

Meeting: 17th Mediterranean AIS Expert Working Group

Place and date: Online meeting, 27 October 2020

Agenda item: MAREΣ network activity and monitoring report

Document number: MAREΣ 17/5/1

Submitted by Italy

Summary	The document provides updates on the MAREΣ network and monitoring activities carried out in the period Nov 19 – Sept 20 .
Action to be taken	As per paragraph 5.
Related documents	<ul style="list-style-type: none"> a. 16th Mediterranean AIS Expert Working Group Workshop report b. MAREΣ 16/4/1 networking activity report (Oct 2018 to Oct 2019)

1 Introduction

This report summarises the MAREΣ activities and describes the services provided by the Regional AIS Server carried out from November 2019 to September 2020.

During the reporting period, MAREΣ has been providing the central SafeSeaNet with AIS data gathered from the following twelve participating Member States: Bulgaria, Croatia, Cyprus, France, UK/Gibraltar, Greece, Italy, Malta, Portugal (including Azores and Madeira), Romania, Slovenia and Spain.

Furthermore, MAREΣ has been providing AIS information delivered by the following third Countries participating in the specific regional projects:

- Montenegro, in the context of a sharing environment implemented in the Adriatic Sea among Italy, Slovenia, Croatia and Montenegro itself;
- Morocco and Jordan, in the framework of the SAFEMED IV project. Tunisia has also been added since May 2019 when the Tunisian Ministry of Transport, Shipping and Maritime ports (*Office de la Marine Marchande et des Ports*) has implemented a small network based on two base stations located in Biserta and La Goulette;
- Ukraine and Georgia, in the framework of the “Black and Caspian Sea” project (BCSEA).

2 Level of the activity

The highest number of vessels was detected during the summer period, when the increasing of the traffic density is due to the duct effect, which boost the AIS radio coverage, as well as the high number of pleasure crafts. The average number of vessels monitored daily during the reference period (Nov 2019 - Sept 2020) is shown in Figure 1. The monthly amount of data for ships carrying AIS Class A are indicated in blue and the Class B ships in red.

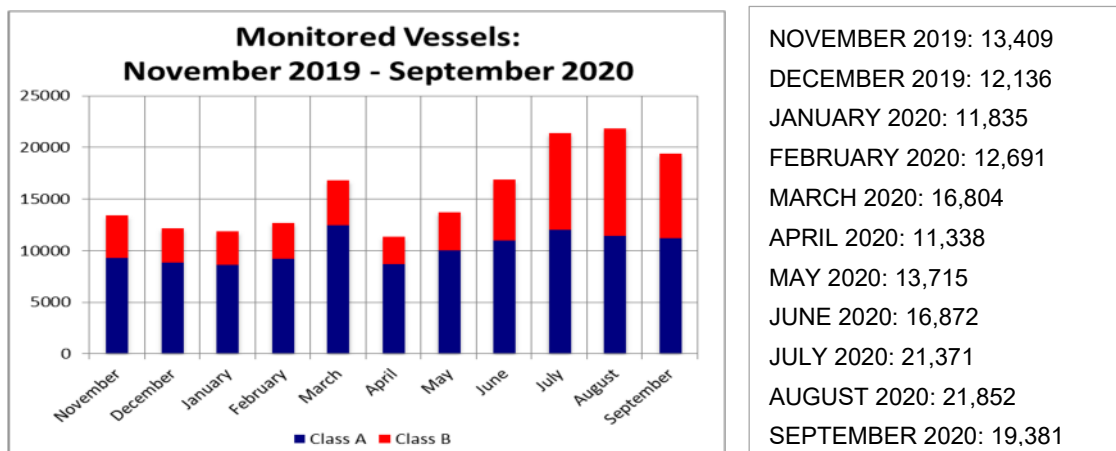


Figure 1 - No. of vessels monitored from **Nov 19 to Sept 20**

The amount of monitored vessels in the reference period is not fully coherent with the numbers of the previous reference period, mainly due to the changes in maritime traffic caused by COVID-19, leading to an average decrease of approximately 15% (between April and August 2020) (see Figure 2).

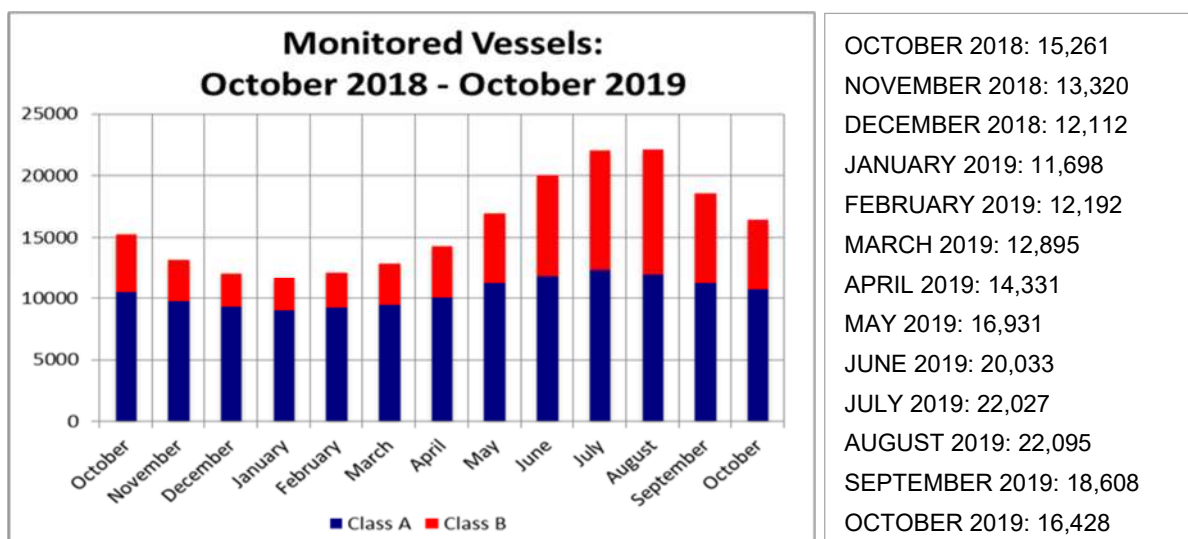


Figure 2 - No of vessels monitored from **Oct 18 – Oct 19**

The current MAREΣ release, running since October 2014 provides the total amount of the information collected and delivered by each participating Country, including all static, dynamic and voyage-related data. The data duplication filtering has been carried out by the Regional system.

Annex 1 presents the amount of the AIS information provided to MAREΣ by the participating Countries during the reference period. Annex 2 presents the amount of the AIS information delivered by MAREΣ to the participating Countries and to central SSN during the reference period.

Each diagram also includes information on the downsampling configuration and the information exchange area (if the latter is different from the sharing environment of the Mediterranean EU Countries).

According to the down-sampling policy (6 min.) established in the Service Level Agreement between Italy and EMSA, the amount of the information provided by MAREΣ to the central SSN system during the reference period is **1.269.431.431**.

Italy, Slovenia, Croatia and Montenegro are sharing information in the Adriatic Sea without downsampling (at full data rate) since November 2015, Ukraine is exchanging information with 6 minutes downsampling since May 2019, while Georgia is exchanging information without downsampling since January 2019. Since May 2019, Tunisia is exchanging information with 1 minute downsampling.

The amount of the AIS information delivered to MAREΣ by each of the participating Countries (MSs and third Countries), calculated from November 2019 to September 2020 is shown in the Table1.

Overall AIS information delivered by the participating Countries (November 2019 ÷ September 2020)						
BGR	CYP	ESP	FRA	GRC	HRV	ITA
721.482.420	49.376.782	1.309.821.509	120.840.052	100.504.715	1.164.512.854	3.850.698.859
MLT	MNE	PRT ISL	PRT	ROU	SVN	GIB
30.105.447	459.592.040	18.061.407	249.893.302	955.453.258	205.967.867	477.219.478
MOR	JDN	UKR	GEO	TUN		
163.053.379	0	564.527.278	70.216.092	92.031.734		

Table 1 - Overall AIS information delivered to MAREΣ in the reference period by participating Countries

The overall AIS information per month handled by MAREΣ in the same period is shown in Table 2.

Overall AIS information per month handled by ΜΑΡΕΣ (November 2019 ÷ September 2020)					
Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020
3.873.907.915	3.785.530.100	3.718.588.776	3.783.734.027	3.700.629.477	3.546.245.678
May 2020	Jun 2020	July 2020	Aug 2020	Sept 2020	
4.123.236.067	4.737.664.750	5.770.692.872	5.559.422.921	4.772.741.217	
Total: 47.372.393.800					

Table 2 - MAREΣ monthly workload in the reference period

The average number of AIS messages per second shared by MAREΣ is presented in Table 3.

Messages per second handled by MAREΣ (November 2019 ÷ September 2020)					
Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020
~1.495 msg/s	~1.413 msg/s	~1.388 msg/s	~1.510 msg/s	~1.382 msg/s	~1.368 msg/s
May 2020	Jun 2020	July 2020	Aug 2020	Sept 2020	
~1.539 msg/s	~1.828 msg/s	~2.154 msg/s	~2.076 msg/s	~1.841 msg/s	

Table 3 - MAREΣ monthly workload calculated in messages per second handles by the server

Tables 2 and 3 represent the overall MAREΣ workload.

3 MAREΣ network status

3.1 Network malfunctions/incidents

During the overall observation period 80 network malfunctions (incidents), involving National Proxies and requiring a human intervention to restore operations were reported. The reported incidents, as shown in Table 4, were mainly due to breakdowns in communications between the MAREΣ Core application and the National Proxies and breakdowns in communication between the National Proxy and the related AIS network.

All incidents affected the information flow from the concerned participating Countries, and the functioning of MAREΣ.

Submitted reports ^a		
Month/Year ^a	N. of reports ^a	Involved networks ^a
November-2019 ^a	3 ^a	Slovenia (2), Portugal-Islands (1) ^a
December-2019 ^a	9 ^a	Slovenia (2), Italy (1), Greece (1), France (1), Malta (2), Gibraltar (1), Portugal (1) ^a
January-2020 ^a	3 ^a	Portugal-Islands (1), Croatia (1), Cyprus (1) ^a
February-2020 ^a	3 ^a	Greece (2), Spain (1) ^a
March-2020 ^a	9 ^a	Greece (2), Portugal-Islands (3), Spain (1), Romania (1), Malta (1), Cyprus (1) ^a
April-2020 ^a	3 ^a	Portugal-Islands (2), Italy (1) ^a
May-2020 ^a	4 ^a	Cyprus (3), France (1) ^a
June-2020 ^a	12 ^a	France (4), Greece (2), Malta (2), Portugal-Islands (1), Portugal (1), Cyprus (1), ^a
July-2020 ^a	8 ^a	Greece (5), Portugal (1), Malta (1), Slovenia (1) ^a
August-2020 ^a	8 ^a	Spain (3), Greece (1), Italy (1), Cyprus (1), <u>Bulgary (1)</u> ^a
September-2020 ^a	8 ^a	Malta (5), Greece (1), Spain (1), Slovenia (1) ^a
Total^a	70^a	^a

Table 4 - Reported MAREΣ malfunctioning (incidents) during the reference period

All incidents were detected by the “core user monitoring” tool in the MAREΣ application (Figure 3), where the breakdown in the communication between MAREΣ and the National Proxy involved is highlighted in red, while the breakdown between the AIS national network and the related National Proxy is highlighted in yellow.

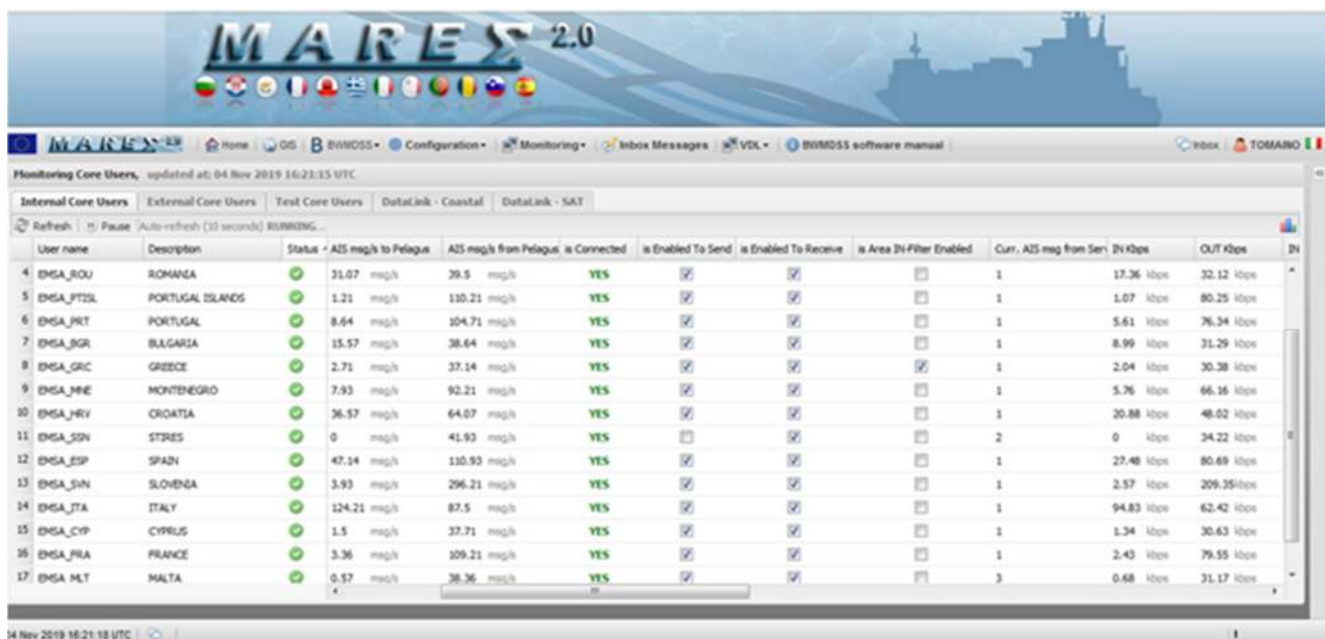


Figure 3 - MAREΣ “core user monitoring” tool

The total numbers of incidents reported to the EWG are as follow:

- **EWG 11:** 86 incidents on a 11 months period (7.8 incident/month);
- **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 a 12 months period (8.3 incident/month);
- **EWG 14:** 178 incidents (on a 24 months period), of which 97 incidents registered in the reference period Oct 2015 – Sept 2016 (8 incident/month) and 81 registered in the reference period Oct 2016 – Sept 2017 (6.7 incident/month);
- **EWG 15:** 60 incidents on a 12 months period (5 incident/month);
- **EWG 16:** 80 incidents on a 13 months period (6.1 incident/month).

The average number of incidents per month observed during the last seven years was about 6 failures per month.

3.2 Failure restoring and incident processing time

The availability of the links, including the connection status of the National Proxies (NPRs) and the exchanging rate of the AIS information between NPRs and MAREΣ as well as between MAREΣ and the SSN central application was monitored.

The total elapsed time to restore all the failures registered during the reference period (i.e. the processing time of the incident) was **431.4 hours**, and it varied between 8.33 hours (February 2020) and 81.67 hours (April 2020) per month (see in Table 5).

The average total elapsed time needed to restore the failures was about **06^h.16**.

Month	Nov. 2019	Dec. 2019	Jan. 2020	Feb. 2020	Mar. 2020	Apr. 2020	May 2020	Jun. 2020	July 2020	Aug. 2020	Sept. 2020	Total
No. Incidents	3	9	3	3	9	3	4	12	8	8	8	70
Minutes	1,835	3,577	4,162	500	2,778	4,900	599	2,256	1,734	1,431	2,112	25,884
Hours (Est.)	30.58	59.62	69.36	8.33	46.3	81.67	9.98	37.6	28.9	23.85	35.2	431.4

Table 5 - Total elapsed time needed to restore the failures

The numbers shows that results are better than those presented at the 16th EWG (related to the period: October 2018 ÷ October 2019), when the following results were presented:

- total elapsed time to restore the failures: 597.10 hours;
- average elapsed time to restore the failures: 7.46 hours.

