SPRFMO
South Pacific Regional Fisheries Management Organisation

6TH MEETING OF THE COMPLIANCE AND TECHNICAL COMMITTEE (CTC)

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CTC 6 – DOC 08
The Secretariat's Report on VMS Implementation

Secretariat

This report is provided under Paragraph 30 of CMM 06-2018: *"At each annual meeting of the Commission, the Secretariat shall provide the Commission with a report on the implementation and operation of the Commission VMS"*.

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1. Introduction

Background

Articles 25(1)(c) and 27(1)(a) of the Convention allows for the adoption of a vessel monitoring system for the reporting of vessel movements and fishing activities. For authorised vessels operating in the SPRFMO Convention Area, Article 27.1(a) of the SPRFMO Convention requires that the Commission establish appropriate cooperative procedures for *"the reporting of vessel movements and activities by a satellite vessel monitoring system that shall be designed to ensure the integrity and security of near real-time transmissions, including through the possibility of direct and simultaneous transmission, to the Commission and flag Stage."* Article 25 1(c) requires that *"each member of the Commission shall take all necessary measures to ensure that fishing vessels flying its flag carry and operate equipment sufficient to comply with vessel monitoring system standards and procedures adopted by the Commission."*

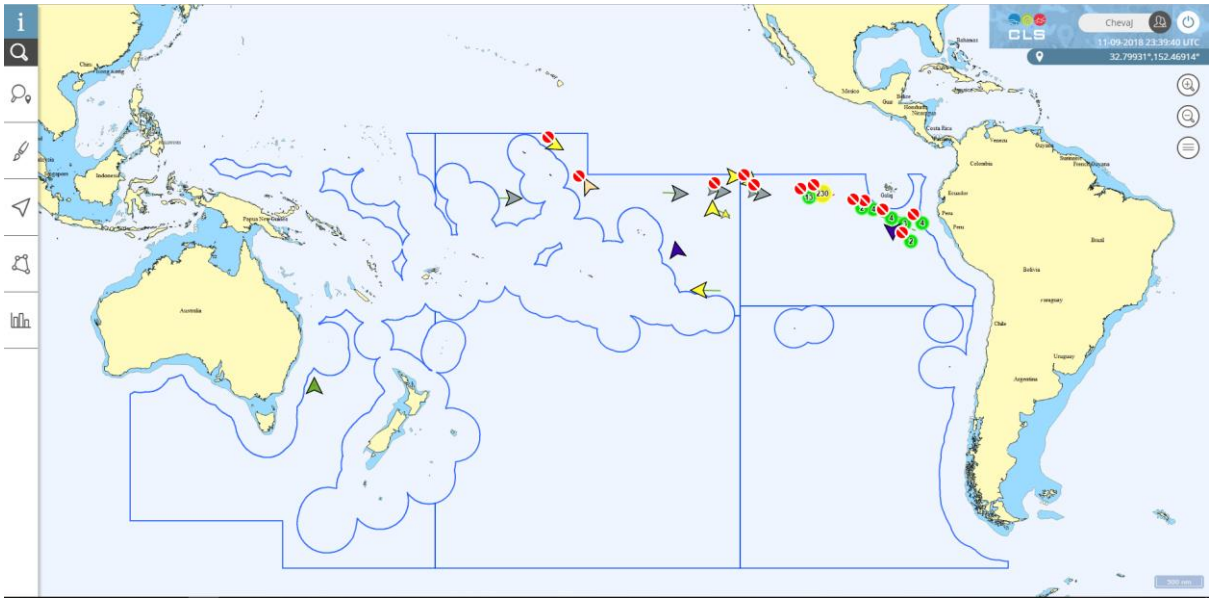


Figure 1 SPRFMO Convention Area in THEMIS

The purpose of the Commission VMS as set out in paragraph 4 of CMM 06-2018 provides that *"the purpose of the Commission VMS is to continuously monitor the movements and activity of fishing vessels that are on the Commission Record of Vessels and are authorised by Members or CNCPs to fish for fisheries resources in the SPRFMO Convention Area in a cost-effective manner in order to, inter alia, support the implementation of SPRFMO CMMs."*

Paragraph 9 of CMM 06-2018 requires vessels flying its flag to report to the Commission VMS automatically either:

(a) to the Secretariat via their Member or CNCP's FMC; or
(b) simultaneously to both the Secretariat and its FMC.

2. Description of the Commission VMS

The central tool provided by CLS which allows permanent monitoring of fishing fleet and control of parameters onshore is the THEMIS (Thematic Maritime Information System) Application. THEMIS is a high-end web-based application. Access to this application is highly secured (as it uses the HTTPS protocol), the certificate of authenticity and logins and passwords.

