

## Meeting: 13<sup>th</sup> Mediterranean AIS Expert Working Group

**Place and date:** Rome, 17 November 2015

**Agenda item:** MAREΣ network monitoring report

**Document number:** MAREΣ 13/3/1

**Submitted by** EMSA and Italy

Summary	The document provides participating countries with updates on the MAREΣ monitoring activities carried out in the period October, 2014 – September, 2015.
Action to be taken	As per paragraph 4.
Related documents	MAREΣ 12/4/1 – 22nd October 2014

### 1. Introduction

During the reporting period MAREΣ has been providing SafeSeaNet with AIS data gathered from the following participating Member States:

- Portugal (including Azores and Madeira)
- Spain
- France
- Italy
- Malta
- Slovenia
- Croatia
- Greece
- Cyprus
- Bulgaria
- Romania

MAREΣ is also acquiring AIS information from Montenegro in the Adriatic-Ionian Mediterranean sub-region and from Jordan in the framework of SAFEMED III project.

This report summarises the MAREΣ activities and provides analyses of the services provided by the regional AIS system.

### 2. Level of activity

Figure 1 together with table 1 show the average number of vessels monitored between October 2014 and September 2015. Figure 1 also shows a comparison between the numbers of vessels monitored during the period from October 2014 to September 2015 with the numbers of vessels monitored in the same period from October 2013 to September 2014 (presented during the MAREΣ EWG 12).

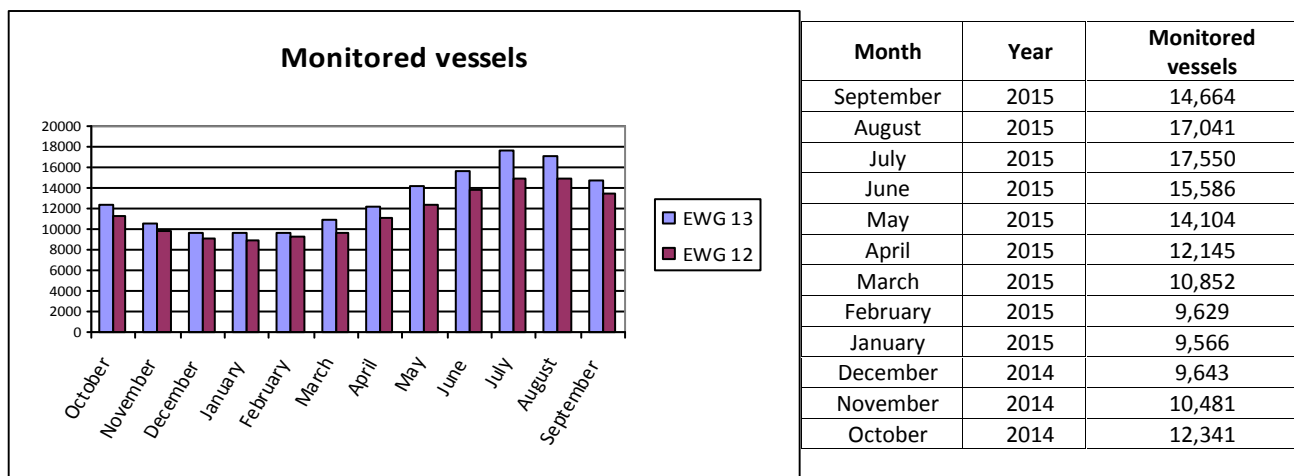


Figure 1 – Table 1: Number of vessels monitored per month (October 2014 – September 2015)

The highest number of vessels was detected during the summer period. This increase in traffic density is due to the duck effect which boost the AIS radio coverage and for the strong presence of pleasure crafts.

The diagrams in Annex 1 and Annex 2 show the amount of AIS information exchanged through MAREΣ. Each diagram includes information on the downsampling configuration and the area of the information exchange.

For this EWG the Italian Coast Guard changed the methodology to acquire this kind of information. In the previous EWGs these results were obtained, by querying the MAREΣ dBase, where all the incoming information are stored according to the following criteria:

- avoidance of duplication
- storage of all dynamic data
- storage of static and voyage-related data only once, unless they change.

The current MAREΣ release, running since October 2014, can provide the total amount of information acquired and delivered by each participant Country, including all static, dynamic and voyage-related data before the duplicates are taken out. The numbers of the messages per country and per state are presented in Tables 2 and 3:

BGR	CYP	ESP	FRA	GRC	HRV	ITA
27,419,051	44,636,323	1,228,601,658	53,012,578	127,686,678	38,645,135	957,849,018
MLT	MNE	POR ISL	POR	ROU	SVN	JDN
25,791,985	10,209,683	21,693,742	293,772,125	59,312,552	31,047,006	47,927,100

Table 2: Numbers of messages per State

Oct	Nov	Dec	Jan	Feb	Mar
241,037,260	202,606,937	184,991,518	197,999,566	173,233,441	218,235,913
Apr	May	Jun	Jul	Aug	Sep
228,213,693	285,160,677	307,462,178	347,763,120	321,983,855	258,916,476
<b>Total: 2,967,604,634</b>					

Table 3: Number of messages handled by MAREΣ per month

Since October 2<sup>nd</sup> 2015, MAREΣ is testing the connection with Morocco for the SAFEMED III purposes. Figures 2 and 3 show the information amount daily exchanged between Morocco and Italy through the MAREΣ testing environment:

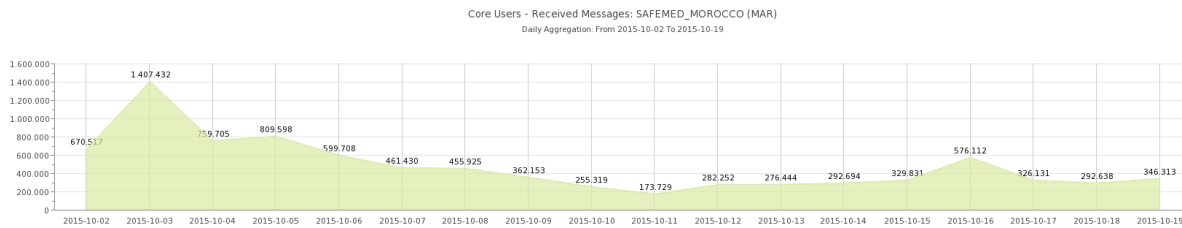


Figure 2: AIS information delivered by Morocco to MAREΣ test environment (six minutes downsampling)

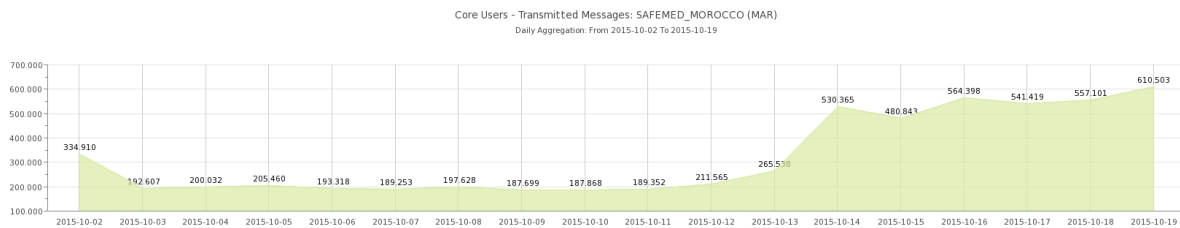


Figure 3: AIS information delivered by Italy to Morocco through MAREΣ test environment (six minutes downsampling)

### 3. MAREΣ network status

#### 3.1. Network malfunctions and incidents

During the observation period, 100 network malfunctions (incidents), involving national proxies and requiring a human intervention to restore normal operations, were reported by MAREΣ.

The reported incidents were mainly due to breakdowns in communications between the MAREΣ Core application and the national proxies. All of these incidents had an effect on the information flow with the concerned participating countries, and also had an impact on the general functioning of MAREΣ. The reported cases are shown in table 4.