The following table presents failures and related incidents, with the National Proxies, which affected the registered incident processing time, as defined in the SLA between ICG and EMSA¹, and exceeded the maximum time established for restoring the AIS data transfer from the national proxies to MAREΣ:

Report Date	MAREΣ incident number	Participant Country involved	Processing time	Root cause of incidents
September 22 th 2020	20200922-01	Malta	12 ^h 50 ^m	NIL

Since 27th September (18:16 UTC) the national proxy of Malta is disconnected from the Regional Server due to a major technical issue.

3.3 MAREΣ/SSN-SI incidents

No incidents affected MAREΣ SSN-SI and STAR RH in the reference period.

¹ Total time in which the user can expect resolution of the reported incident, after the incident is reported to the Regional Server by phone or e-mail or detected by a SSN user or EMSA or Regional Server operator staff. This covers the time for acknowledgement and analysis, as well as the intervention time. In case of an incident classified with a priority level more than 2 (i.e. normal, low, scheduled), the calculation of the processing time take into account only the time within the "Office hours", during normal working days of ICG staff.

3.4 Link availability

Diagrams in Annex 3 present the link availability for each NPR of the participating Countries during the reference period.

The overall availability is affected by the incidents involving the National Proxy, the breakdown in communication and, if occurred, by the MAREΣ inactivity periods.

4 MAREΣ upgrading

4.1 Star Streaming Remote Hub SW testing and migration from SSN-SI

The agreed migration to the last release (1.1) of the STAR Streaming Remote Hub interface (replaces the SSN SI application) was completed during the reference period, for both, the pre-production, production and backup environments. Both applications, the SSN-SI (production and backup environments) and STAR Streaming Remote Hub (pre-production, production and backup environments) are still running in parallel.

4.2 Coverage Analyzer Tool

At the 16th MAREΣ EWG meeting, Italy announced its intention to implement a tool for estimating AIS coverage within the MAREΣ region. The tool was uploaded on MAREΣ on 12 October 2020. A brief description and the main characteristics are presented in next chapter.

4.2.1 Main features

The tool for estimating the AIS coverage is based on the ISENOR-LAPINSKI method applied in the predefined area, as the MAREΣ area of interest.

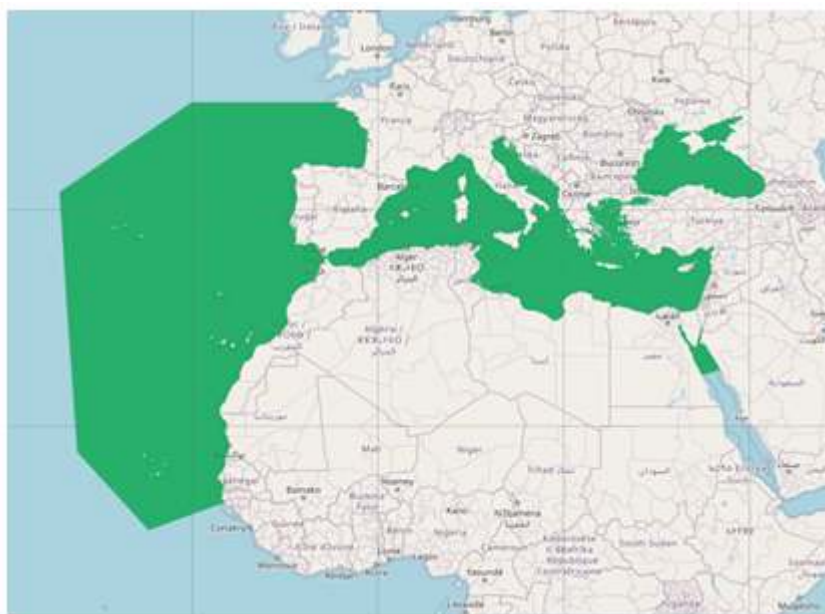


Figure 4 - The MAREΣ area of interest

The method applied in this tool, involves the creation of a grid which is composed by cells of the fixed size to determine, in a given **time period**, the following data:

- total number of AIS tracks received in the cell;
- number of AIS track received for the first time in the cell (born in the cell);
- number of AIS track last received in the cell (death in the cell).

The cell size used in MAREΣ is 0.1° x 0.1° (latitude x longitude).

AIS coverage is estimated for the following three different **time periods**: short term (1 hour, 12 hours, 1 day), mid-term (1 week) and long term (1 month).

The tool is able to estimate the AIS coverage assured by MAREΣ, by each participating Country and - potentially - by each AIS Base Station, whether this information is available in the comment block associated to each VDM string delivered by the participants.

The estimated AIS coverage is provided in three different method: on the GIS, in the AIS stream, and throw a Web Map Server.

4.2.2 Estimated AIS coverage on the GIS

The “Coverage Analyzer Tool” is available under the “Tool” bottom placed in the top bar menu.

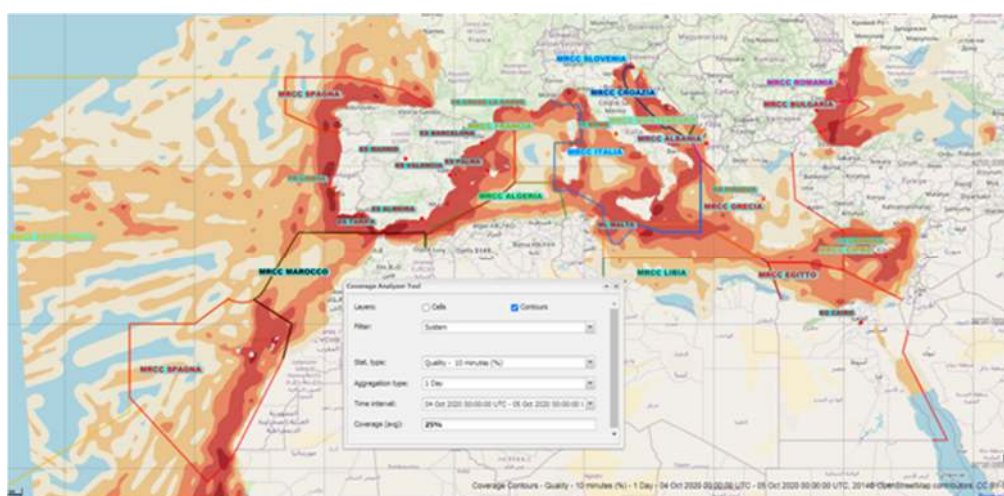


Figure 5 - The Coverage Analyzer Tool menu

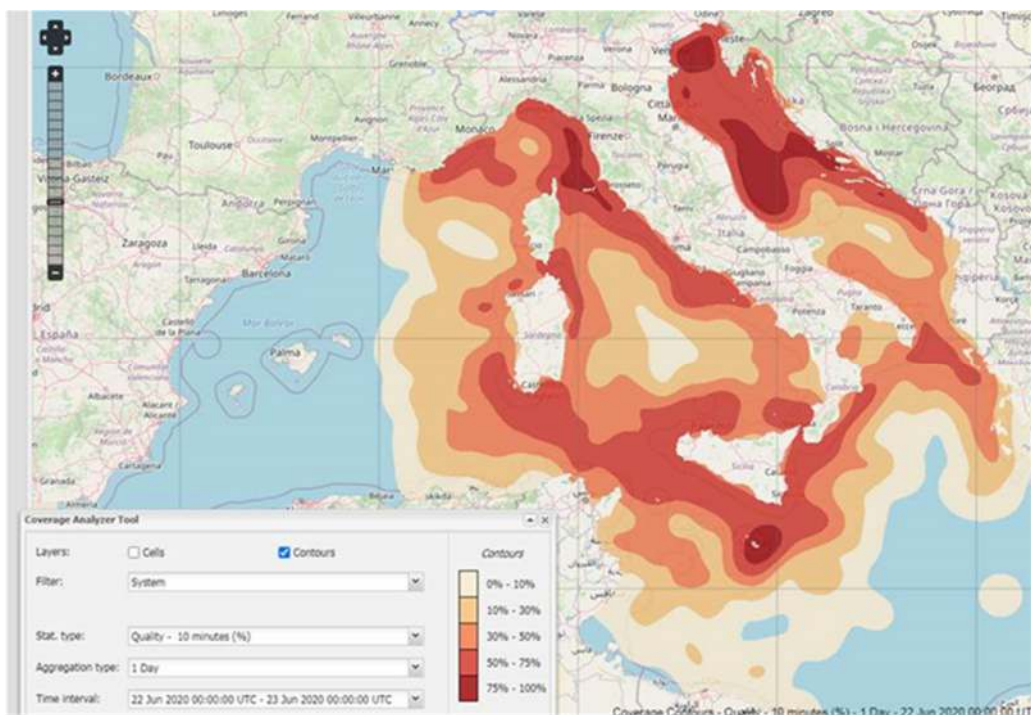


Figure 6 – The Filter menu

Through the special drop-down “Filter” menu it’s possible to select the coverage of which system to display. In the above picture is depicted the AIS coverage provided by Italy. If the participating Country enriches its own AIS flow delivered to MAREΣ with the information related to the AIS Base Station that has acquired the information, the tool will estimate and display the coverage ensured by the single AIS Base Station as well.

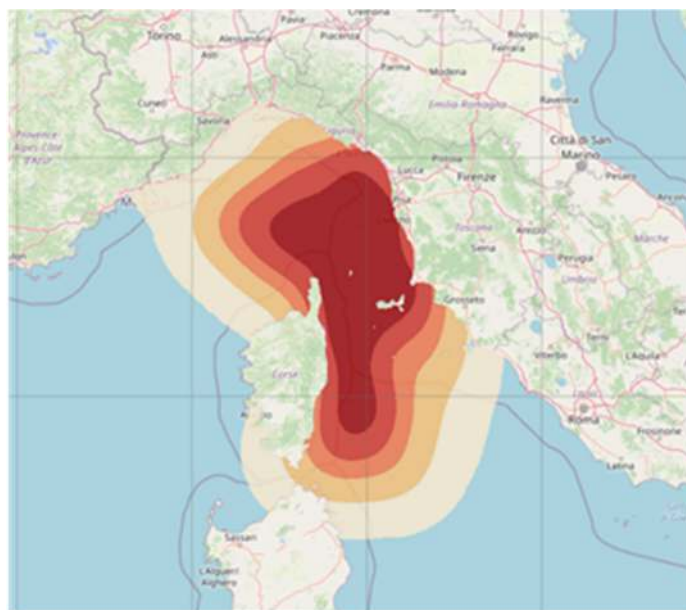


Figure 7 – Coverage assured by an Italian AIS Base Station located on the Corsica Channel

A special switch allows the user to activate the layer coverage. Each colour associated with an area

corresponds to an interval of the probability of receiving AIS information from naval units presented in that area.

The following probability ranges are available:

- 0 ÷ 10%
- 10% ÷ 30%
- 30% ÷ 50%
- 50% ÷ 75%
- 75% ÷ 100%

Through the drop-down “*Aggregation type*” menu it’s possible to select the **time period** used to calculate the estimated AIS coverage. The “*Time interval*” drop-down menu allows the user to select from a historical archive the actual time period interval to be considered (see pictures below).

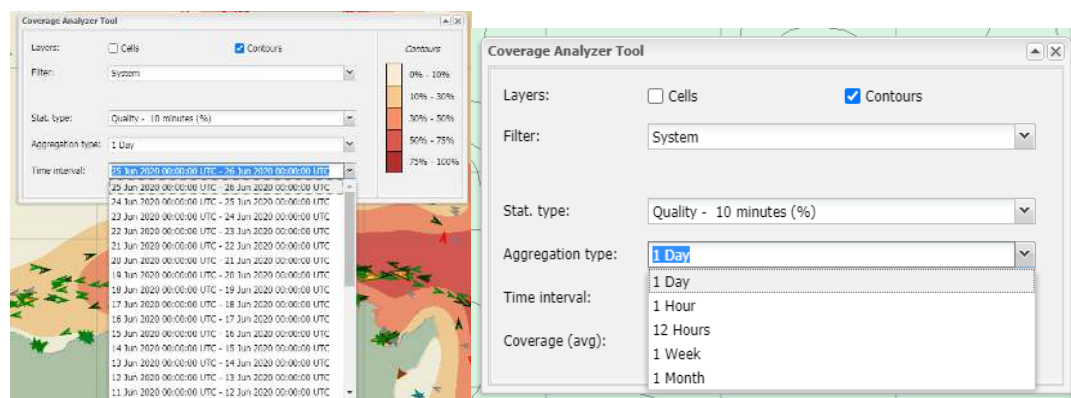


Figure 8 – Drop down menus

For each target it’s also possible to know the probability of receiving the vessel AIS transmission from the position reported in AIS message transmitted by the vessel itself.

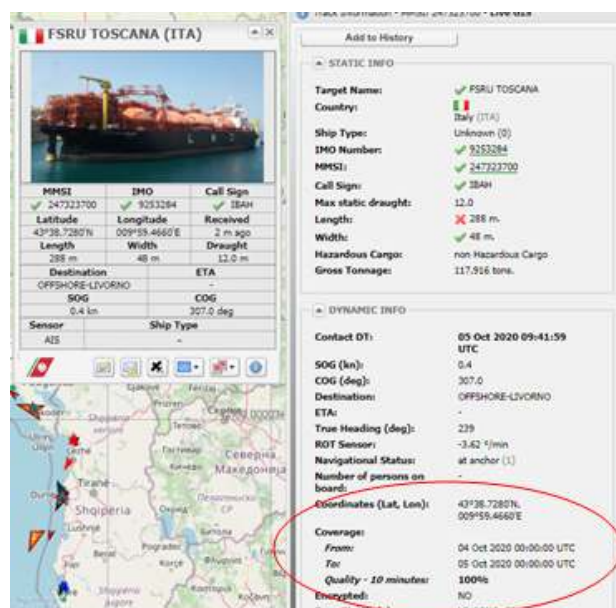


Figure 9 – Coverage monitoring information

4.2.3 Coverage quality in the AIS streaming

The probability to receive the AIS information from a vessel in the position reported by the vessel itself may be added in the comment block associated to each VDM string delivered by MAREΣ.

```
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O><CQ>77</CQ>*1D$ABVSI,TANGERVILLE-BS1,0,120314.377725,539,-109,*21
\c:1592913794,s:ID,i:<O>ID</O><CQ>91</CQ>*45\!ABVDM,1,1,,B,B5@aON@06j6<R5wpTcLH?wW5oP06,0*1F
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O><CQ>38</CQ>*16\!ABVDM,1,1,1,B,13ku;:h01eOSV10DU9K;@8uv0d0s,0*2C
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O><CQ>38</CQ>*16\!ABVSI,TANGERVILLE-BS1,1,120314.404642,540,-108,*2C
\c:1592913989,s:ID,i:<O>ID</O><CQ>16</CQ>*48\!BSVDM,1,1,,A,17l0ba8P007qMU;t1JL2gwwF087D,0*1F
\c:1592913794,s:ID,i:<O>ID</O><CQ>91</CQ>*45\!ABVDM,1,1,,A,67ldNT@1@8M4ENNNNBSC,0*59
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O><CQ>77</CQ>*1D\!ABVDM,1,1,2,B,13F=uP0001wW@gTDdkF6p4rL288O,0*2E
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O><CQ>77</CQ>*1D\!ABVSI,TANGERVILLE-BS1,2,120314.484361,543,-107,*2F
\c:1592913794,s:ID,i:<O>ID</O><CQ>91</CQ>*45\!ABVDM,1,1,,A,65@aP?h1@8M4ENNNNBNN,0*3F
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O><CQ>70</CQ>*1A\!ABVDM,1,1,3,A,13Tldt8P01wWNB:Dd81v4?vL2L2a,0*28
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O><CQ>70</CQ>*1A\!ABVSI,TANGERVILLE-BS1,3,120314.510975,544,-114,*28
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\c:1592913794,s:ID,i:<O>ID</O><CQ>91</CQ>*45\!ABVDM,1,1,,A,65@aPI@1@8M4ENNNNBNN,0*6D
\c:1592913794,s:ID,i:<O>ID</O><CQ>91</CQ>*45\!ABVDM,1,1,,B,7050Q1Au@vNPE2Uw;71dpVh,2*10
\c:1592913794,s:ID,i:<O>ID</O><CQ>91</CQ>*45\!ABVDM,1,1,,A,6050SM0:c1k:03H0@P2VJQ0004,2*58
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O>*32\!ABVDM,1,1,4,B,402Cu@ivAc3=wVr5pDRso7005P<,0*7F
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O>*32\!ABVSI,TANGERVILLE-BS1,4,120314.697589,551,-97,*12
\c:1592913794,s:ID,i:<O>ID</O><CQ>91</CQ>*45\!ABVDM,1,1,,A,B5@aQ2h0026<d10pA9D03wW5oP06,0*31
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O>*32\!ABVDM,1,1,5,A,D028jLQc@N?b<`O6EbO6D0,2*6C
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O>*32\!ABVSI,TANGERVILLE-BS1,5,120314.724465,552,-98,*15
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O>*32\!ABVDM,1,1,6,B,D028jIALTN?b<`O6DCDO6D0,2*46
\c:1592913794,s:TANGERVILLE-BS1,i:<O>MA</O>*32\!ABVSI,TANGERVILLE-BS1,6,120314.750943,553,-69,*13
\c:1592913794,s:ID,i:<O>ID</O><CQ>76</CQ>*4C\!BSVDM,1,1,,B,17ld1ehP0083gEqst;@3IgvL05P<,0*49
\c:1592913794,s:ID,i:<O>ID</O><CQ>79</CQ>*43\!ABVDM,1,1,,B,B7lu1H@00j65nSwni1@wW5oP06,0*30
\c:1592913794,s:ID,i:<O>ID</O><CQ>79</CQ>*43\!ABVDM,1,1,,B,17lu1h@00j65nSwni1@wW5oP06,0*30
```

Figure 10 – The comment block information (sample)

The information is inserted in the i: field of the comment block between the TAG <CQ> </CQ>, as depicted in the above picture.

