AIS 24/7 contacts are, in certain cases, different. The meeting agreed that Regional servers should have access to SSN 24/7 contact information (for contacting MSs in case of incidents).

EMSA agreed to present the issue at the next SSN group and invite the MSs to coordinate their operational 24/7 contacts (May 2017) (Action point 14).

EMSA proposed the documentation of the regional Servers would consist of two sections: the technical and also operational (containing the service continuity procedures). The meeting agreed that this requirement to the RS documentation would be reflected in the next SLA (in line with Action point 1).

EMSA stated that the AIS Regional Server is considered to be a component of the central SSN system. Its role is defined in section 1.4 of the SSN IFCD. However, IFCD is not defining the role of the Regional server administrator or its 24/7 service.

EMSA agreed to assess the issue and propose the necessary amendments to reflect the role of the RS administrator or its 24/7 service in the IFCD (Action point 15).

EMSA recalled the agreement made at MARES 13th EWG (Rome, 17 November 2015) and recommended the NCA to evaluate the ICG experience in generating the statistics. The **ICG** confirmed that the relevant information was provided to Norway. The **NCA** confirmed that they have already started working on the issue.

Agenda Item 7: Conclusions and follow up actions

Lazaros Aichmalotidis thanked the participants for attending the meeting, and presented the agreed actions (see **Annex 3**).

Annexes

Annex 1 – Agenda

Annex 2 – List of participants

Annex 3 – Actions agreed

Annex 1: EMSA/ Italy/ Norway meeting on AIS Regional Servers

EMSA, Praça Europa 4, Lisbon, Portugal, 07 February 2017

Time	Agenda Item	Speakers
09:00 – 09:15	Opening	EMSA
09:15 – 09:40	<p>Introduction</p> <p>EMSA will present information explaining the role of the Regional Servers as elements of the central SSN (extracted from the IFCD) and highlight the relevant requirements of the SLAs. Furthermore EMSA will present the objectives of the meeting.</p>	EMSA
09:40 – 10:30	<p>General presentation of the Regional Servers</p> <p>Italy and Norway will provide a general personation of the Regional Servers architecture, configuration, monitoring and incident management as well as the reporting capabilities.</p> <p>The meeting will discuss on how to standardise (to the extent possible) the technical documentation of the RS and to establish a mechanism to maintain and update the documentation when changes occur.</p>	ICG/NCA
10:30 – 11:30	<p>Data buffering, archiving and storing</p> <p>EMSA, Italy and Norway will present the data buffering, archiving and storing capabilities of the three versions of the software for the AIS data exchange:</p> <ol style="list-style-type: none"> the SSN SI developed by EMSA (for the RS connection to the central SSN and for AIS data streaming to users), the NPR software developed by the ICG (for the MARES participating countries), and the NPR software developed by the NCA (for the North Atlantic, North Sea and HELCOM RS participating countries). <p>The meeting will discuss on how to harmonise the functionalities of the software.</p>	EMSA/ICG/NCA
11:30 – 12:30	<p>Alignment of the configuration capabilities</p> <p>Italy and Norway will present the configurability capabilities of the RS as well as how they have been configured. Information to be presented includes the following;</p> <ol style="list-style-type: none"> Transmission capabilities: Types of messages transmitted (e.g. <i>msg 22</i>); Configuration of the transmission criteria (e.g. <i>per msg type, geographical area, MS providing data (originator), sensor type (e.g. T-ASI/ SAT-AIS, etc.)</i>); and Throughput (in <i>msgs/second</i>) Data streaming (i.e. <i>transmit to a data requestor data received by a data provider</i>): Streaming configuration capabilities; Data filtering configuration capabilities (i.e. <i>down sampling configuration, removal of duplicates, data age, etc</i>); and “Throttling” possibility (e.g. <i>to adjust throughput to avoid stressing the receiving endpoint</i>) 	EMSA/ICG/NCA