Submitted reports		
Month/Year	N. of reports	Involved networks
October, 2014	8	Greece (1), Malta (1), Romania (1), Slovenia (4), Spain (1)
November, 2014	8	MAREΣ (1), France (1), Greece (2), Malta (2), Port. Islands (2)
December, 2014	5	Croatia (2), Portugal (1), Port. Islands (1), Romania (1)
January, 2015	2	Greece (1), Romania (1)
February, 2015	9	Malta (2), France (2), Bulgaria (1), Croatia (3), Romania (1)
March, 2015	12	MAREΣ (2), France (1), Romania (1), Croatia (1), Malta (3), Greece (4)
April, 2015	6	MAREΣ (1), France (1), Greece (1), Malta (2), Romania (1)
May, 2015	7	Cyprus (2), Greece (1), Malta (3), Romania (1)
June, 2015	7	France (1), Greece (1), Malta (1), Slovenia (4)
July, 2015	10	MAREΣ (1), Cyprus (2), France (2), Malta (1), Portugal (1), Slovenia (1) Bulgaria (2)
August, 2015	15	Bulgaria (1), Cyprus (1), France (1), Greece (4), Slovenia (1), Croatia (1), Malta (6)
September, 2015	11	MAREΣ (1), Cyprus (1), France (1), Greece (1), Croatia (2), Malta (2), Romania (1), Slovenia (1), Spain (1)
<b>Total:</b>	<b>100</b>	

Table 4: Reported Malfunctioning (incidents)

These incidents were detected by the MAREΣ “proxy monitoring” application, highlighting in red the communication breakdown between MAREΣ and the national proxy involved (Figure 4). Whenever there were communication breakdowns, the ITCG contacted the national points of contact and requested the re-establishment of the connection. All cases were also reported to the EMSA MSS.

User name	Description	Status	Disconnection Time	AIS mag/s to Pelagus	AIS mag/s from Pelagus	Is Enabled To Send	Is Enabled To Receive	Is Area IN-Filter Enabled	kbps to Server	OUT kbps	IN AIS Errors	6m AIS mag/s to Server	1h AIS mag/s to Server
1 EMSA_HRV	CROATIA	✓	-	1.33 mag/s	4 mag/s	✓	✓	✓	1.12 kbps	3.93 kbps	0	1 mag/s	1 mag/s
2 EMSA_MNE	MONTENEGRO	✓	-	0.27 mag/s	4.87 mag/s	✓	✓	✓	0.51 kbps	4.57 kbps	0	0 mag/s	0 mag/s
3 EMSA_CYP	CYPRUS	✓	-	2.6 mag/s	37.8 mag/s	✓	✓	✓	2.01 kbps	31.84 kbps	0	2 mag/s	2 mag/s
4 EMSA_SVN	SLOVENIA	✓	-	1.71 mag/s	43.14 mag/s	✓	✓	✓	1.4 kbps	36.14 kbps	0	1 mag/s	1 mag/s
5 EMSA_BGR	BULGARIA	✓	-	0.14 mag/s	43.14 mag/s	✓	✓	✓	0.29 kbps	35.96 kbps	0	0 mag/s	0 mag/s
6 EMSA_GRC	GREECE	✓	-	4.29 mag/s	39.29 mag/s	✓	✓	✓	3.56 kbps	32.94 kbps	0	4 mag/s	3 mag/s
7 EMSA_ROU	ROMANIA	✓	-	2.36 mag/s	43.29 mag/s	✓	✓	✓	1.91 kbps	36.23 kbps	0	1 mag/s	1 mag/s
8 EMSA_ITA	ITALY	✗	-	44.64 mag/s	73.71 mag/s	✓	✓	✓	37.05 kbps	52.32 kbps	61	39 mag/s	39 mag/s
9 EMSA_SSN	STIRES	✓	-	0 mag/s	43.43 mag/s	✓	✓	✓	0 kbps	36.15 kbps	0	0 mag/s	0 mag/s
10 EMSA_MLT	MALTA	✓	-	0.71 mag/s	43 mag/s	✓	✓	✓	0.68 kbps	35.85 kbps	0	0 mag/s	0 mag/s
11 EMSA_FRA	FRANCE	✓	-	2.57 mag/s	112.14 mag/s	✓	✓	✓	1.86 kbps	94.33 kbps	0	1 mag/s	1 mag/s
12 EMSA_ESP	SPAIN	✓	-	49 mag/s	113.36 mag/s	✓	✓	✓	29.07 kbps	85.2 kbps	0	45 mag/s	45 mag/s
13 EMSA_PRT	PORTUGAL	✓	-	11.5 mag/s	105.71 mag/s	✓	✓	✓	6.97 kbps	80.09 kbps	0	10 mag/s	10 mag/s
14 EMSA_PTSL	PORTUGAL ISLANDS	✓	-	0.86 mag/s	113.07 mag/s	✓	✓	✓	0.78 kbps	85.08 kbps	0	0 mag/s	0 mag/s

Figure 4: MAREΣ “proxy monitoring” application

In comparison with the activity reports of previous years, the total number of incidents decreased, as showed below:

- **EWG 11:** 86 incidents (on a 11 months period)
- **EWG 12:** 132 incidents (this peak was due to the transition forward MAREΣ 2.0 when all the national proxies had to change their connections;
- **EWG 13:** 100 incidents (on 12 month period).

The average number of incident per month, relieved during the last 3 years is almost the same.

### 3.2.Incident processing time

MAREΣ monitored the availability of links, including the connection status of national systems and the exchange of AIS notifications with MAREΣ, and with the SSN central application. During the observed period, a number of significant downtimes were detected.

The total duration of unavailability (downtime) during the observed period was 2,059.53 hours, and malfunctions processing time varied from 3.67 to 528.12 hours per month. Both the number of incidents that occurred within the MAREΣ network, and the time needed to process them, are shown in table 5.

The average time to restore an incident was about 20.5<sup>h</sup>.

This figure is coherent with the one presented at 12<sup>th</sup> EWG:

- total duration of unavailability, 2,155.32 hours
- average time to restore the incident, 16<sup>h</sup>

Month	Oct. 2014	Nov. 2014	Dec. 2014	Jan. 2015	Feb. 2015	Mar. 2015	Apr. 2015	May 2015	Jun. 2015	Jul. 2015	Aug. 2015	Sept. 2015	Total
No. Incidents	8	8	5	2	9	12	6	7	7	10	15	11	100
Minutes	12,933	24,037	3,799	220	1,0791	31,687	9,525	4,409	1,400	13,081	5,991	5,698	12,3571
Hours (Est.)	215.55	400.62	63.32	3.67	179.85	528.12	158.75	73.48	23.33	218.02	99.85	94.97	2059.53

Table 5: Malfunctioning (incidents) processing time

Table 5 shows that the resolution time for malfunctions has increased, which indicates a need for greater attention to ensure the technical availability of the AIS networks.

### 3.3. Minor incidents

Table 6 illustrates the numbers of minor breakdowns in communications between MAREΣ and national proxies that were reported by MAREΣ. The durations were reported by MAREΣ as being very short (from milliseconds to a few minutes). These incidents have been automatically restored by the MAREΣ CORE and the proxy application.

BGR	CYP	ESP	FRA	GRC	HRV	ITA	ISL	MLT	MNE	POR	ROU	SVN	JDN	SSN
267	495	443	245	28,554	310	58,280	233	219	1922	283	420	401	66,617	56,005

Table 6: Breakdowns in communications

The high numbers of minor incidents affecting the Italian, Greek and Jordanian networks were caused by an instantaneous malfunctioning of their proxy hosting environment (HW, firewall, ect.) which progressively deteriorated to an incident.

The high number of breakdown in communication affecting the SSN proxy is not an incident but is due to MAREΣ business process for handling the proxies connections. A proxy connected to MAREΣ has to send every six minutes a “keep alive” message. Failing this message MAREΣ closes and immediately reopens the connection. This is the case of the proxy used by SafeSeaNet (SSN SI) to connect itself to MAREΣ considering that it isn’t providing the “keep alive” message.

Annex 3 is reporting (through diagrams) the monthly link availability reached for each of the participant Countries during the period from October 2014 to September 2015.

The overall availability is affected by the incidents involving the national proxy, the breakdown in communication and the MAREΣ inactivity periods.

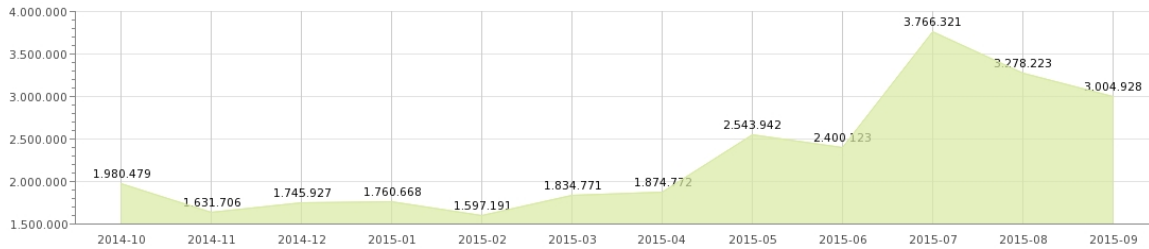
## 4. Action required

Participating states are invited to note the submitted information.