For each participating Country, including EMSA, the system administrator can decide whether to include coverage information in the comment block.

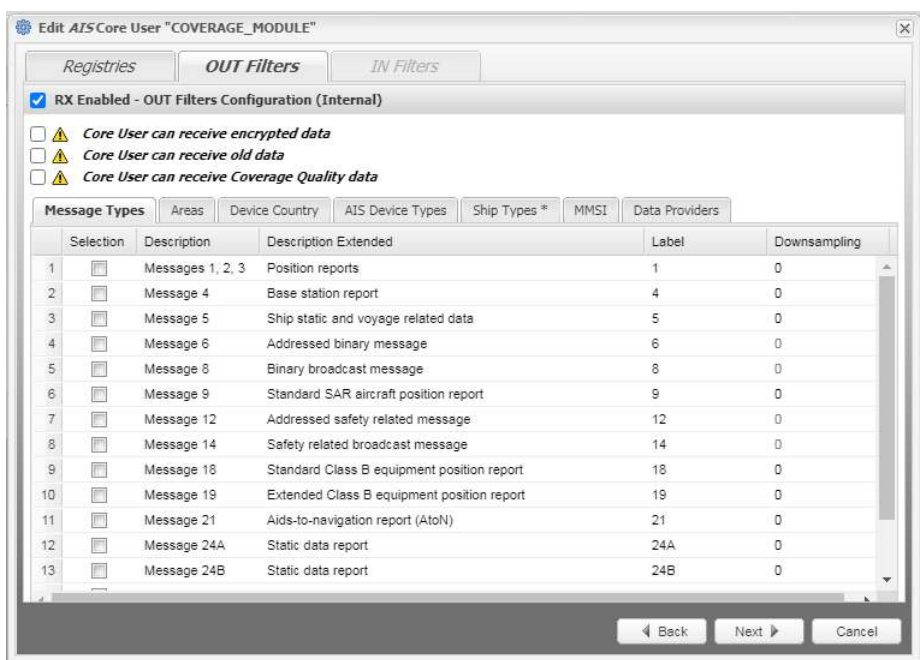


Figure 11 – The administrator module

4.2.4 Coverage quality through Web Map Service

Through a dedicate Web Map Service, MAREΣ is able to provide the coverage layers to external users (through M2M connection).



Figure 12 – The coverage layer (sample)

Those interested in consuming these services can contact the system administrator who will provide all the necessary technical details.

4.3 Identification of the synchronization status

According to the international standards, the Class A AIS mobile station has to be fitted with an internal GNSS receiver also able to provide the clock which is necessary to ensure the correct synchronization of its own transmissions according to the Self Organized Time Division Multiple Access (SO-TDMA) schema appointed by the Recommendation ITU-R M.1371-5².

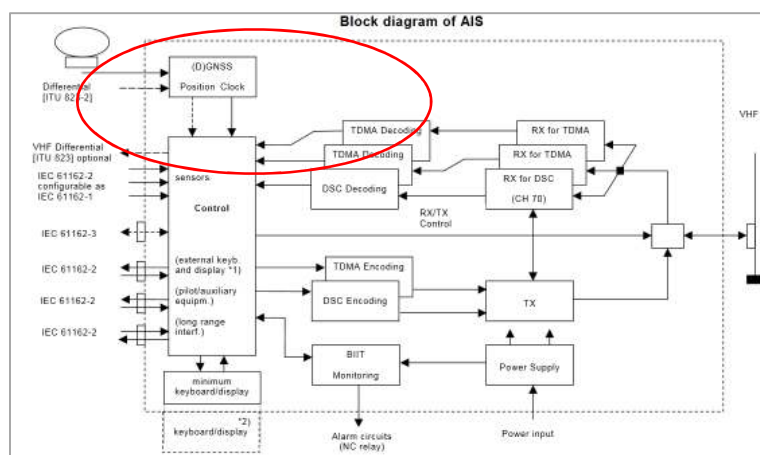


Figure 13 – SO-TDMA schema

² Technical characteristics for an Automatic Identification System using Time Division Multiple Access in the VHF maritime mobile frequency band.

To avoid dangerous overlaps, each transmission must begin and end within the identified or assigned slot (see picture below); for this reason it's very important that the mobile station is synchronized using its internal clock.

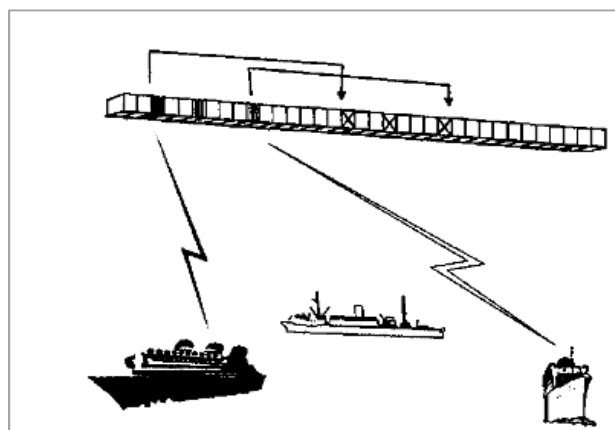


Figure 14 – Time slots synchronisation

If the internal clock is not available (for example in case of failure or malfunction of the receiver) the ITU 1371-5 provides for different synchronization mechanisms based on the transmissions of the nearby AIS stations (fixed or mobile).

Particularly the above mentioned ITU recommendation provides five different ways of synchronization numbered from 1 (internal receiver) to 5, as showed in Table below.

Sync mode of own station	Priority	Illustration	Sync state (in communication state) of own station	May be used as source for indirect sync by other station(s)
UTC direct	1		0	Yes
UTC indirect	2		1	No
Base direct	3		2	Yes
Base indirect	4		3	No
Mobile as semaphore	5		3	No

Table 6 - Synchronisation table

According to the ITU 1371 a station provides its mode of synchronization through the “Sync state”, which is a number from 0 (better case, internal receiver) to 3 (worst case).

In order to provide users with information on the synchronization status of the mobile stations, MAREΣ has been integrated with a special tool that indicates on the GIS those targets that have a “sync state” other than 0.

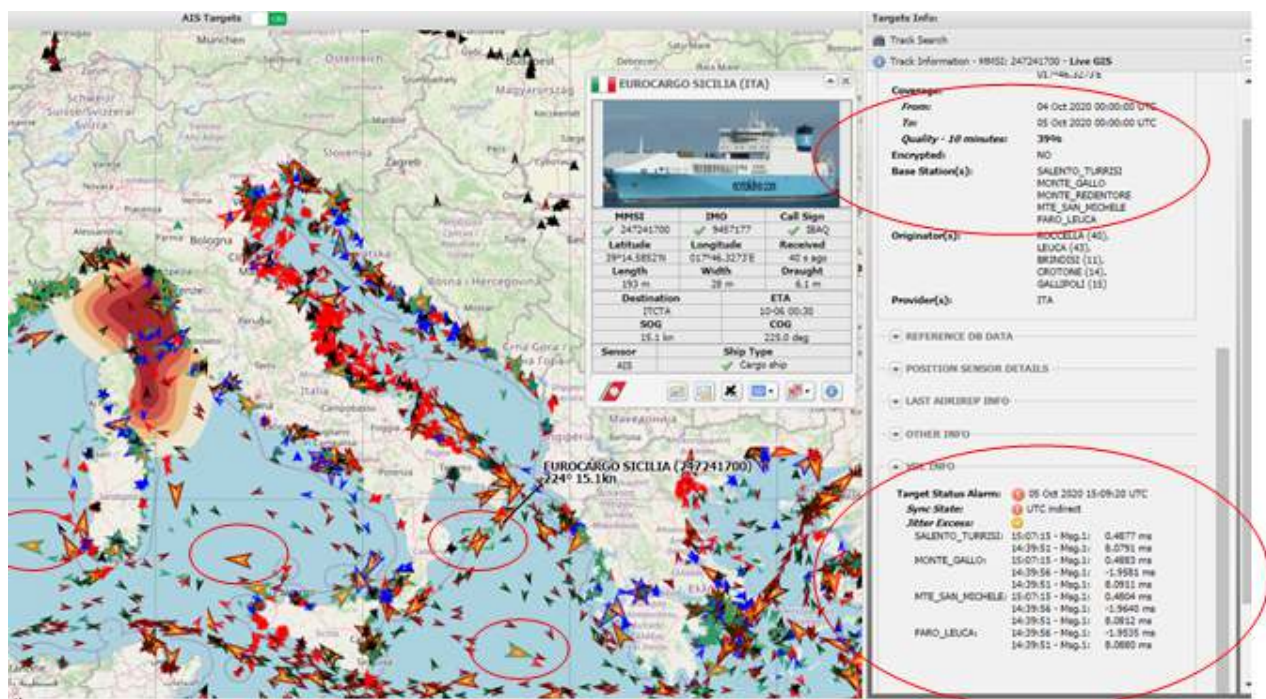


Figure 15 – Example of the time synchronization issues

As shown in above picture an AIS station not well synchronized may transmit with a jitter excess, outside its slot, overlapping the transmissions of other stations in adjacent slots. If the overlap exceeds certain limits, the overlapping transmissions will no longer be intelligible and will be lost.

Through the “*Preferences menu*” the user can decide whether to display the targets having a sync state other than 0.



Figure 16 – The preferences menu

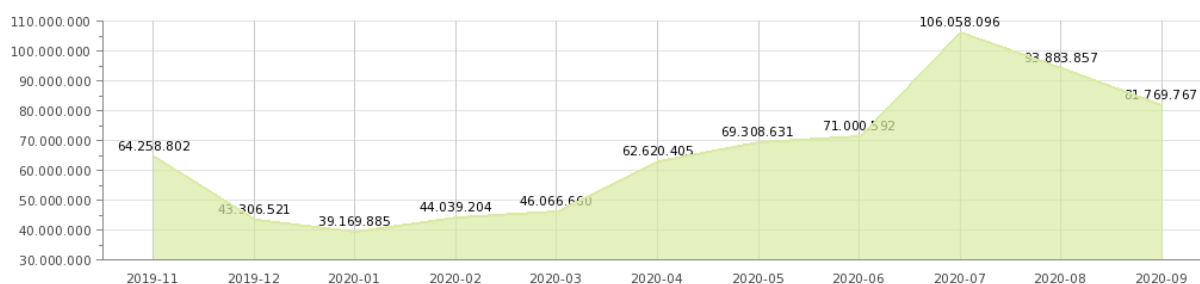
5 Action required

Participating Countries are invited to **note** the submitted information.

Annex 1

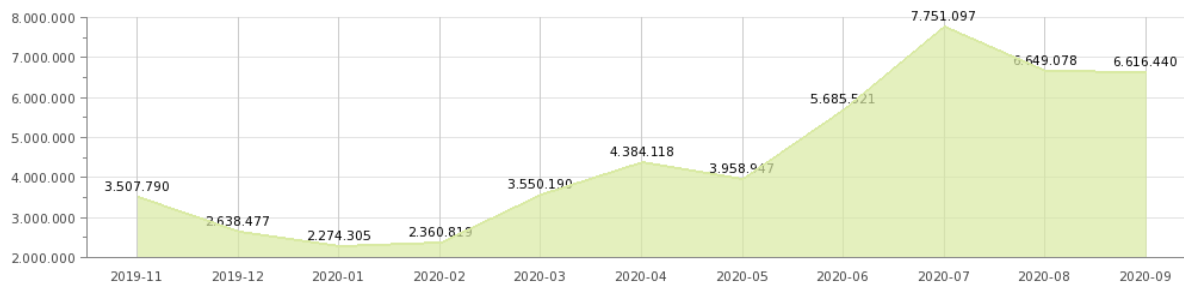
AIS information provided to MAREΣ by the participating Countries

Core Users - Received Messages: EMSA_BGR (BGR)
Monthly Aggregation: From 2019-11 To 2020-09



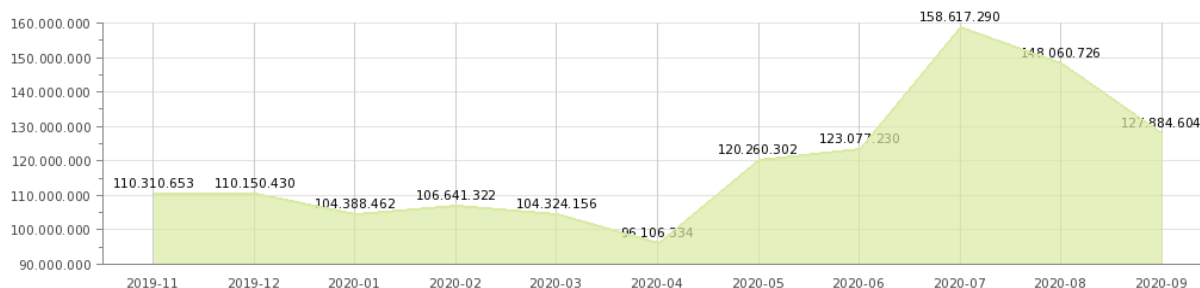
AIS information delivered by Bulgaria (full data rate since December 2016)

Core Users - Received Messages: EMSA_CYP (CYP)
Monthly Aggregation: From 2019-11 To 2020-09