This application is developed specifically for the use of the administration. The software user interface is composed of one cartographic window, with tools for performing simple actions such as working with the map or displaying vessel positions on it. The management of all VMS information (beacons, vessels, zones, positions, etc) is done via a client application. It is a Graphical User Interface (GUI) which allows editing (create/modify/delete) VMS information which is stored in the system database.

The application is also capable to upload DNID, poll a vessel, programming and activating a DNID, stop programming, or change their reporting interval.

3. State of Reporting

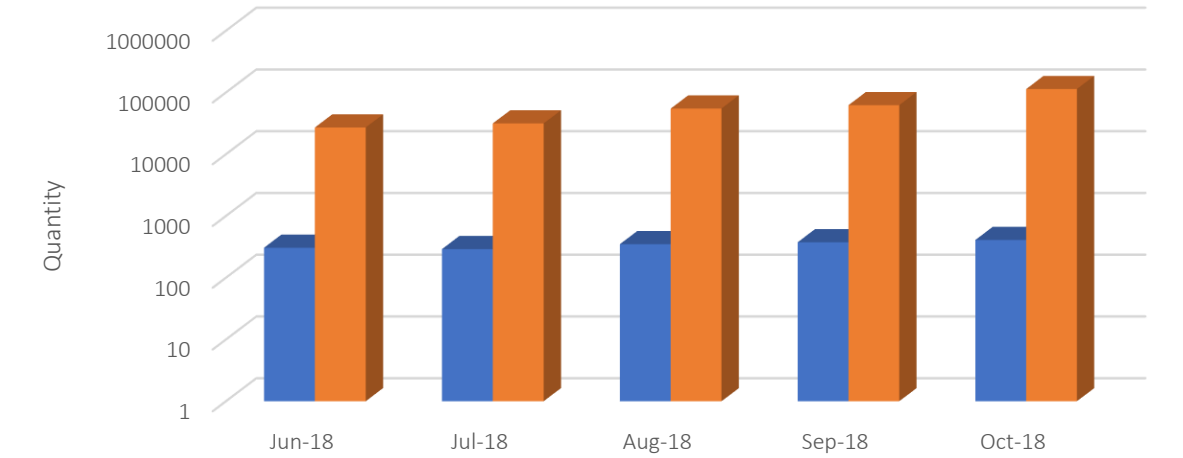
Table 1 below gives the status of reporting from the Members and CNCPs which have vessels that are fishing in the SPRFMO Convention Area.

Table 1 The current state of reporting for SPRFMO Members and CNCPs

Flag	Type of Reporting	Format	Protocol	Vessels available in Commission VMS?
Australia	Simultaneous	Inmarsat-C	-	Yes
Chile	Via FMC	CLS	THEMIS Senapesca	Yes
China	Via FMC	NAF	Email	Yes
Colombia	-	-	-	No active vessels
Cook Islands	Via FMC(FFA)	NAF	ftp	Yes
Cuba	-	-	-	No active vessels
Curacao	-	-	-	No active vessels
Ecuador	Yet to be advised	-	-	Awaiting Member
EU (Germany)	Via FMC	NAF	https	Yes
EU (Lithuania)	Via FMC	NAF	https	Yes
EU (Netherlands)	Via FMC	NAF	https	Yes
EU (Poland)	Via FMC	NAF	https	Yes
Faroe Islands	-	-	-	No active vessels
Korea	Via FMC	NAF	Email	Yes
Liberia	Via FMC	NAF	Themis/CLS	Yes
New Zealand	Simultaneous	Inmarsat-C	-	Yes
Panama	Via FMC	-	Themis/CLS	Yes
Peru	Via FMC			Testing in progress.
Russian Federation	Via FMC	NAF	Email	Yes
Chinese Taipei	Via FMC	NAF	Email	Yes
USA	-	-	-	No active vessels
Vanuatu	Via FMC	NAF	Themis/CLS	No active vessels

The Commission Record of Vessels authorised to fish in the Convention Area currently contains 992 authorised vessels. This data is fed to the SPRMO VMS along with the position data for each individual vessel (either via the Member/CNCP FMC or directly from the vessel).