# Annex 1

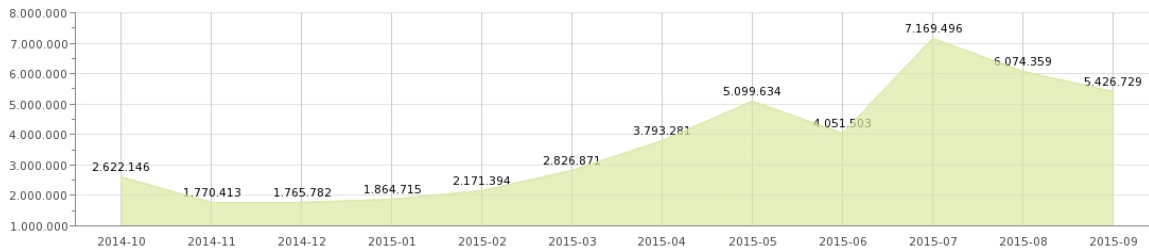
## AIS information provided by each participating Country to MAREΣ

Core Users - Received Messages: EMSA\_BGR (BGR)  
Monthly Aggregation: From 2014-10 To 2015-09



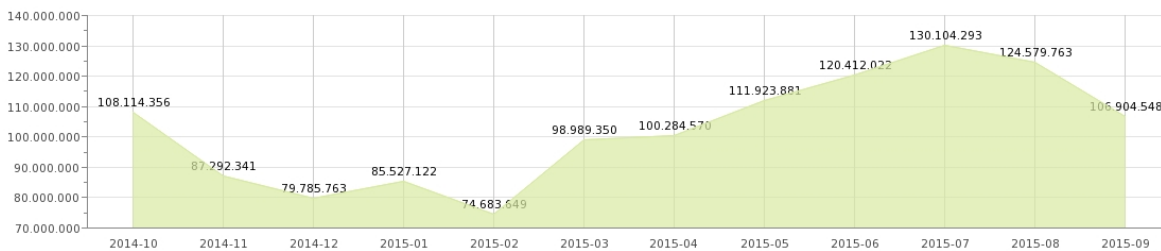
AIS information delivered by Bulgaria (downsampling 6 min)

Core Users - Received Messages: EMSA\_CYP (CYP)  
Monthly Aggregation: From 2014-10 To 2015-09



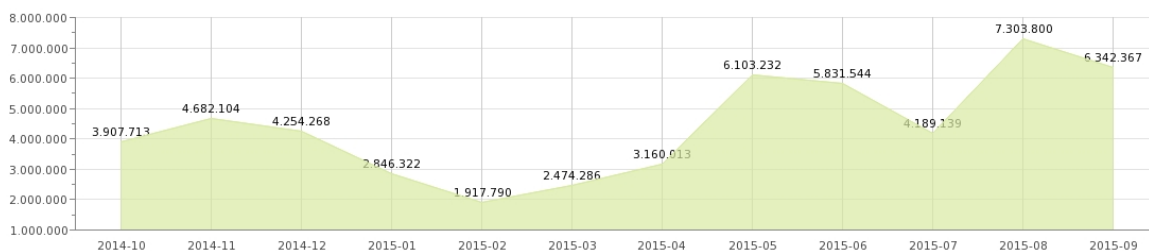
AIS information delivered by Cyprus (downsampling 6 min)

Core Users - Received Messages: EMSA\_ESP (ESP)  
Monthly Aggregation: From 2014-10 To 2015-09



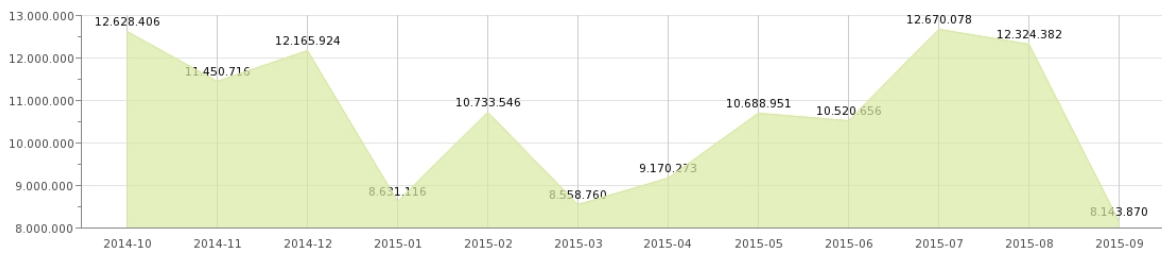
AIS information delivered by Spain (downsampling 1 min)

Core Users - Received Messages: EMSA\_FRA (FRA)  
Monthly Aggregation: From 2014-10 To 2015-09



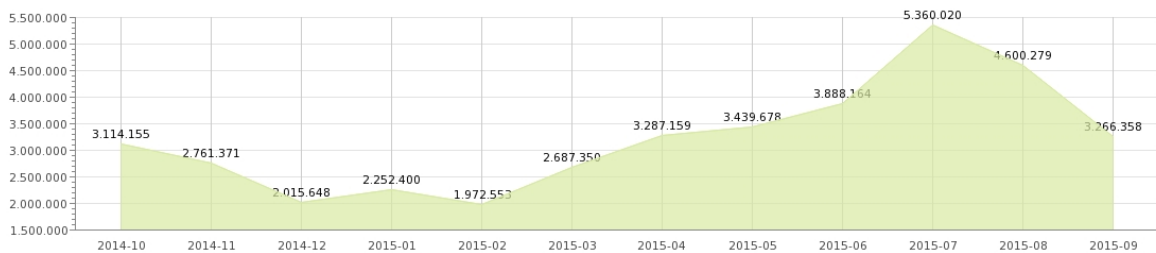
AIS information delivered by France (downsampling 1 min)

Core Users - Received Messages: EMSA\_GRC (GRC)  
Monthly Aggregation: From 2014-10 To 2015-09



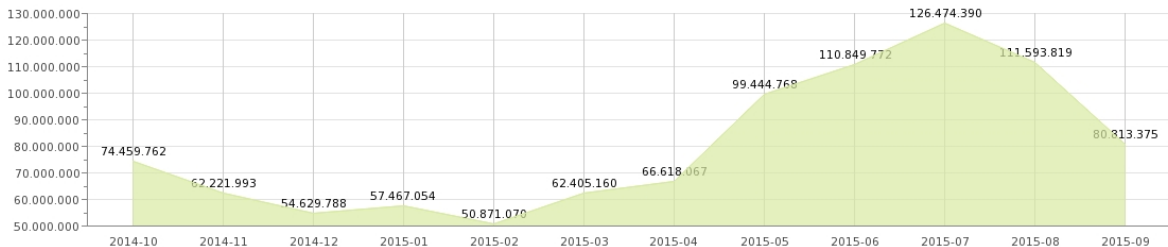
AIS information delivered by Greece (downsampling 6 min)

Core Users - Received Messages: EMSA\_HRV (HRV)  
Monthly Aggregation: From 2014-10 To 2015-09



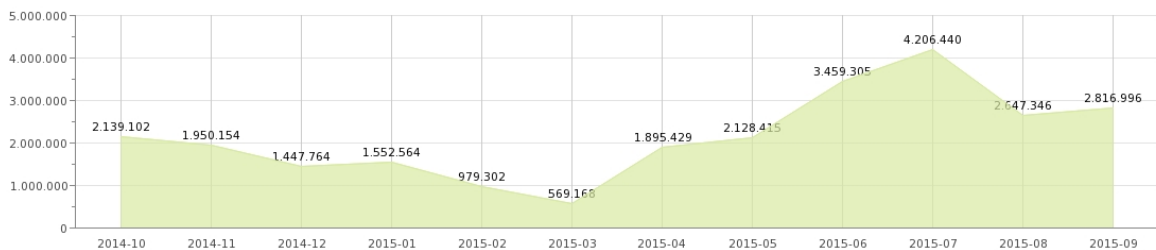
AIS information delivered by Croatia (downsampling 6 min)

Core Users - Received Messages: EMSA\_ITA (ITA)  
Monthly Aggregation: From 2014-10 To 2015-09