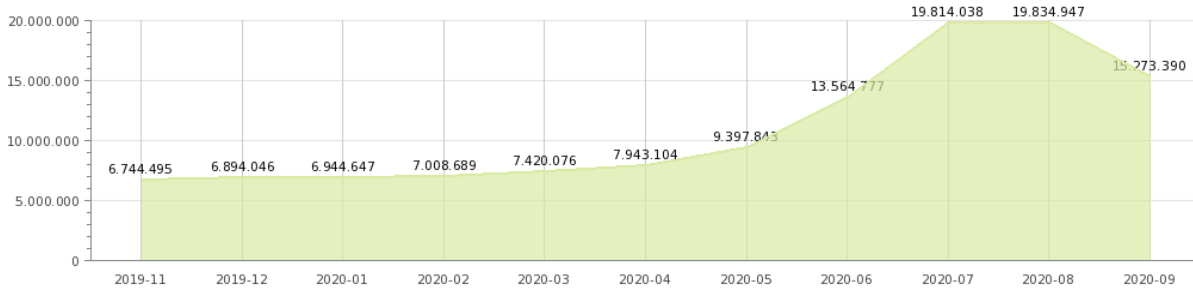
AIS information delivered by Cyprus (downsampling 6 min)

Core Users - Received Messages: EMSA_ESP (ESP)
Monthly Aggregation: From 2019-11 To 2020-09



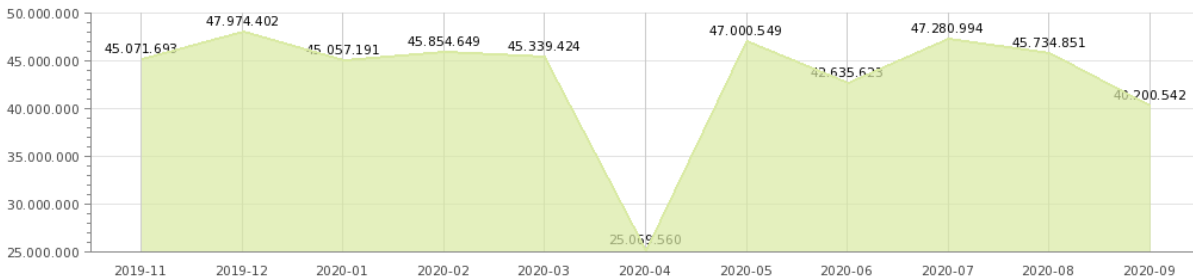
AIS information delivered by Spain (downsampling 1 min)

Core Users - Received Messages: EMSA_FRA (FRA)
Monthly Aggregation: From 2019-11 To 2020-09



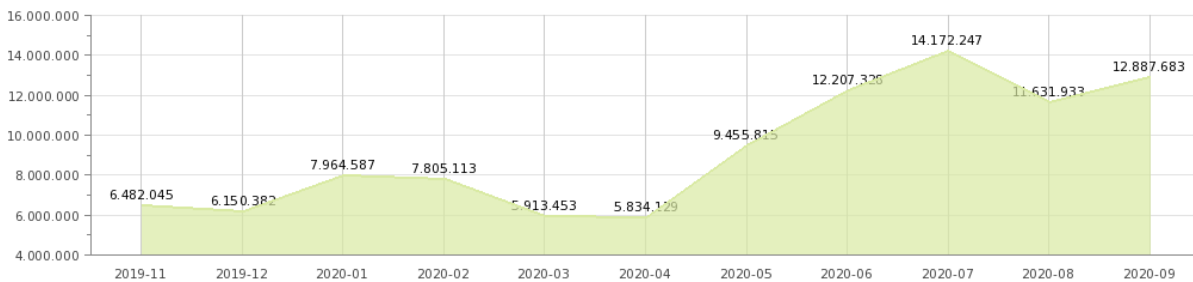
AIS information delivered by France (downsampling 1 min)

Core Users - Received Messages: EMSA_GIB (GIB)
Monthly Aggregation: From 2019-11 To 2020-09



AIS information delivered by Gibraltar3 (full data rate)

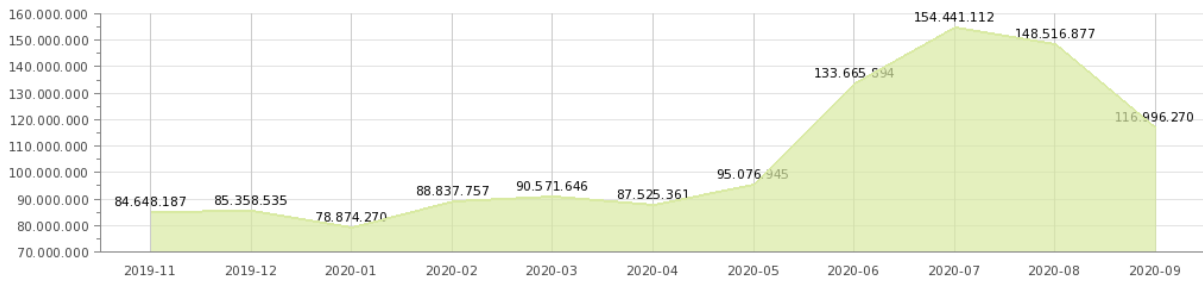
Core Users - Received Messages: EMSA_GRC (GRC)
Monthly Aggregation: From 2019-11 To 2020-09



AIS information delivered by Greece (downsampling 6 min)

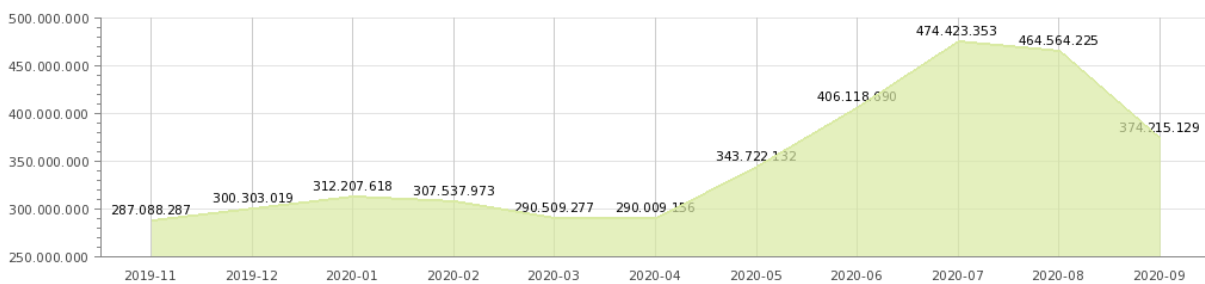
³ Since September 1st 2018, Gibraltar implemented a new NAISP.

Core Users - Received Messages: EMSA_HRV (HRV)
Monthly Aggregation: From 2019-11 To 2020-09



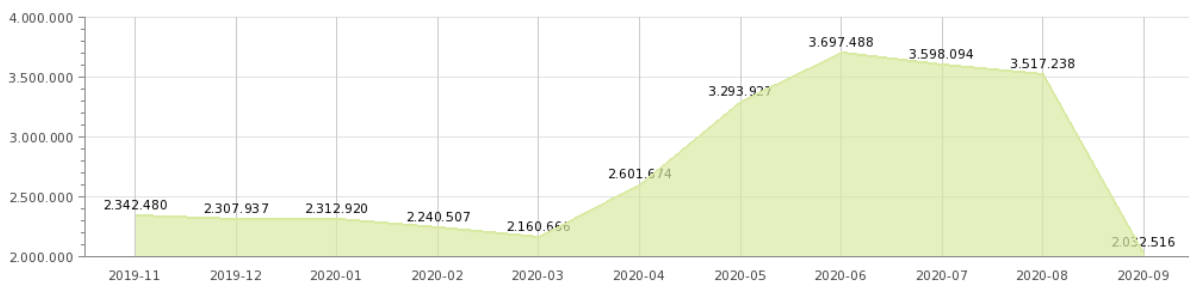
AIS information delivered by Croatia (full data rate since December 2015)

Core Users - Received Messages: EMSA_ITA (ITA)
Monthly Aggregation: From 2019-11 To 2020-09



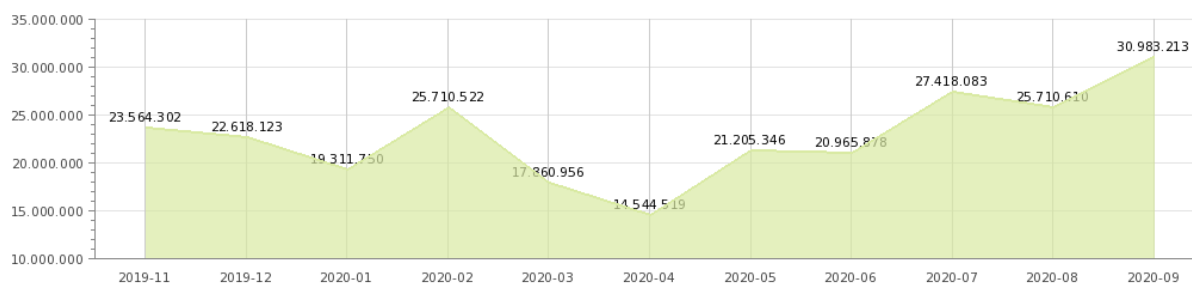
AIS information delivered by Italy (full data rate since February 2016)

Core Users - Received Messages: EMSA_MLT (MLT)
Monthly Aggregation: From 2019-11 To 2020-09



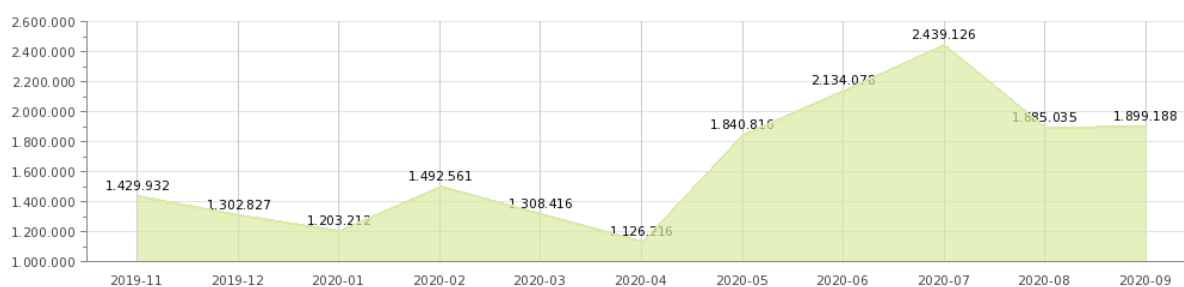
AIS information delivered by Malta (downsampling 6 min)

Core Users - Received Messages: EMSA_PRT (PRT)
Monthly Aggregation: From 2019-11 To 2020-09



AIS information delivered by Portugal mainland (downsampling 1 min)

Core Users - Received Messages: EMSA_PTISL (PRT)
Monthly Aggregation: From 2019-11 To 2020-09

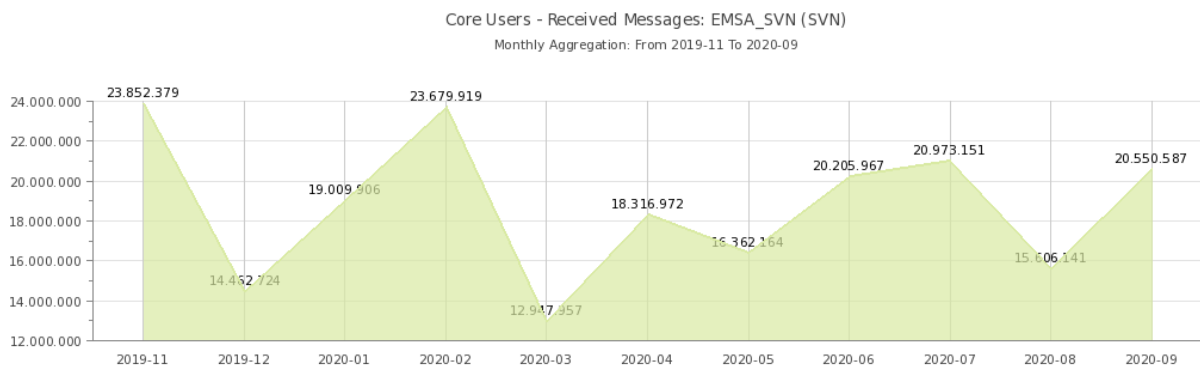


AIS information delivered by Portugal Azores and Madeira (downsampling 1 min)

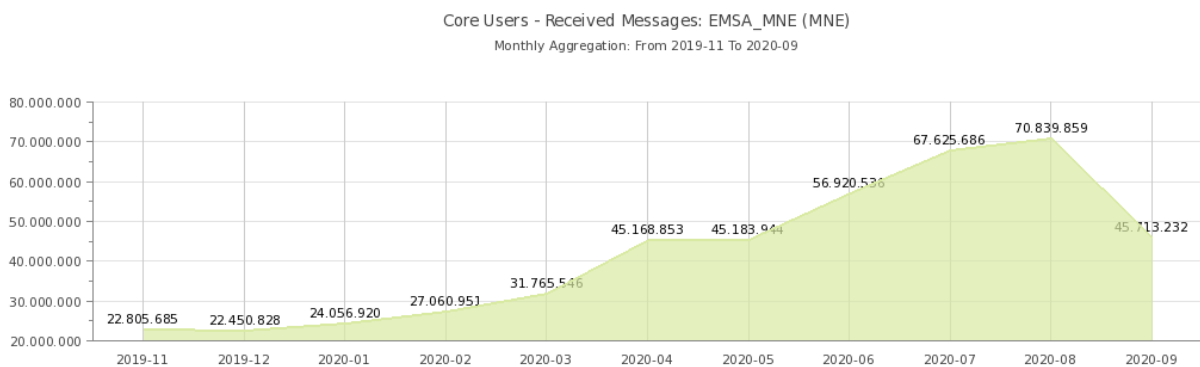
Core Users - Received Messages: EMSA_ROU (ROU)
Monthly Aggregation: From 2019-11 To 2020-09



AIS information delivered by Romania (full data rate since December 2016)

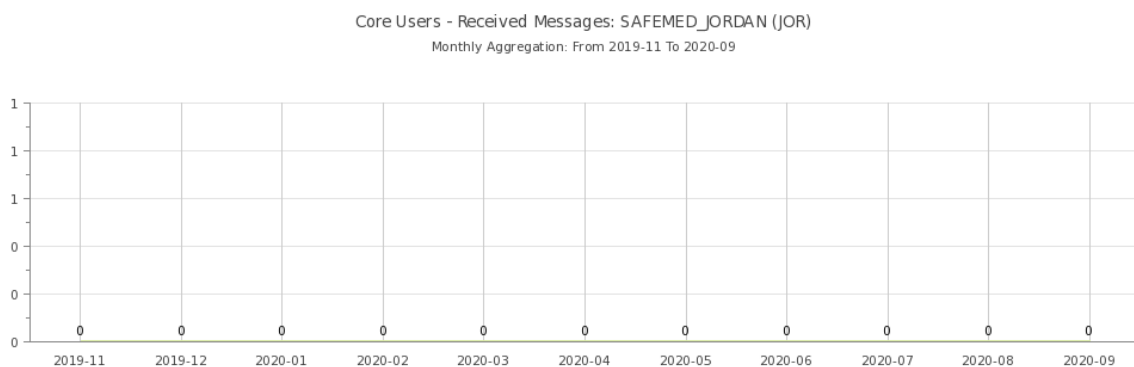


AIS information delivered by Slovenia (full data rate since December 2015)



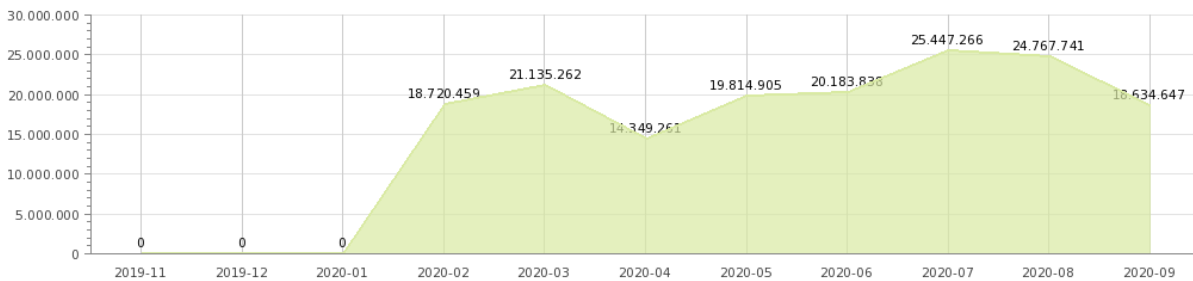
AIS information delivered by Montenegro

(sharing within the Adriatic Region, full data rate since December 2015)