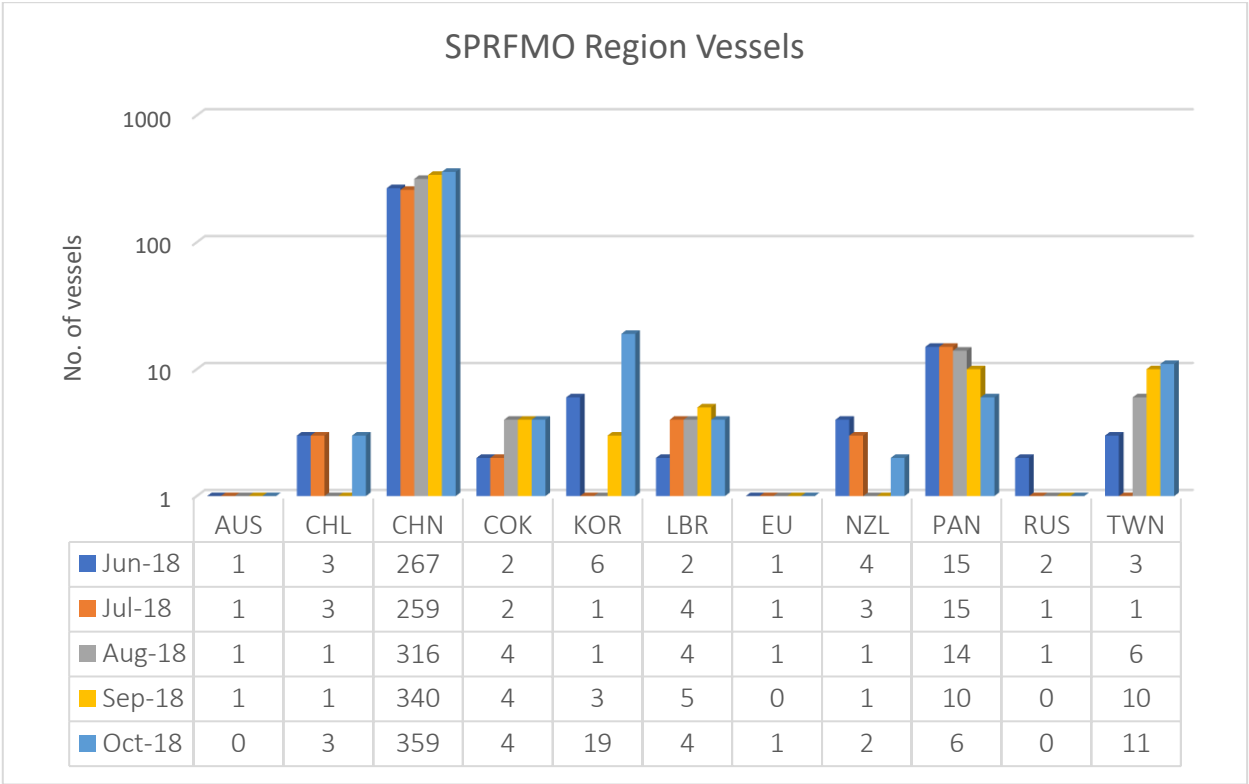
Table 2 Monthly Vessels and positions



	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18
No of vessels	306	291	350	375	409
No of positions	27097	31552	54967	62258	113589

Around 350 vessels (monthly average) report to the Commission VMS while fishing in the Convention Area as shown in Table 2.

Table 3 Vessels in the SPRFMO Convention area by flag and month



	AUS	CHL	CHN	COK	KOR	LBR	EU	NZL	PAN	RUS	TWN
Jun-18	1	3	267	2	6	2	1	4	15	2	3
Jul-18	1	3	259	2	1	4	1	3	15	1	1
Aug-18	1	1	316	4	1	4	1	1	14	1	6
Sep-18	1	1	340	4	3	5	0	1	10	0	10
Oct-18	0	3	359	4	19	4	1	2	6	0	11