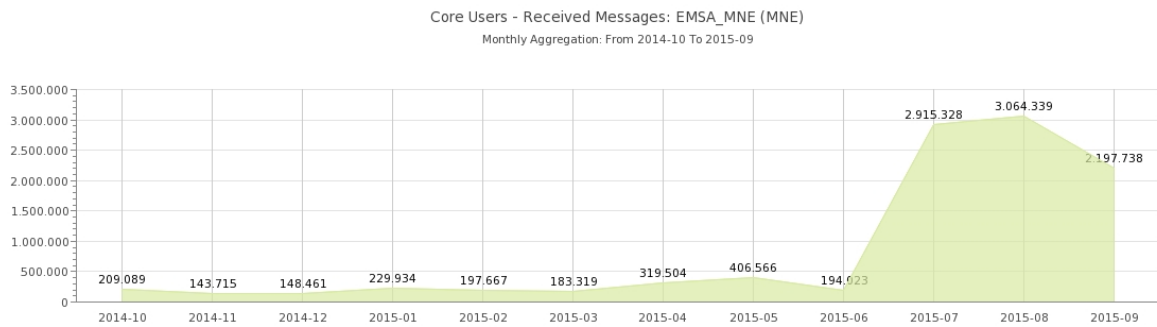


AIS information delivered by Italy (downsampling 1 min)

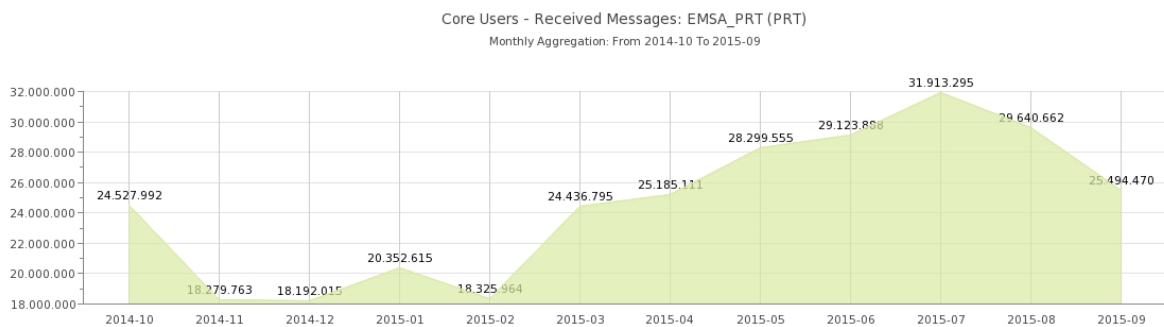
Core Users - Received Messages: EMSA\_MLT (MLT)  
Monthly Aggregation: From 2014-10 To 2015-09



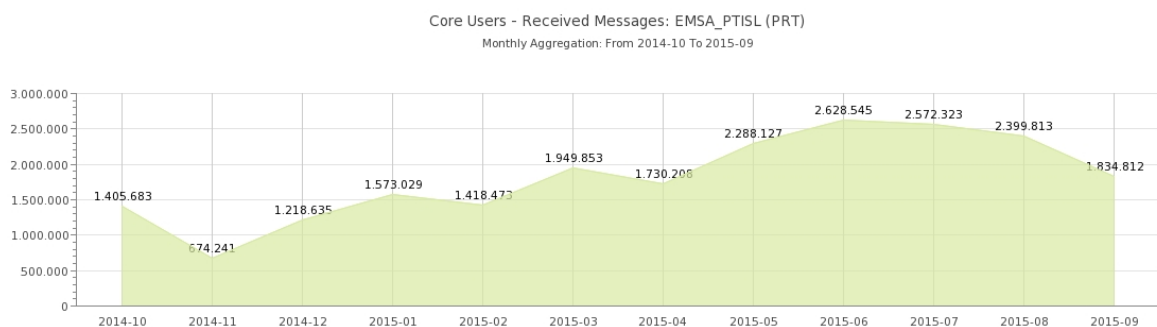
AIS information delivered by Malta (downsampling 6 min)



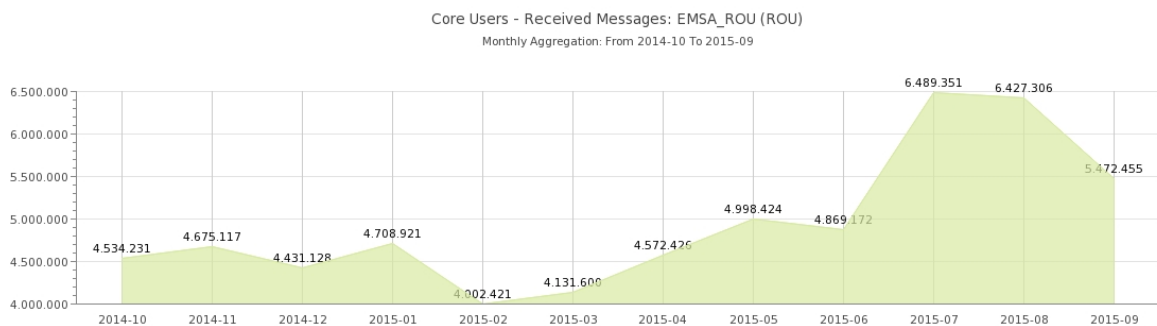
AIS information delivered by Montenegro (downsampling 6 min)



AIS information delivered by Portugal mainland (downsampling 1 min)

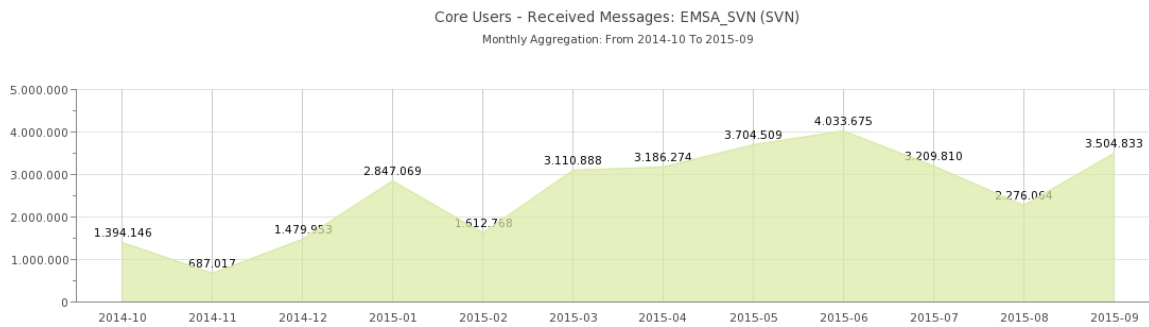


AIS information delivered by Portugal Azores and Madeira (downsampling 6 min)

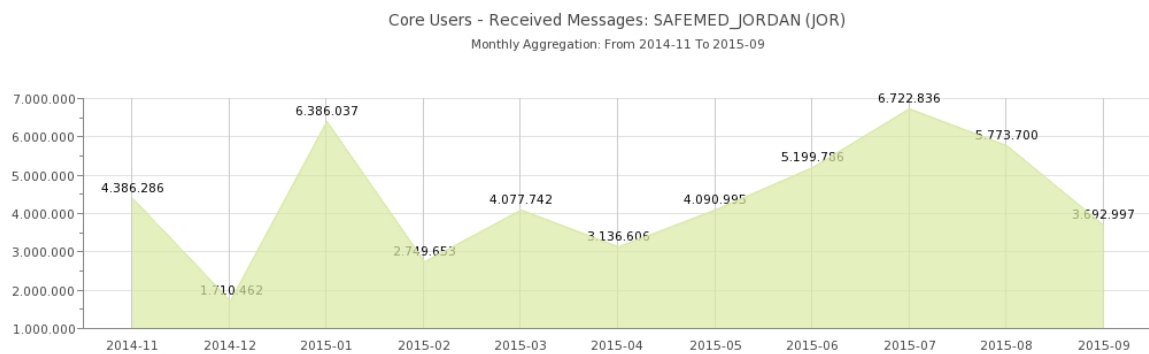


AIS information delivered by Romania (downsampling 6 min)





AIS information delivered by Slovenia (downsampling 6 min)