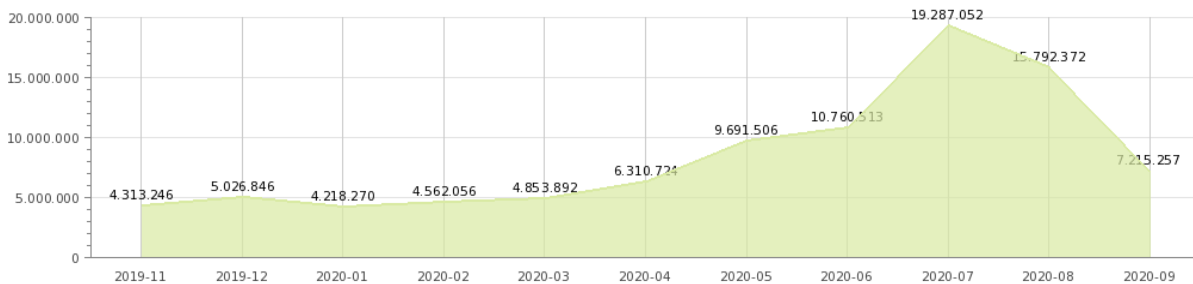
AIS information delivered by Jordan (sharing among SafeMed countries, full data rate)

Core Users - Received Messages: SAFEMED_MOROCCO (MAR)
Monthly Aggregation: From 2019-11 To 2020-09



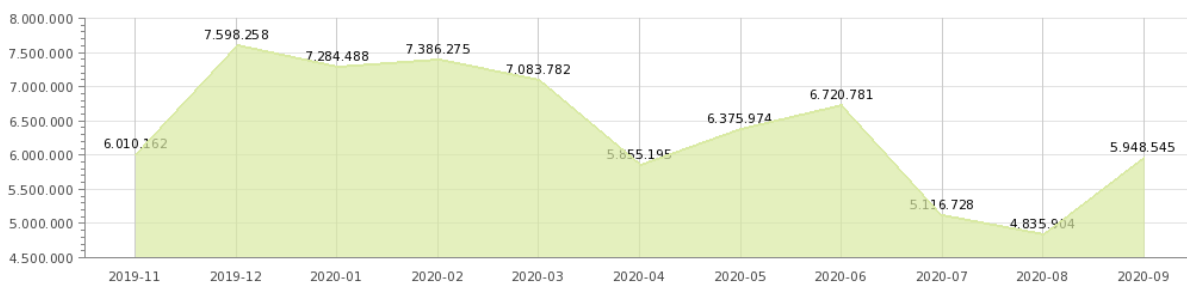
AIS information delivered by Morocco (sharing among SafeMed countries, full data rate)

Core Users - Received Messages: SAFEMED_TUNISIA (TUN)
Monthly Aggregation: From 2019-11 To 2020-09



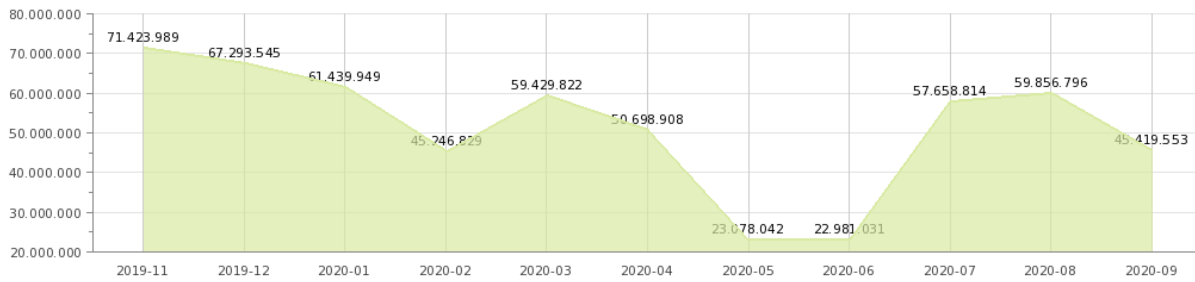
AIS information delivered by Tunisia (sharing among SafeMed countries, full data rate)

Core Users - Received Messages: BKSEA_GEO (GEO)
Monthly Aggregation: From 2019-11 To 2020-09



AIS information delivered by Georgia (sharing among BCSEA countries, full data rate)

Core Users - Received Messages: BKSEA_UKR (UKR)
Monthly Aggregation: From 2019-11 To 2020-09

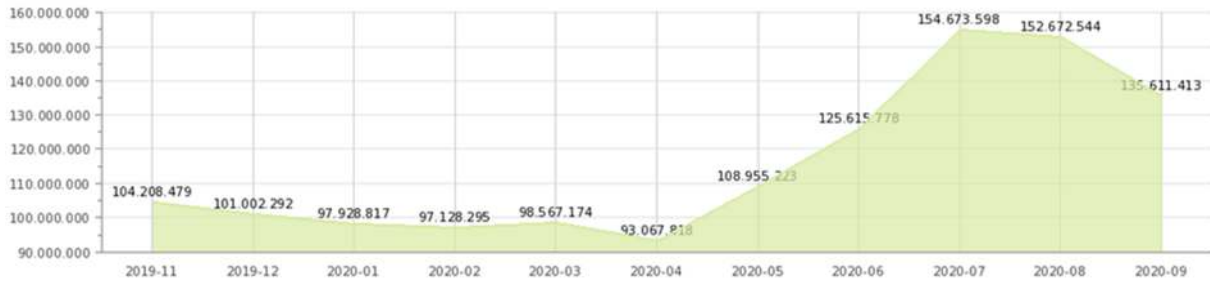


AIS information delivered by Ukraine (sharing among BCSEA countries, full data rate)

Annex 2

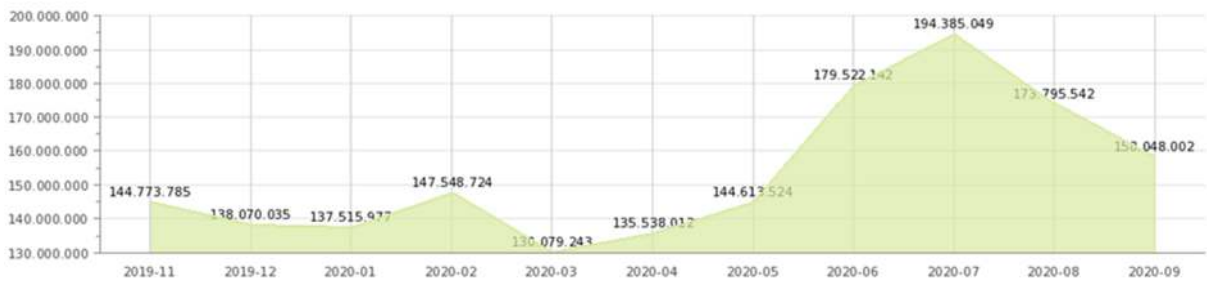
AIS information delivered by MAREΣ

Core Users - Transmitted Messages: EMSA_SSN (EMS)
Monthly Aggregation: From 2019-11 To 2020-09



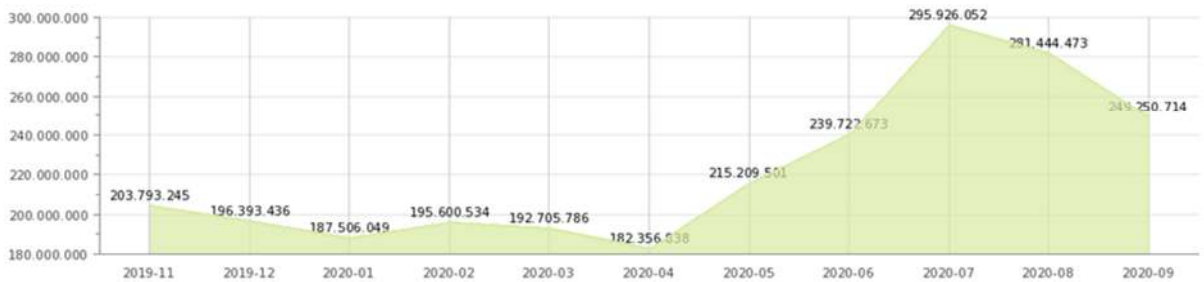
AIS information delivered to SafeSeaNet (downsampling 6 min)

Core Users - Transmitted Messages: EMSA_HRV (HRV)
Monthly Aggregation: From 2019-11 To 2020-09

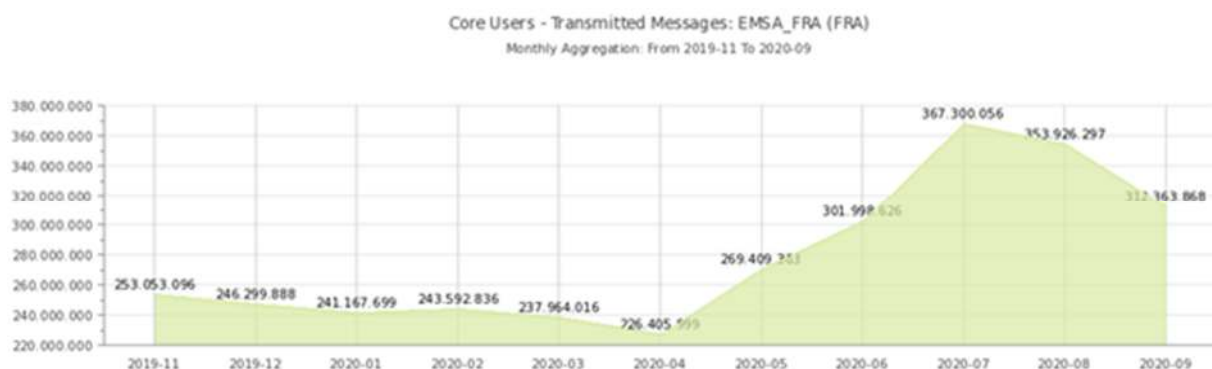


AIS information delivered to Croatia (Adriatic Region - full data rate since December 2015)

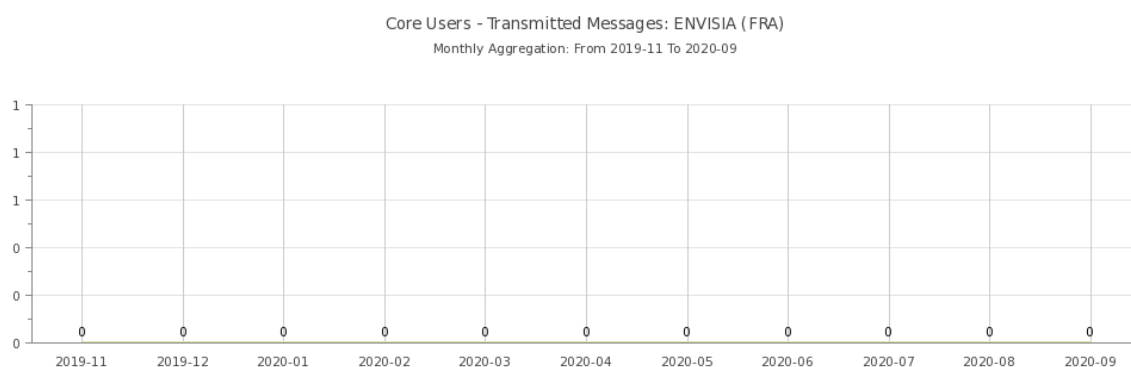
Core Users - Transmitted Messages: EMSA_ITA (ITA)
Monthly Aggregation: From 2019-11 To 2020-09



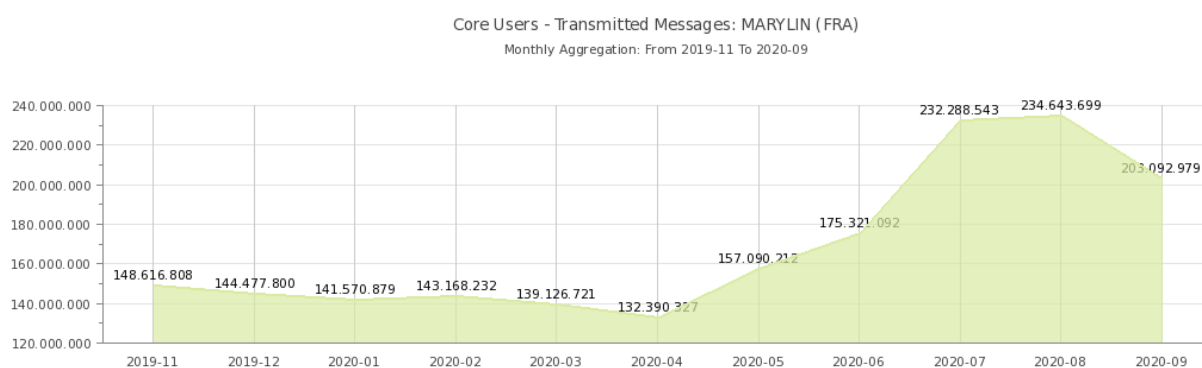
AIS information delivered to Italy (downsampling 1 min)



AIS information delivered to France (downsampling 1 min)

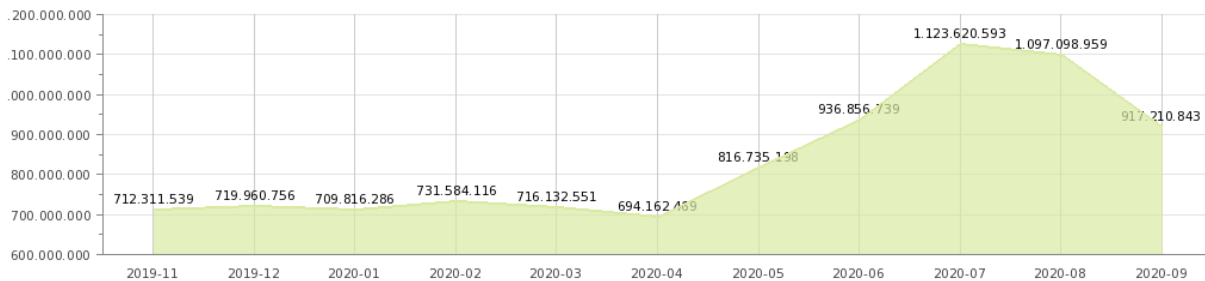


AIS information delivered to France (for needs of the Envisia project – full data rate)



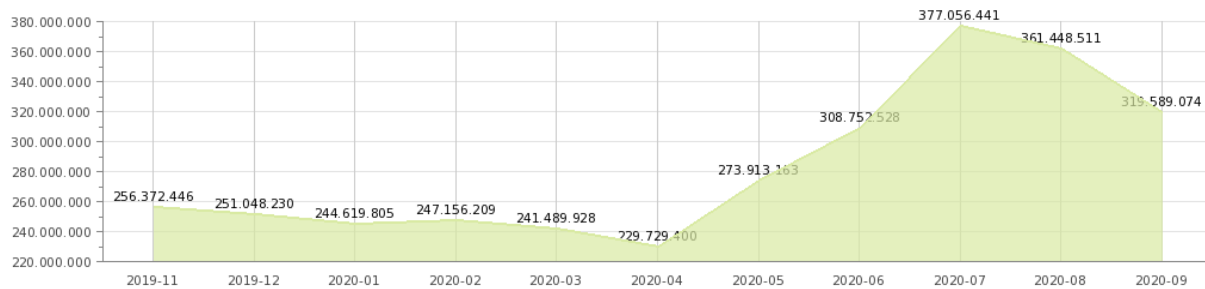
AIS information delivered to France (for needs of the Marylin project – full data rate)