Time	Agenda Item	Speakers
	<p>c. Buffered data “pushing” (<i>i.e. in case of a downtime</i>): Data resending order /priority (<i>e.g. FIFO, FILO etc.</i>); Data filtering configuration capabilities (<i>i.e. down sampling configuration, removal of duplicates, data age, etc</i>); and “Throttling” possibility (<i>e.g. to adjust throughput in order to avoid stressing the receiving endpoint</i>).</p> <p>The meeting will discuss on how to align the configuration of these software.</p>	
12:30 – 13:30	Lunch break	
13:30 – 14:00	<p>Monitoring tools</p> <p>EMSA will present the current monitoring tools in place at the Agency (in regard to monitoring the RS) and ideas on how to improve its functionalities. Italy and Norway will present their monitoring tools as well.</p> <p>The meeting will discuss on how to improve the monitoring tools implemented by EMSA, Italy and Norway.</p>	EMSA MSS
14:00 – 14:30	<p>Incident management / reporting / service continuity</p> <p>EMSA will present the SLA requirements on the Incident management / reporting / service continuity.</p>	EMSA
14:30 – 15:00	<p>New SSN SI</p> <p>EMSA will present the new SSN SI and the relation to the RS. The meeting will discuss on the possible next steps to be taken in respect to the new SSN SI.</p>	EMSA
15:00 – 16:00	<p>Conclusions and follow up actions</p> <p>The meeting will discuss and agree the conclusions and the follow up actions.</p>	All
16:00	End of the meeting	

Annex 2: Participants

1.	Giuseppe Aulicino	ICG
2.	Antonio Vollero	ICG
3.	Francesco Borghese	ELMAN
4.	Erasmus Zottola	ELMAN
5.	Harald Åsheim	NCA
6.	Bjørnar Jakobsen	NCA
7.	Brendan Mitchell	Kongsberg Norcontrol
8.	Marius Pettersen	Kongsberg Norcontrol
9.	Lazaros Aicmalotidis	EMCA, C.2
10.	Ivo Kupsky	EMSA, C.4
11.	Marta Lima	EMSA, C.2.1
12.	Edmunds Belinskis	EMSA, C.2.1
13.	Nikos Panagiotarakis	EMSA, C.4.1
14.	Joao Noronha	EMSA, C.4.1
15.	German Sarasua	EMSA, C.2.2

Annex 3: Actions agreed

Action point	Action
1	The obligation to share the technical documentation of the RSs and procedure on how to maintain and update it will be reflected in the SLAs.
2	EMSA and Norway will discuss amending the SLA during its next revision to reflect the applied technical solution.
3	The NCA will assess and propose the possibility of integrating of the North Atlantic and North Sea Experts Working Groups and propose merging the two groups at the next meeting of the EWGs.
4	EMSA will gather information from ICG to understand if it is possible to pass on to the SSN-SI the special mark indicating the buffered data.
5	The NCA will request the historical AIS database of the Helcom and North Sea region from Denmark through the Helcom Secretariat.
6	Italy and Norway will maintain the automatic data retransmission approach as the basic option, and the manual retransmission as an alternative option utilised for specific cases. This will be reflected in the next SLA proposal.
7*	EMSA will further evaluate and propose if any additional method and procedures for the data retransmission/uploading needs to be introduced.
8	Italy will present the systems synchronisation issue at the MARES EWG and will request MSs to use a commonly agreed method for time-synchronisation of their systems.
9*	EMSA, Italy and Norway will work further in order to define standardised requirements for the NPRs maintenance (e.g. the configuration parameters, data buffering/archiving, down sampling, data age filtering and data storage etc.) and also requirements for the RSs allowing their further harmonisation (e.g. data buffering / archiving policies, the methods for exchanging information, the monitoring procedures etc.). The agreed solutions will then be reflected in the future amendments of SLAs.
10	Italy will present the data coverage maps distribution service at the next EWG.
11*	EMSA, Italy and Norway will assess further the need of making available a quality indicator in the comment block (as well any other indicator).
12*	EMSA, Italy and Norway will assess the possible implementations in order to improve and harmonise the systems' monitoring functionalities. EMSA will provide the MSS monitoring procedures to RSs for their assessment and possible implementation.
13	All types of incidents to be reported by RS will be included in the SLAs amendments during their next revision.
14	EMSA will present the 24/7 contact availability issue at the next SSN group and invite the MSs to coordinate their operational 24/7 contacts.
15	EMSA will propose the necessary amendments to reflect the role of the RS administrator in the IFCD.

* These actions should be performed on the best effort basis.

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