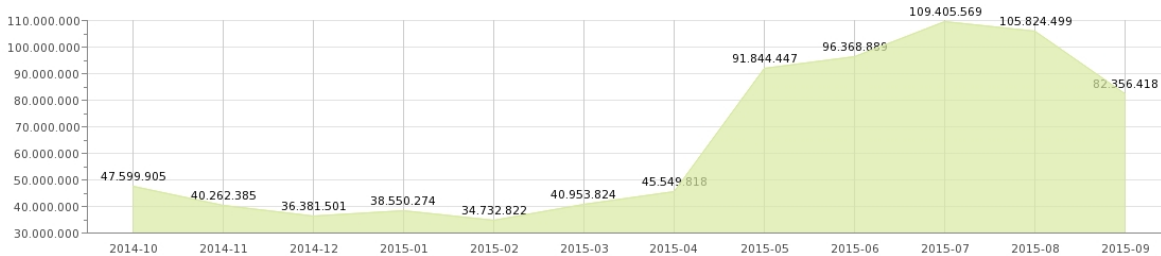


AIS information delivered by Jordan (full data rate)

## Annex 2

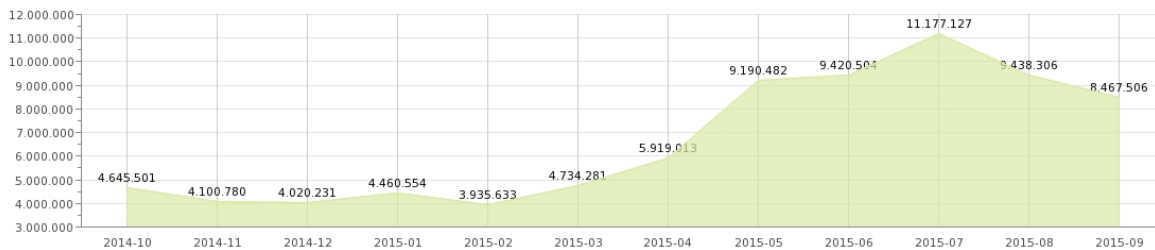
### AIS information delivered by MAREΣ

Core Users - Transmitted Messages: EMSA\_SS  
Monthly Aggregation: From 2014-10 To 2015-09



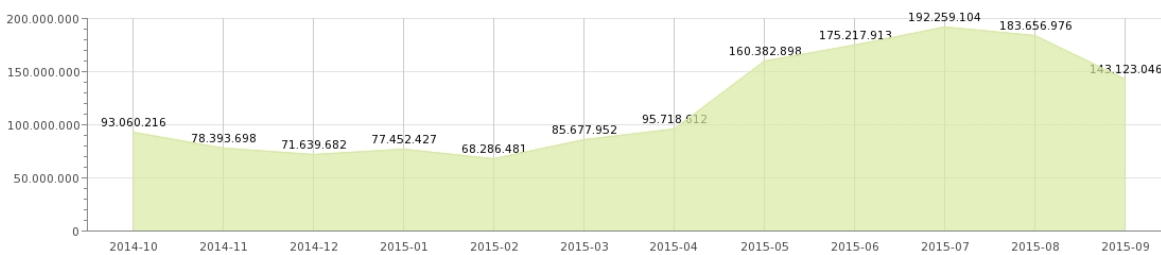
AIS information delivered to SafeSeaNet (downsampling 6 min)

Core Users - Transmitted Messages: EMSA\_HRV (HRV)  
Monthly Aggregation: From 2014-10 To 2015-09



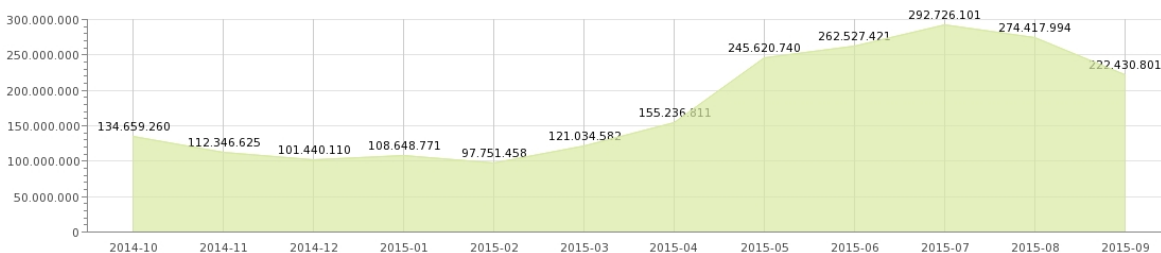
AIS information delivered to Croatia (Adriatic Region - downsampling 6 min)

Core Users - Transmitted Messages: EMSA\_ITA (ITA)  
Monthly Aggregation: From 2014-10 To 2015-09

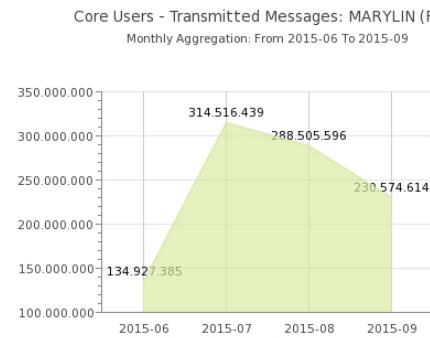
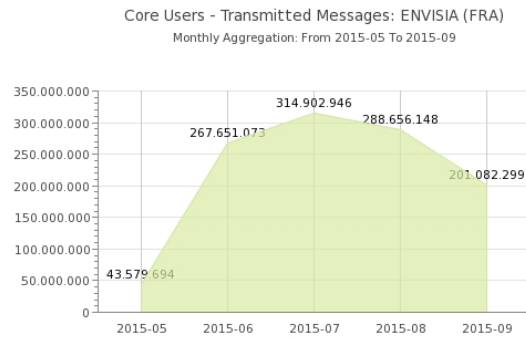


AIS information delivered to Italy (downsampling 1 min)

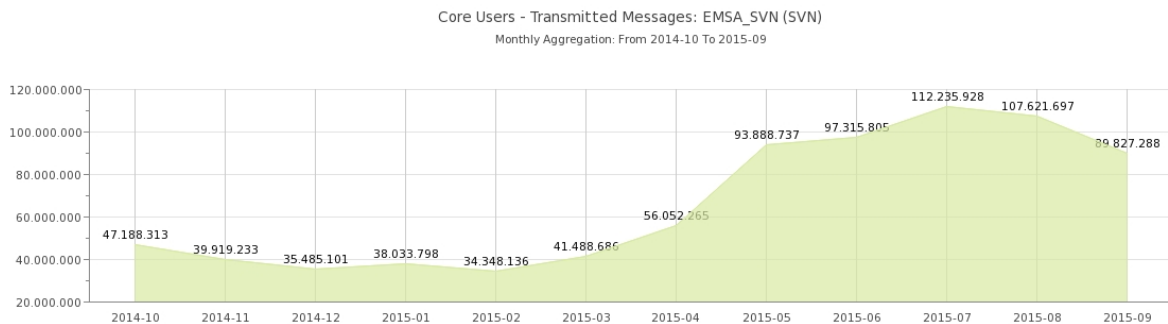
Core Users - Transmitted Messages: EMSA\_FRA (FRA)  
Monthly Aggregation: From 2014-10 To 2015-09



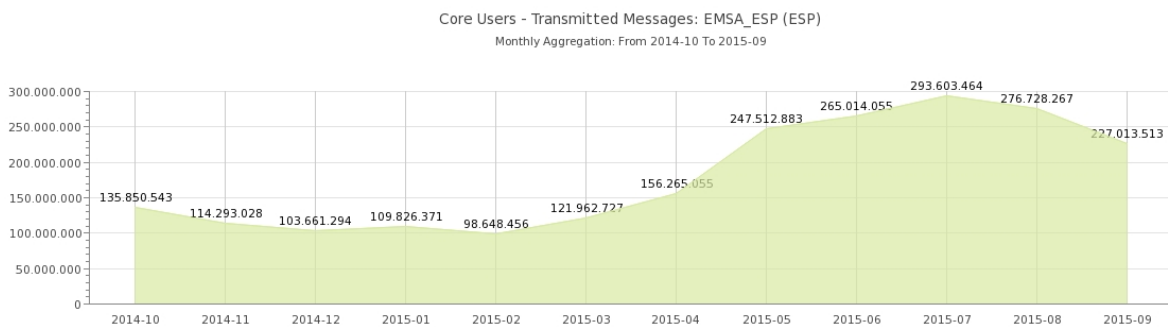
AIS information delivered to France (downsampling 1 min)