Core Users - Transmitted Messages: EMSA_SVN (SVN)
Monthly Aggregation: From 2019-11 To 2020-09



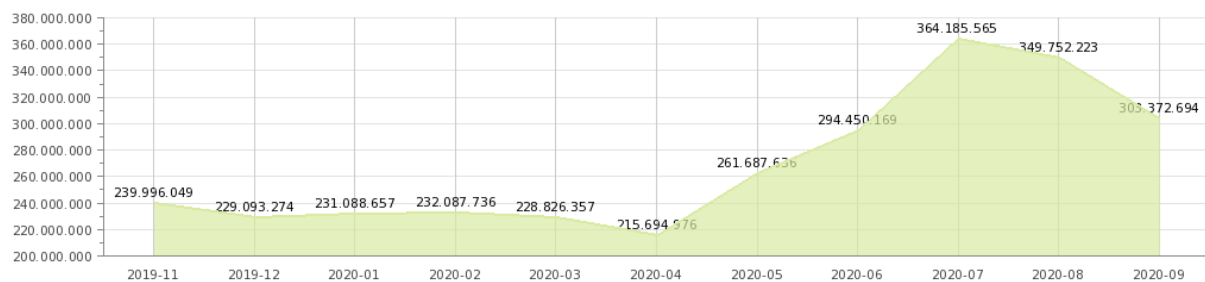
AIS information delivered to Slovenia (Adriatic Region - full data rate)

Core Users - Transmitted Messages: EMSA_ESP (ESP)
Monthly Aggregation: From 2019-11 To 2020-09



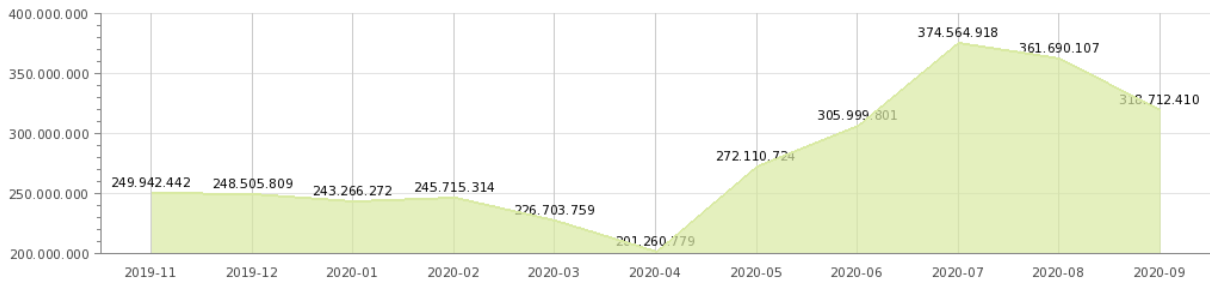
AIS information delivered to Spain (downsampling 1 min)

Core Users - Transmitted Messages: EMSA_PRT (PRT)
Monthly Aggregation: From 2019-11 To 2020-09



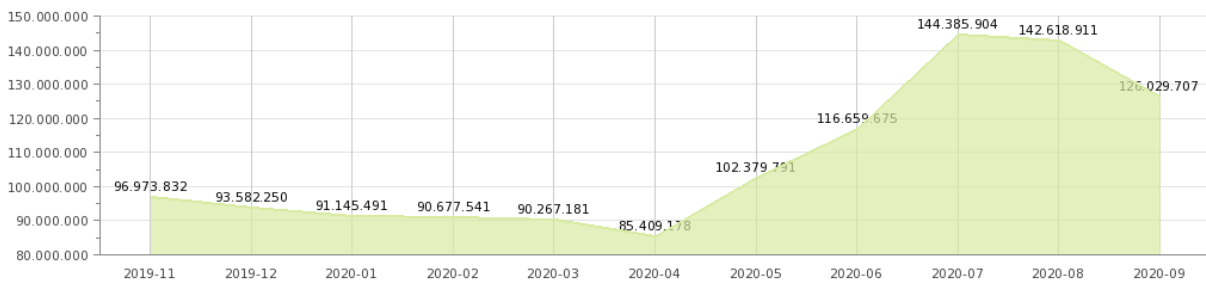
AIS information delivered to Portugal mainland (downsampling 1 min)

Core Users - Transmitted Messages: EMSA_PTISL (PRT)
Monthly Aggregation: From 2019-11 To 2020-09



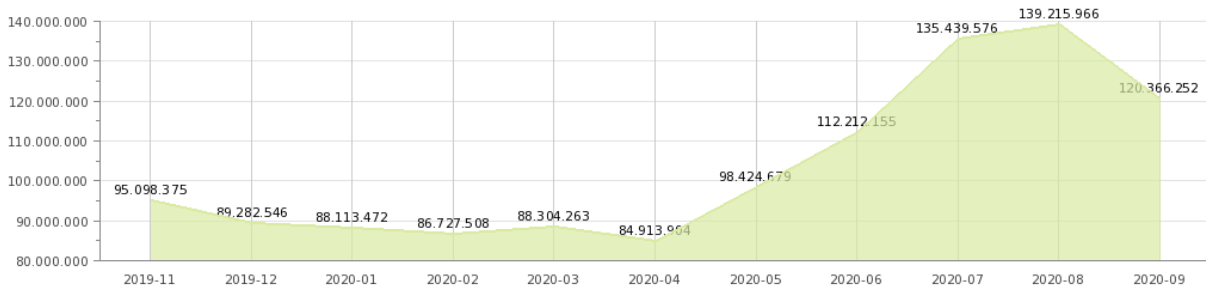
AIS information delivered to Portugal Island (downsampling 1 min)

Core Users - Transmitted Messages: EMSA_CYP (CYP)
Monthly Aggregation: From 2019-11 To 2020-09



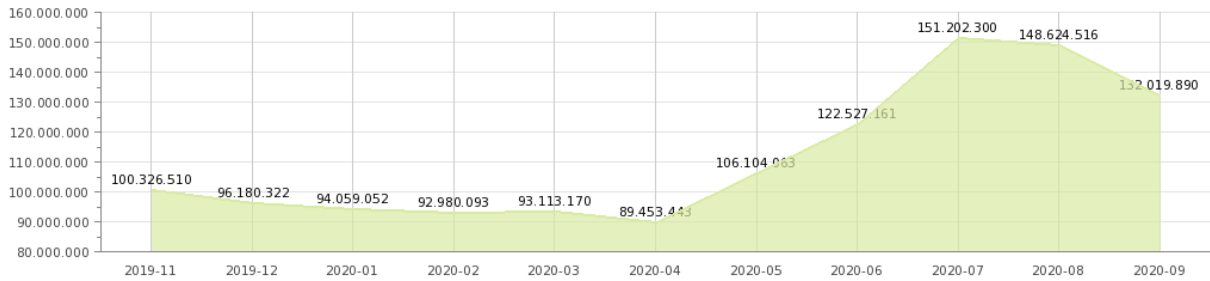
AIS information delivered to Cyprus (downsampling 6 min)

Core Users - Transmitted Messages: EMSA_GRC (GRC)
Monthly Aggregation: From 2019-11 To 2020-09



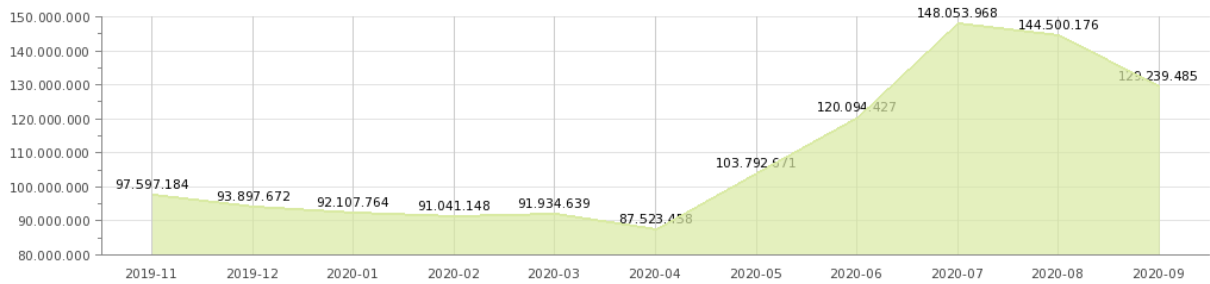
AIS information delivered to Greece (downsampling 6 min)

Core Users - Transmitted Messages: EMSA_ROU (ROU)
Monthly Aggregation: From 2019-11 To 2020-09



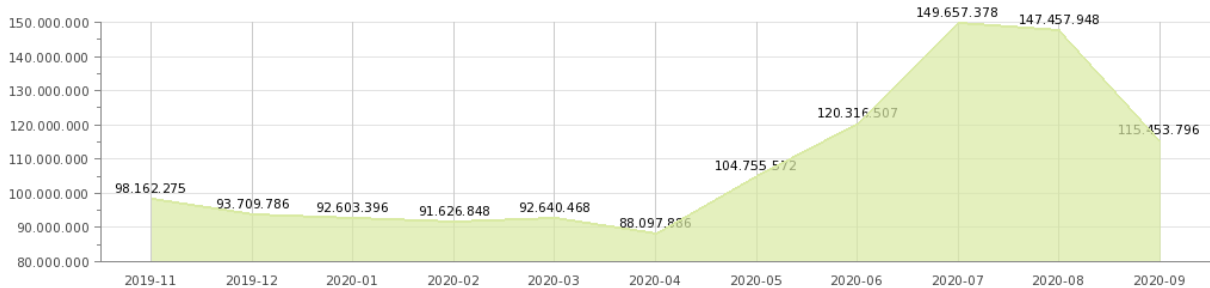
AIS information delivered to Romania (downsampling 6 min)

Core Users - Transmitted Messages: EMSA_BGR (BGR)
Monthly Aggregation: From 2019-11 To 2020-09



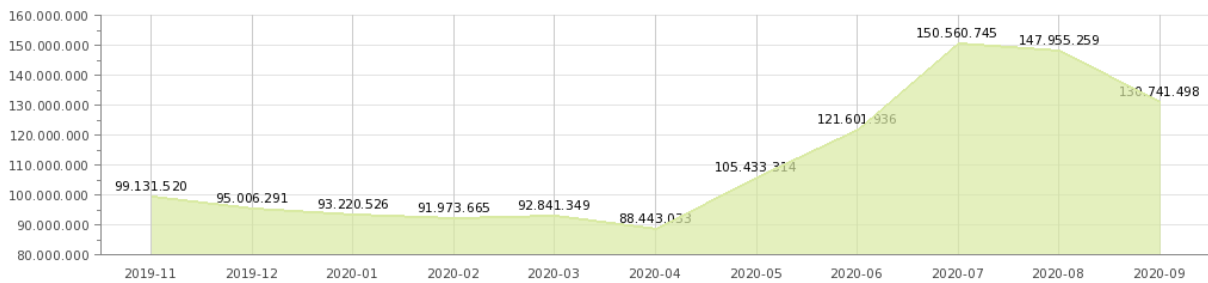
AIS information delivered to Bulgaria (downsampling 6 min)

Core Users - Transmitted Messages: EMSA_MLT (MLT)
Monthly Aggregation: From 2019-11 To 2020-09



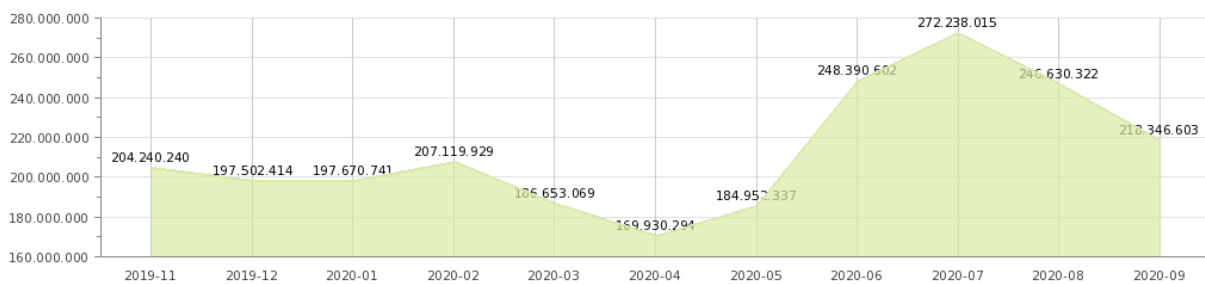
AIS information delivered to Malta (downsampling 6 min)

Core Users - Transmitted Messages: EMSA_GIB (GIB)
Monthly Aggregation: From 2019-11 To 2020-09



AIS information delivered to Gibraltar⁴ (downsampling 6 min)

Core Users - Transmitted Messages: EMSA_MNE (MNE)
Monthly Aggregation: From 2019-11 To 2020-09

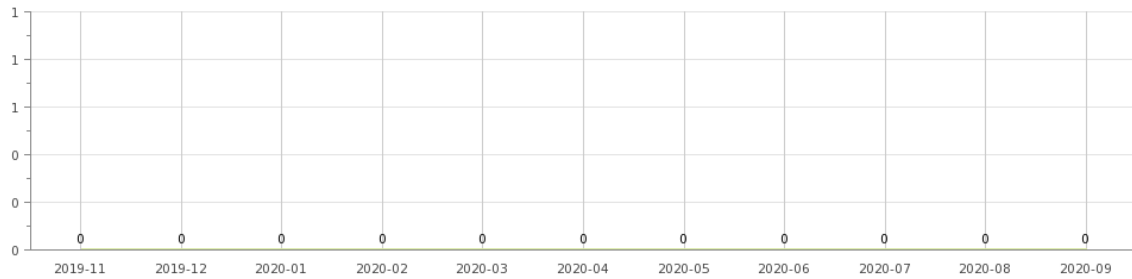


AIS information delivered to Montenegro

(Adriatic Region – full data rate since December 2015)

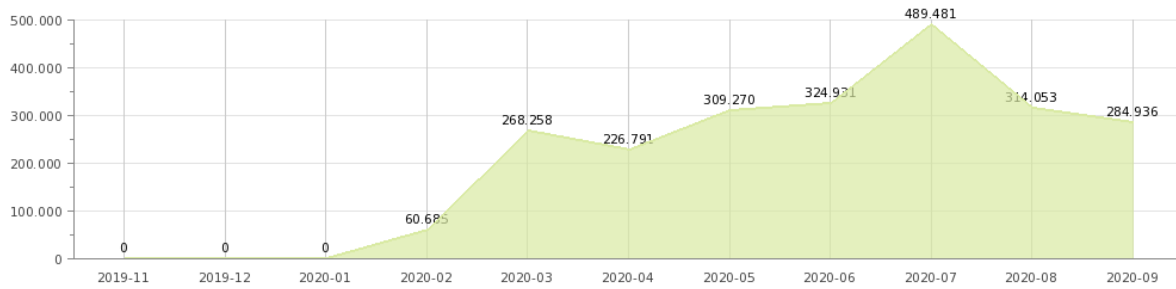
⁴ Since September 19th 2018, Gibraltar implemented a new NAISP.