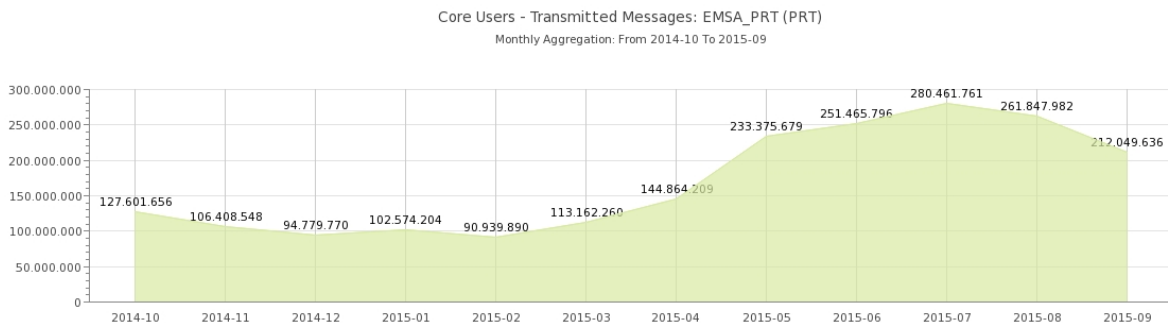
AIS information delivered to France (Envisia and Marylin projects - downsampling 1 min)



AIS information delivered to Slovenia (downsampling 6 min)

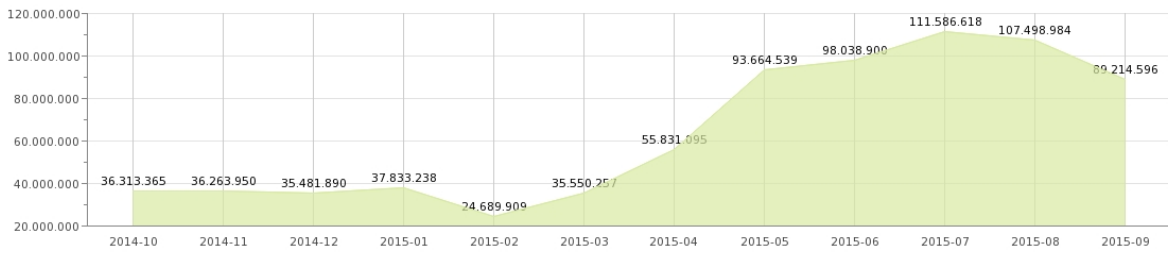


AIS information delivered to Spain (downsampling 1 min)



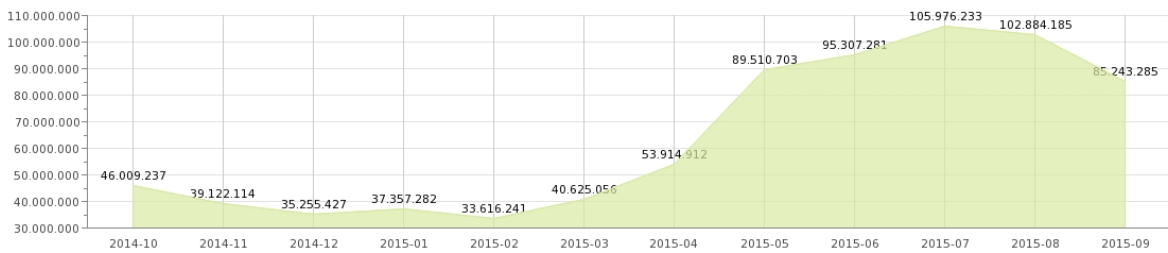
AIS information delivered to Portugal (downsampling 1 min)

Core Users - Transmitted Messages: EMSA\_MLT (MLT)  
Monthly Aggregation: From 2014-10 To 2015-09



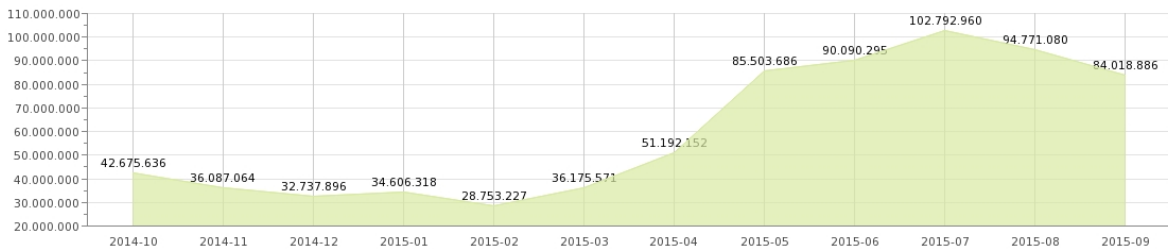
AIS information delivered to Malta (downsampling 6 min)

Core Users - Transmitted Messages: EMSA\_CYP (CYP)  
Monthly Aggregation: From 2014-10 To 2015-09



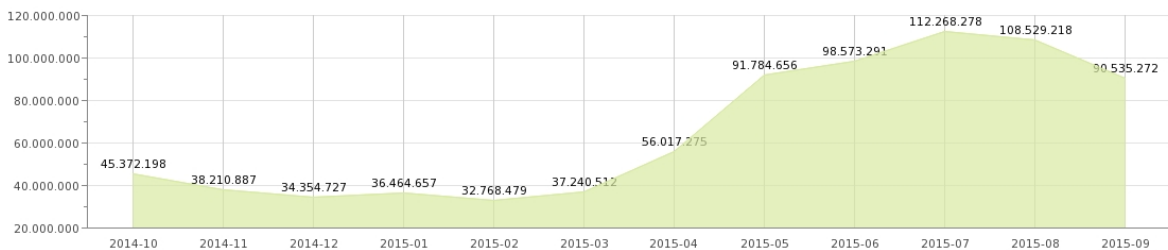
AIS information delivered to Cyprus (downsampling 6 min)

Core Users - Transmitted Messages: EMSA\_GRC (GRC)  
Monthly Aggregation: From 2014-10 To 2015-09

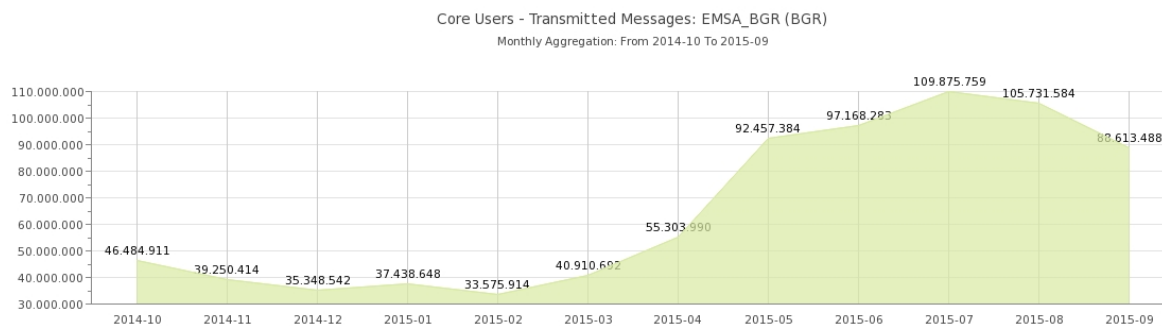


AIS information delivered to Greece (downsampling 6 min)

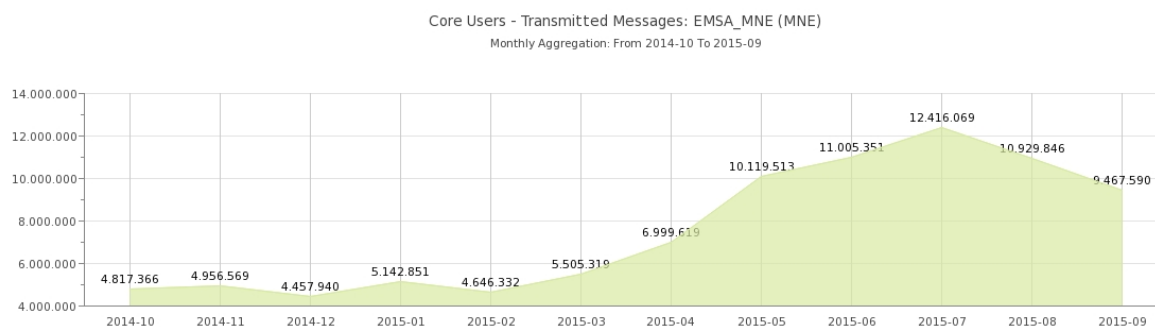
Core Users - Transmitted Messages: EMSA\_ROU (ROU)  
Monthly Aggregation: From 2014-10 To 2015-09



AIS information delivered to Romania (downsampling 6 min)