Core Users - Transmitted Messages: SAFEMED_JORDAN (JOR)
Monthly Aggregation: From 2019-11 To 2020-09



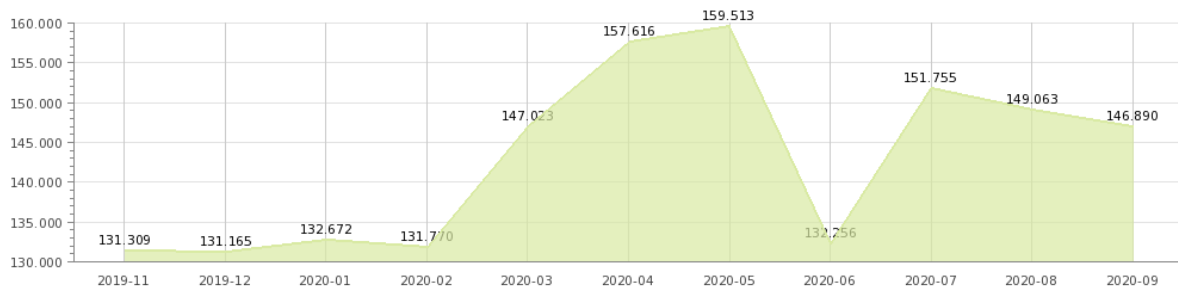
AIS information delivered to Jordan (SAFEMED – full data rate)

Core Users - Transmitted Messages: SAFEMED_MOROCCO (MAR)
Monthly Aggregation: From 2019-11 To 2020-09



AIS information delivered to Morocco (SAFEMED – full data rate)

Core Users - Transmitted Messages: SAFEMED_TUNISIA (TUN)
Monthly Aggregation: From 2019-11 To 2020-09



AIS information delivered to Tunisia (SAFEMED – 1 minute downsampling)

Core Users - Transmitted Messages: BKSEA_GEO (GEO)

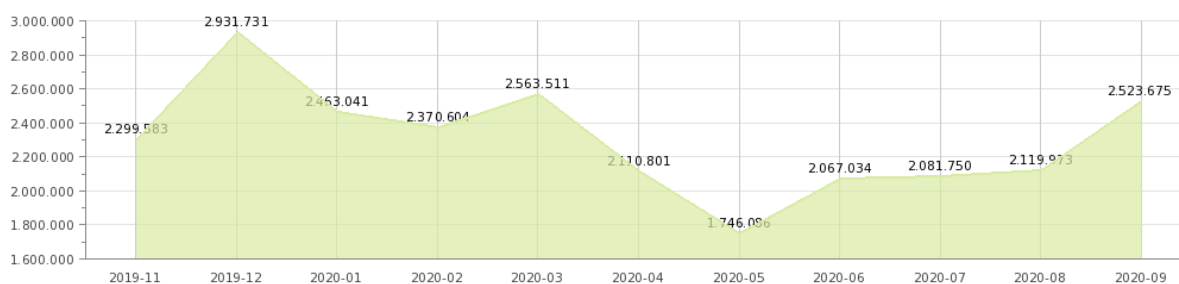
Monthly Aggregation: From 2019-11 To 2020-09



AIS information delivered to Georgia (BCSEA – Full Data rate)

Core Users - Transmitted Messages: BKSEA_UKR (UKR)

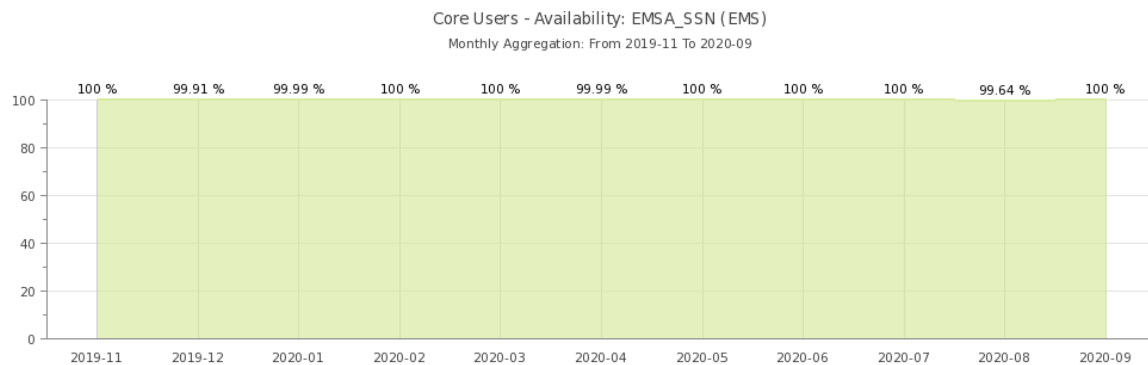
Monthly Aggregation: From 2019-11 To 2020-09



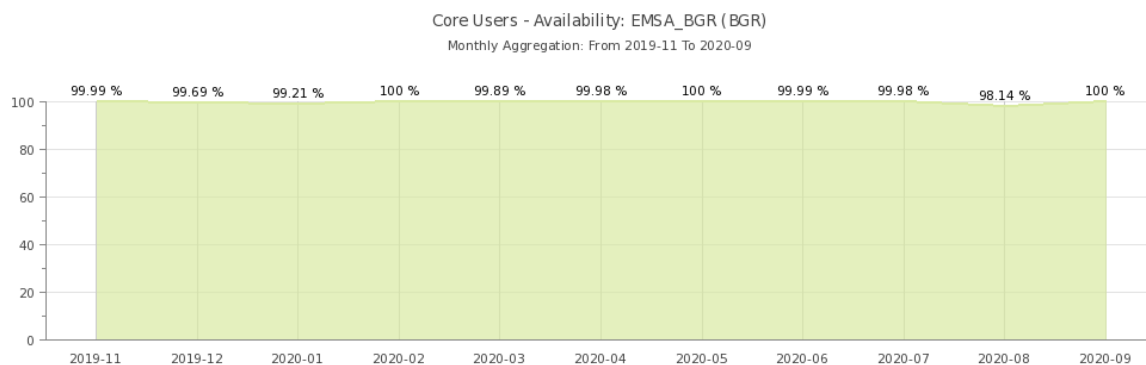
AIS information delivered to Ukraine (BCSEA – Full Data Rate)

Annex 3

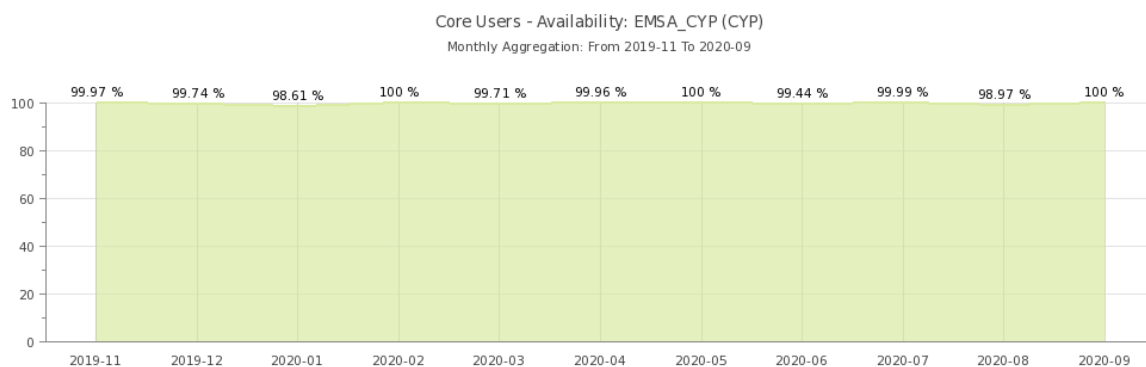
Link availability



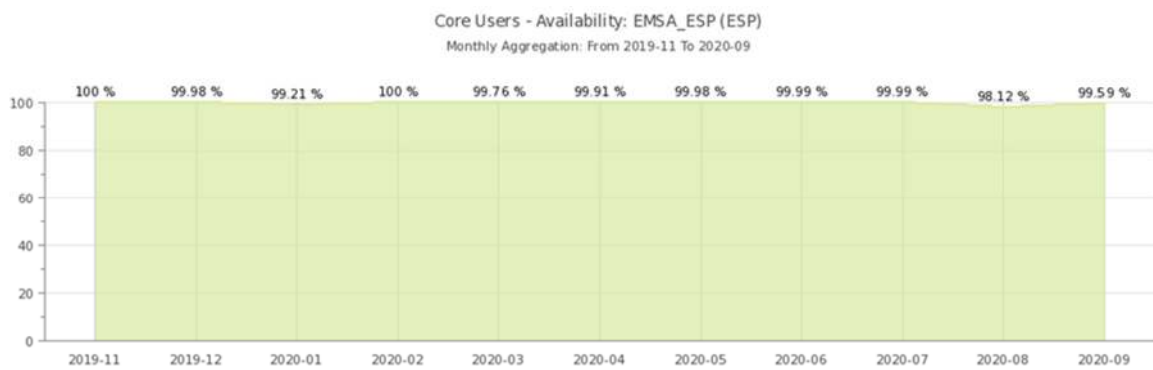
SSN_SI



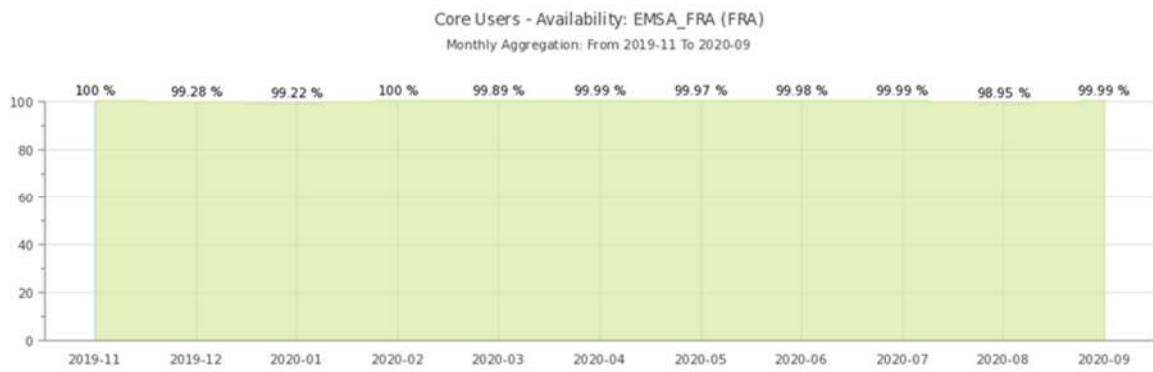
Bulgaria



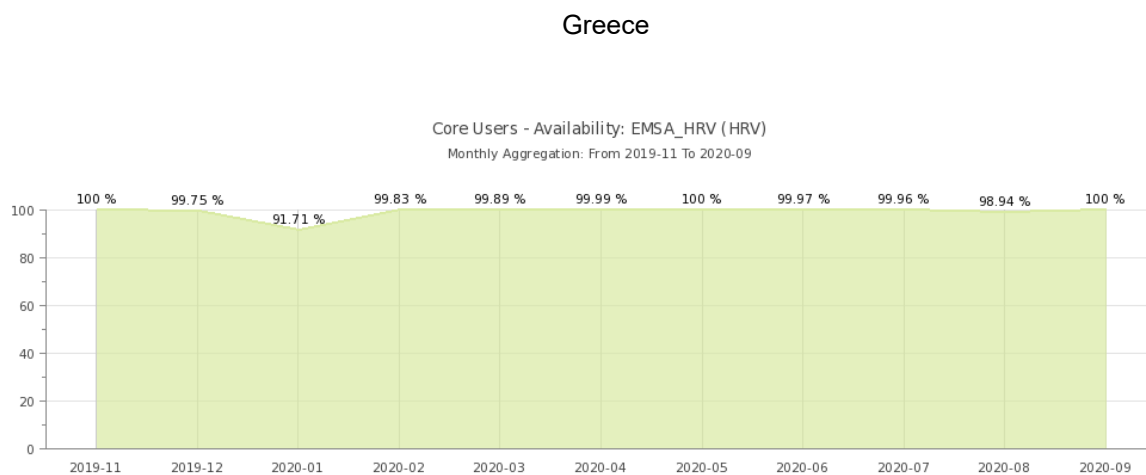
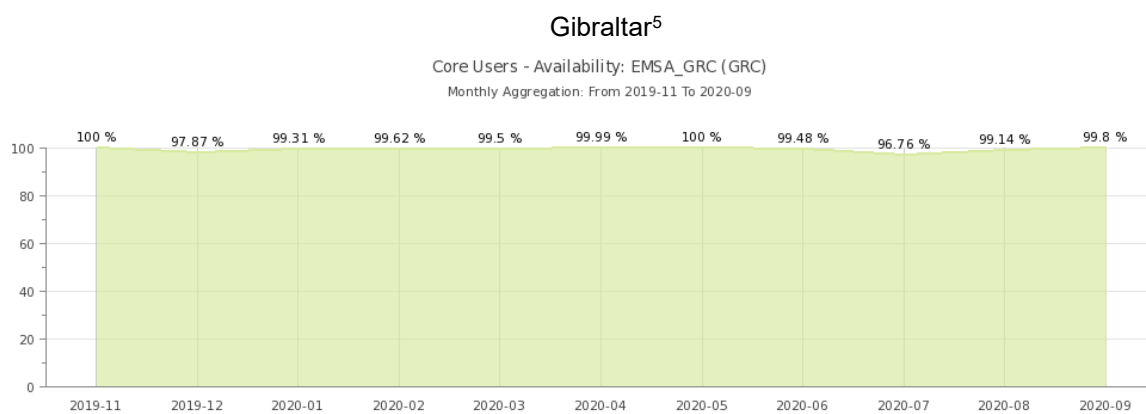
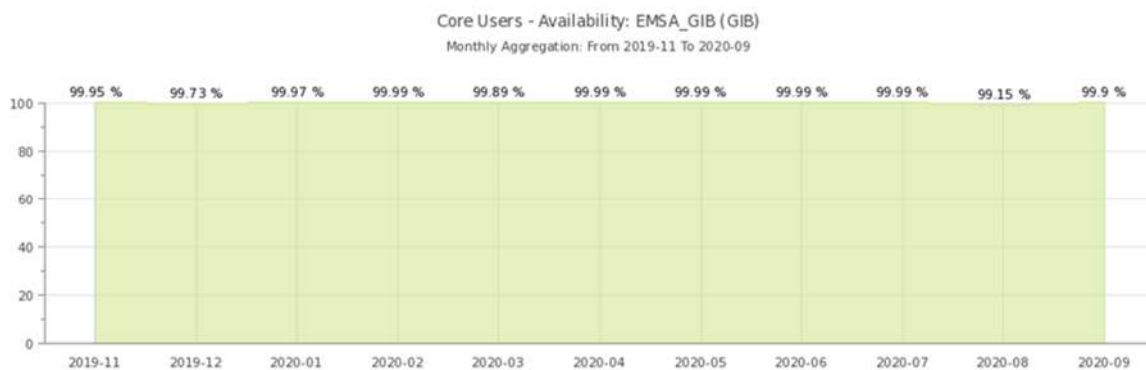
Cyprus