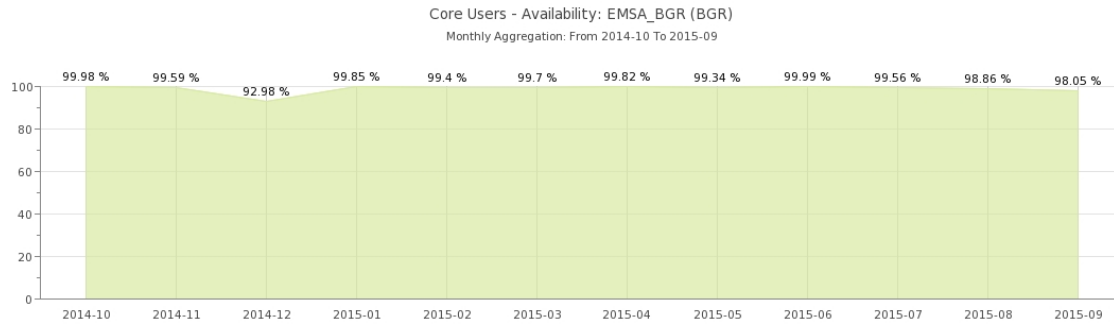
AIS information delivered to Bulgaria (downsampling 6 min)



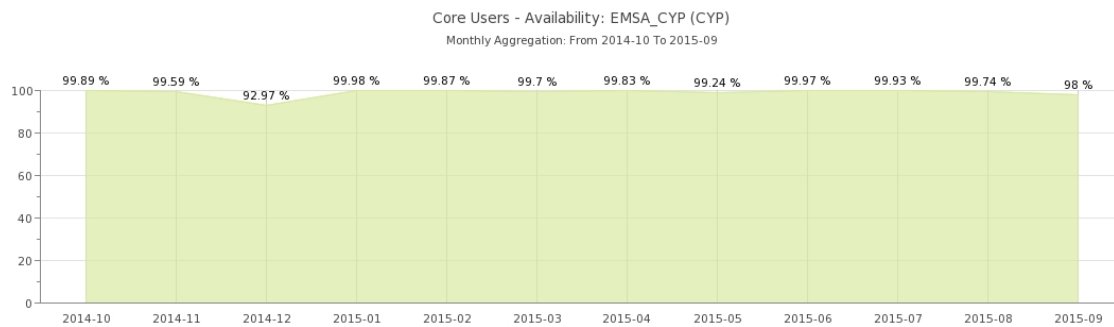
AIS information delivered to Montenegro (Adriatic Region - downsampling 6 min)