Spain

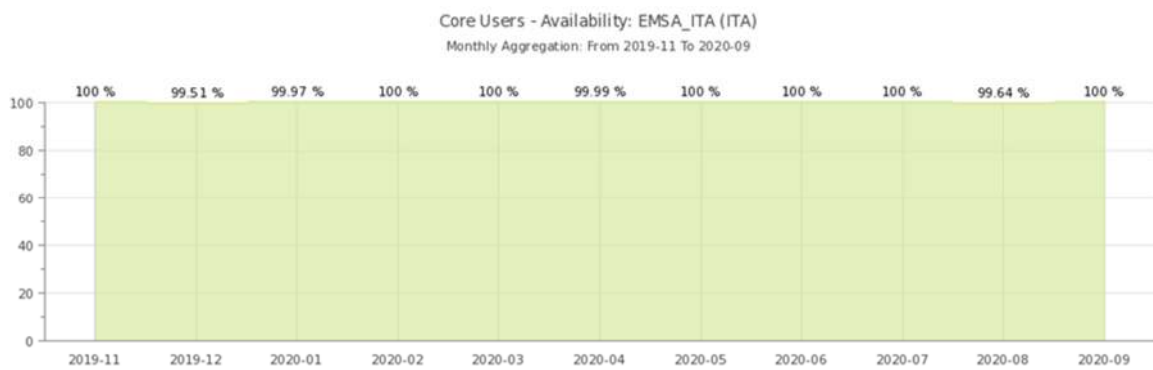


France

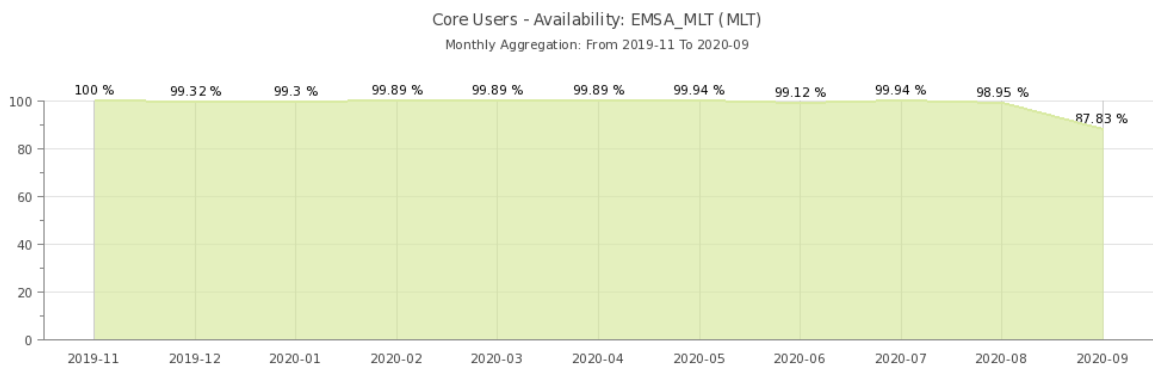


Croatia

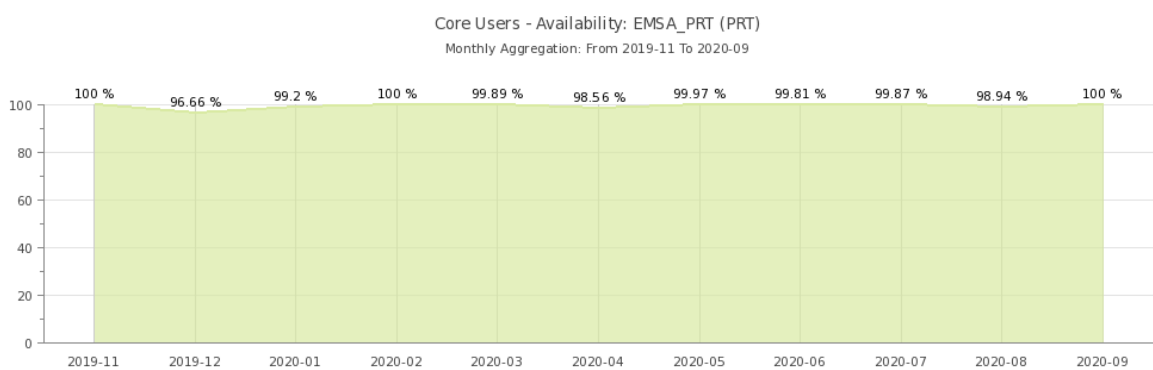
⁵ Since September 19th 2018, Gibraltar implemented a new NAISP.



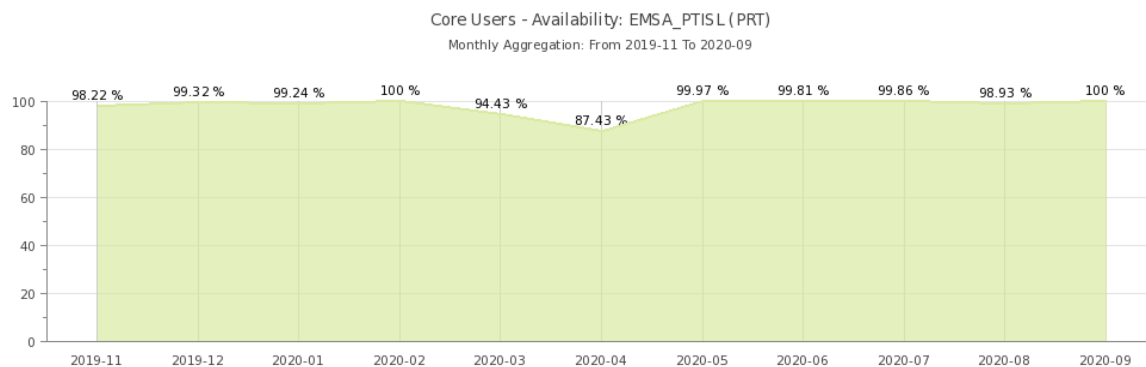
Italy



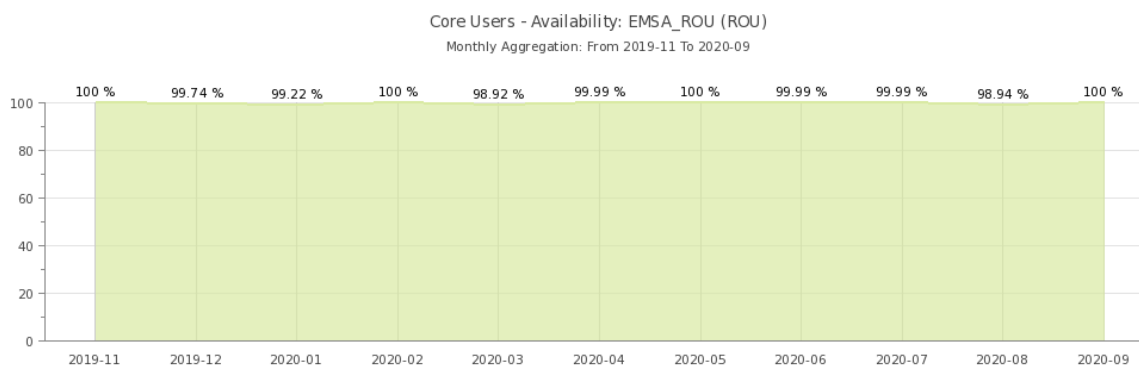
Malta



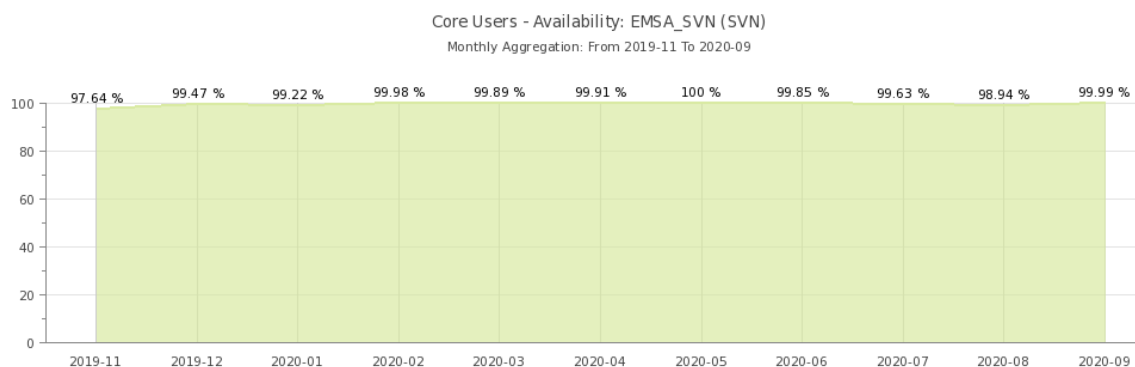
Portugal (mainland)



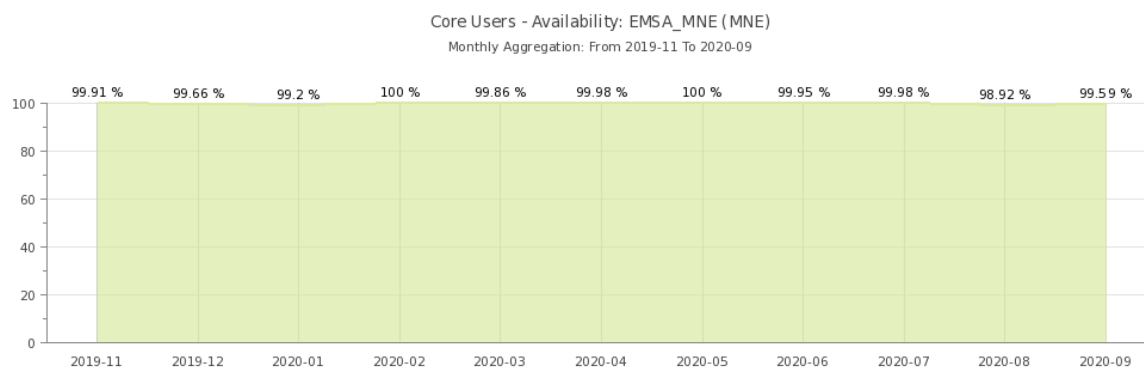
Portugal (Azores and Madeira)



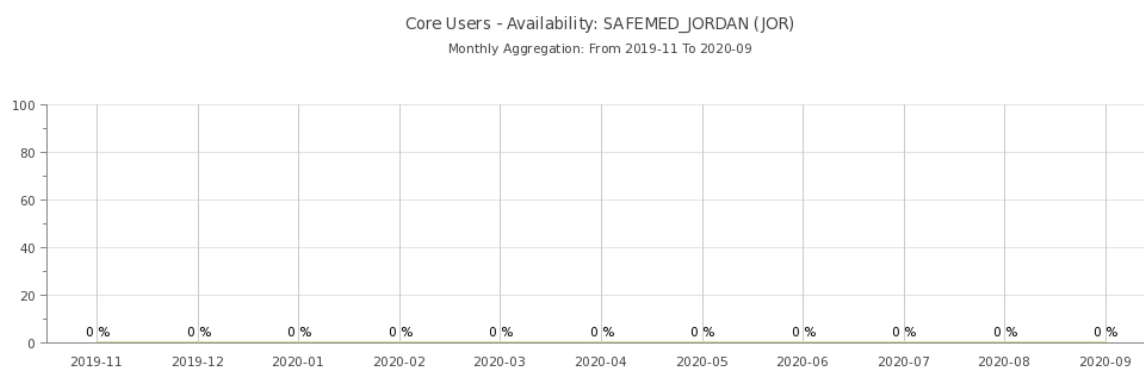
Romania



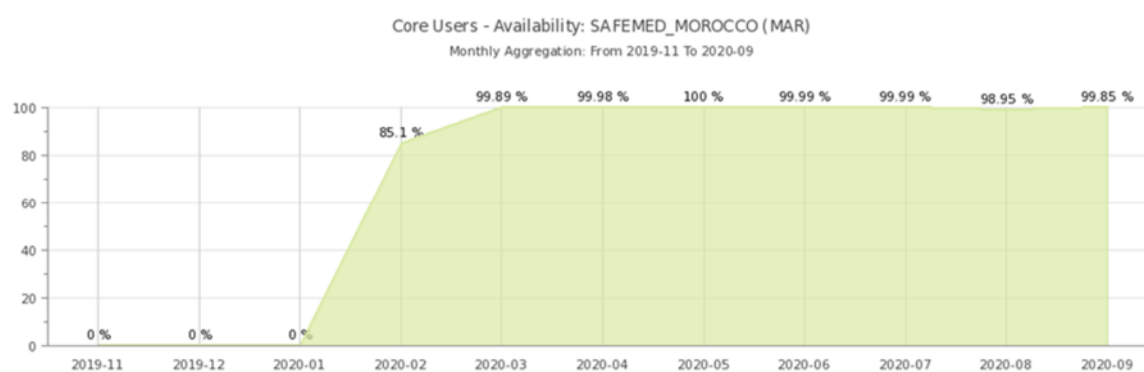
Slovenia



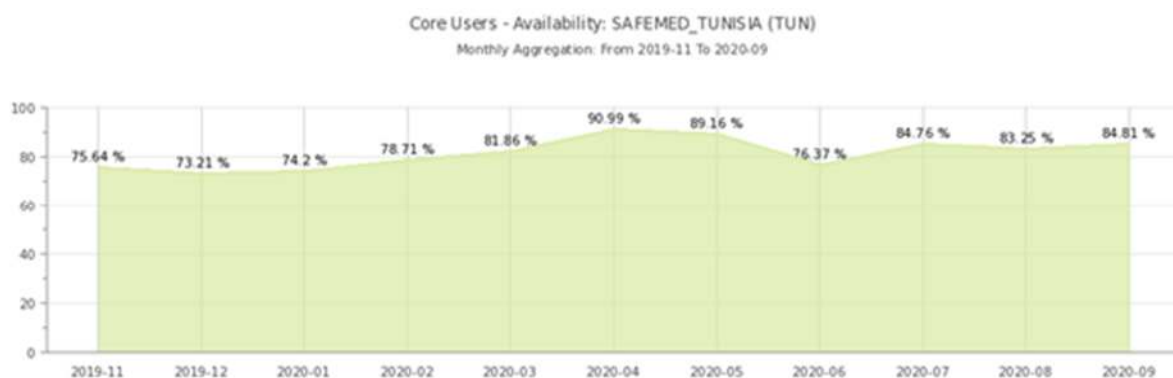
Montenegro



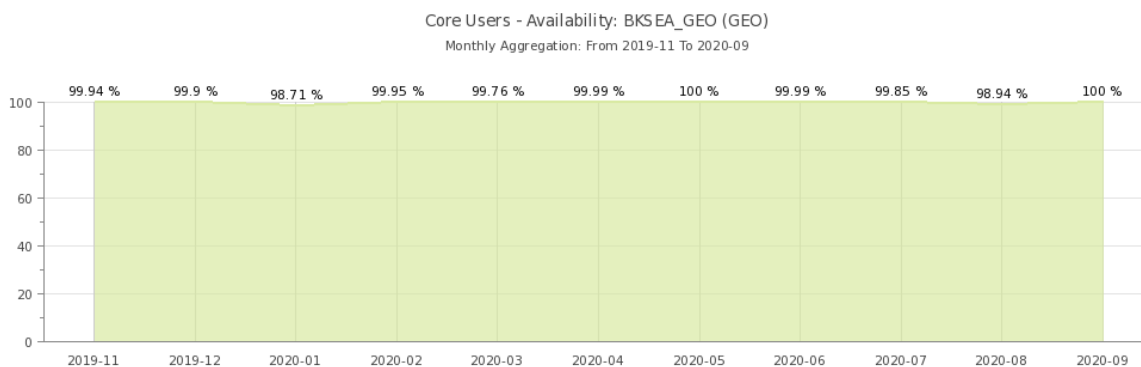
Jordan



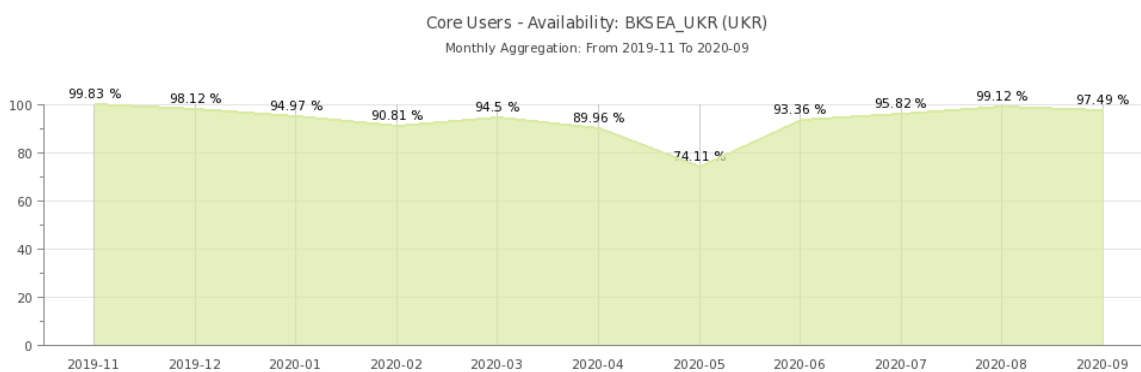
Morocco



Tunisia



Georgia



Ukraine