## Annex 3

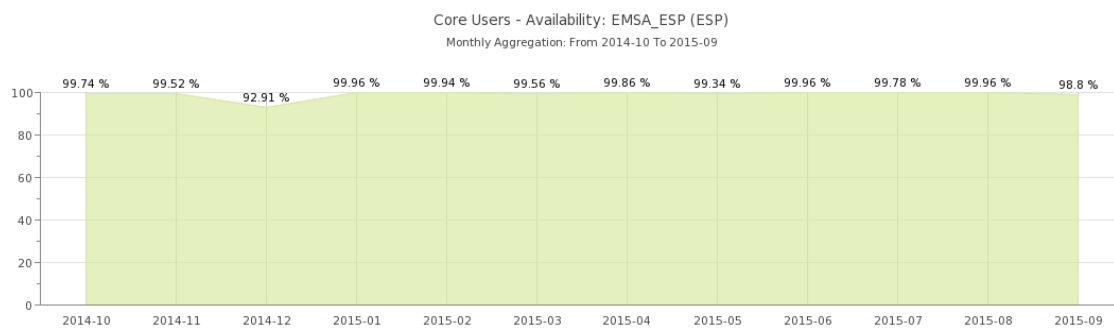
### Link availability



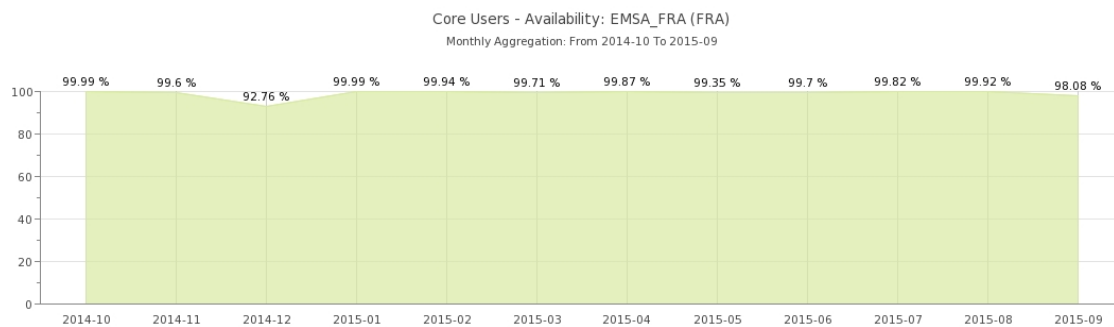
#### Bulgaria



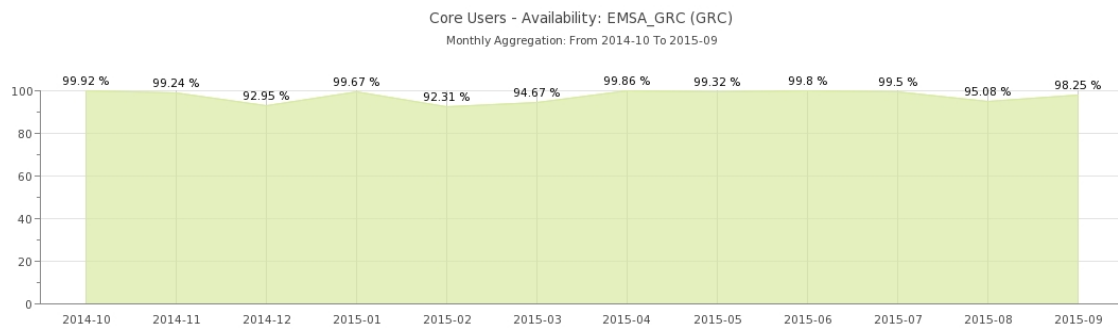
#### Cyprus



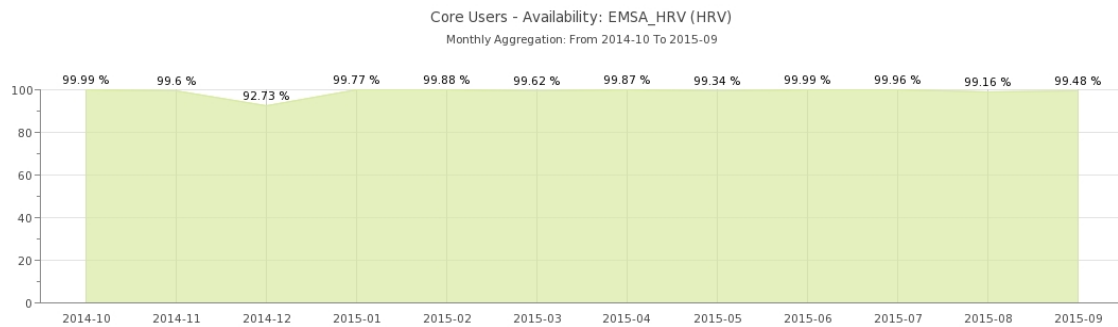
#### Spain



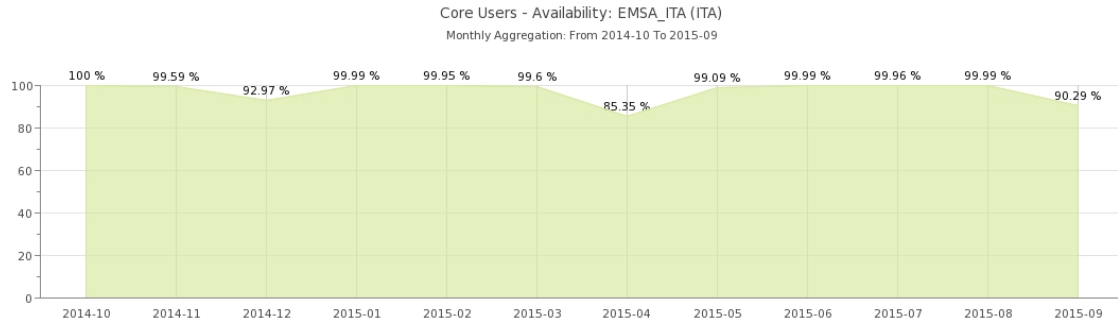
#### France



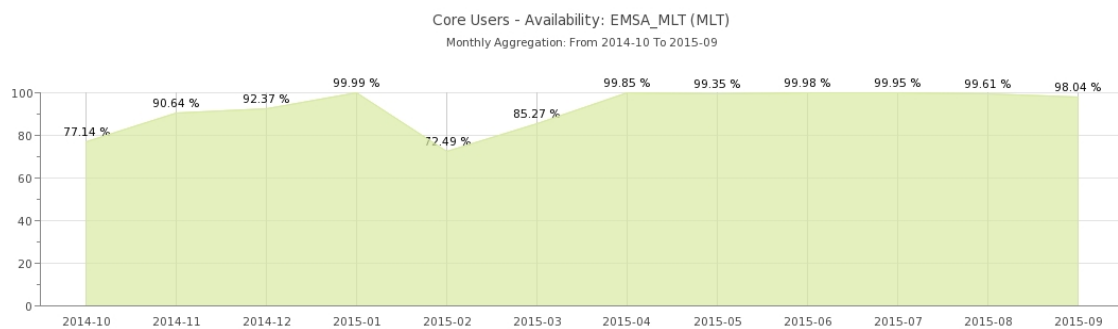
## Greece



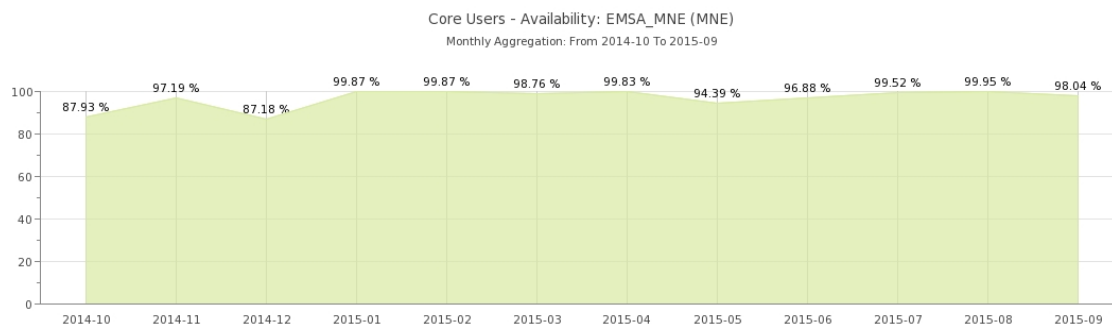
## Croatia



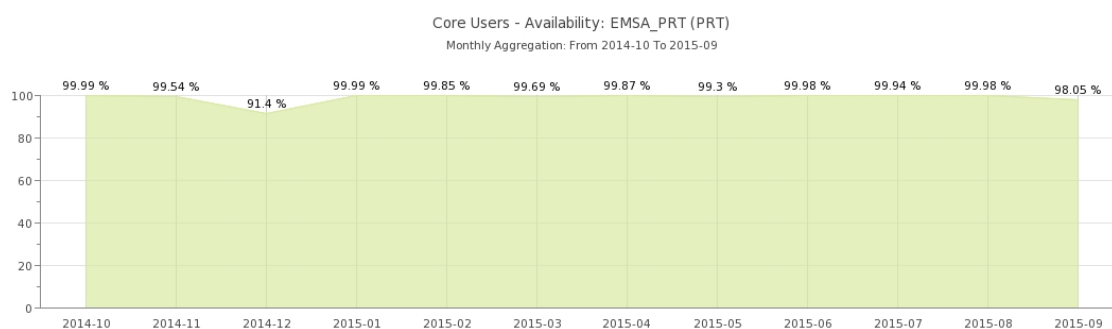
## Italy



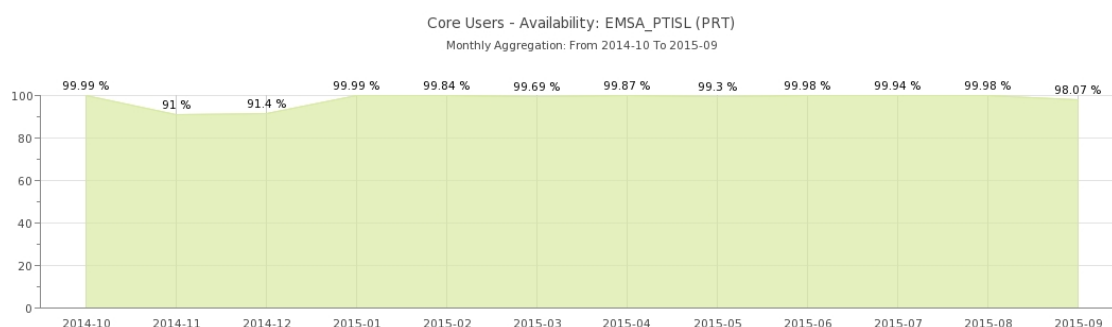
## Malta



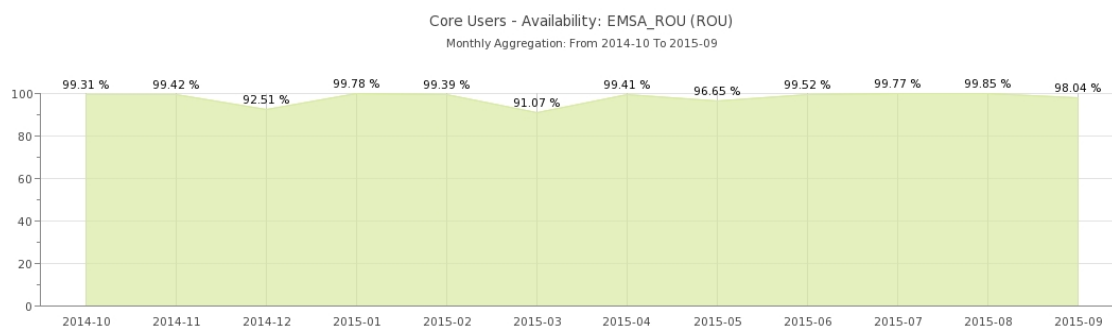
## Montenegro



## Portugal (mainland)

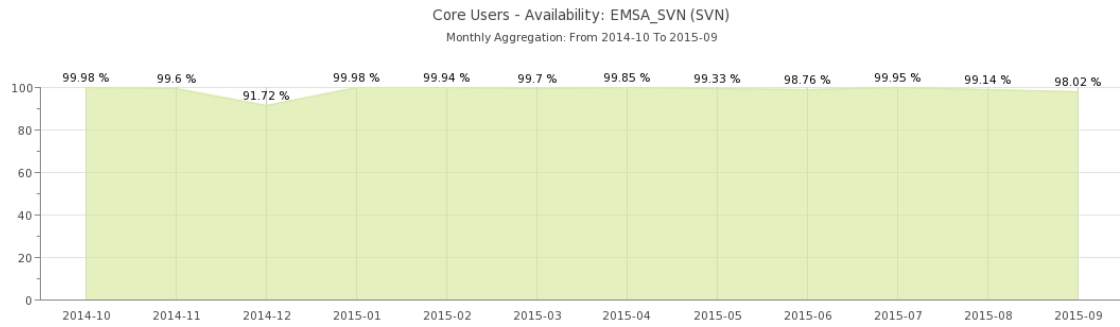


## Portugal (Azores and Madeira)

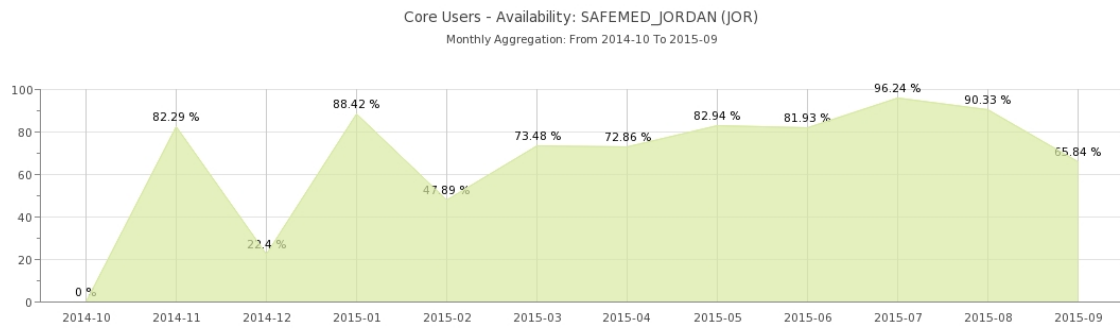


## Romania





## Slovenia



## Jordan