4. Performance of the Commission VMS Service Provider

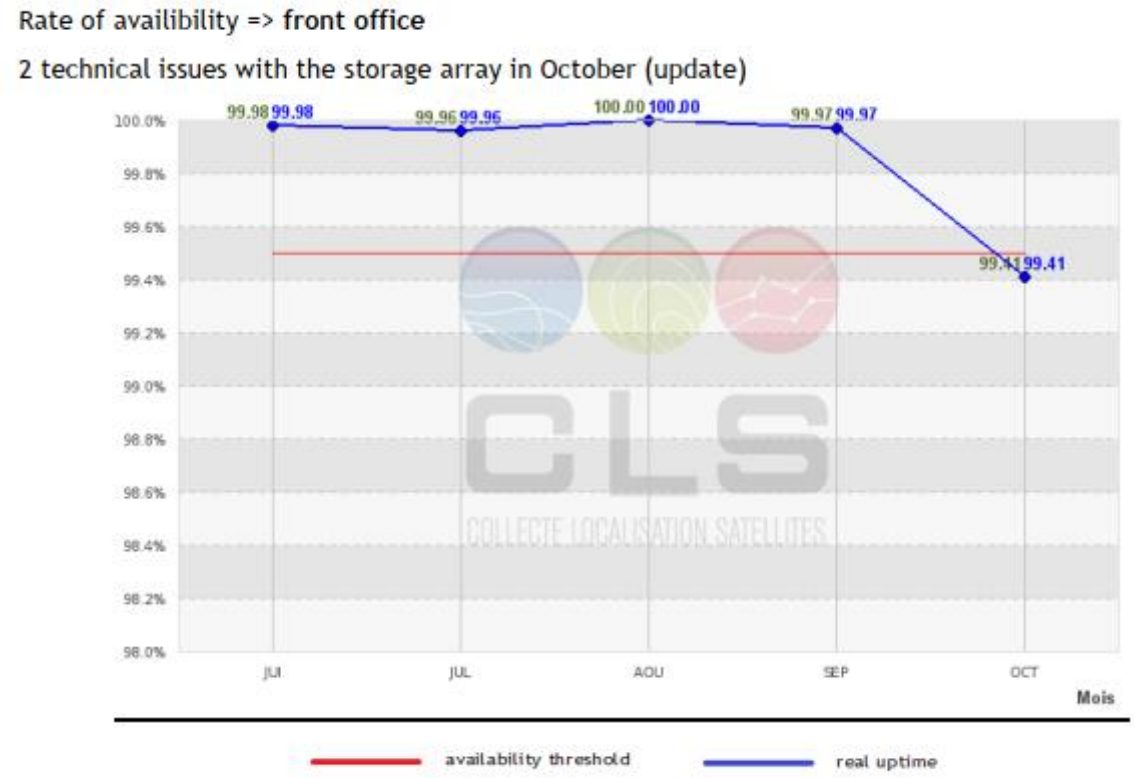
Implemented Upgrades

Date	Events
05/07/2018	Upgrade of the instance (in version 5.07.06.01) => 00h20

Planned Maintenance

Date	Events
25/09/2018	Migration to a new ESX (00h10)
27/09/2018	Incident on a storage bay (00h35)
04/10/2018	Incident on a storage bay (00h35)

Service availability



THEMIS 7 New Features

A new version of THEMIS, version 7 will be available in the first quarter of 2019 and will contain the following new features and evolutions:

- Optimisation of alert processing module: Better process of incoming positions and alerts to reduce the latency of incoming positions reception;
- New possible configuration of time delay to process positions: Configuration of delay between the moment incoming positions arrive in the system and the moment they are being processed. This will enable to prevention from any false alert raise on:
  - Positions which are subjected to processing latency;
  - Positions not arriving in the right order
- New report to count fishing hours – filtering criteria available: Possibility to create reports and extract number of hours of fishing vessels based on different criteria:
  - Zones of interest;

    - Vessel's speed of interest
- Reports can be produced on a daily/weekly/yearly/custom basis
- Additional evolutions in 2019
    - FLUX compatibility to exchange data based on new EU requirements
    - Improvement of UMV data display and navigation (migration to PostgreSQL database)

As part of further improving the current SPRFMO VMS, the Secretariat asked CLS to develop a new module of Electronic Reporting System (ERS) that can be integrated into the current VMS. CLS has agreed to present a demo and proposal (mentioning the cost involved and the time frame to integrate the ERS module into the current system) of the new module at the forthcoming annual meeting of the Commission.

This ERS module would contain:

- Catch reports storage and display;
- Alerts – catch data control, quota management;
- Statistics – catch data as viewed on the map, list of all catch data and corresponding information per vessel/ data-time/ species/ weight/ etc.

Acceptable level of Service availability

The minimum acceptable level of service availability is 99.7%. Should the service availability fall below 99.7% then a reduction in the maintenance fee of 2% is to be applied. Should the service availability fall below 90% then the maintenance fee is reduced by an amount commensurate with the service downtime. *Note that payment of the maintenance fee begins May 2019, so there is no reduction for the October availability.*

5. SPRFMO Inmarsat-C Training

A 1-day training on Data Network Identifier (DNID) setup and management was held in the Secretariat on 10th May 2018. Training was provided by Guan Oon, Managing Director of CLS Oceania, Melbourne, Australia. The following SPRFMO staff attended:

- John Cheva (IT Manager)
- Craig Loveridge (Data Manager)
- Marianne Vignaux (Data Analyst)
- Jong Kwan Ahn (Seconded Fishery Officer)

In addition, the Secretariat invited Mr Dave Stevens, a VMS administrator from the New Zealand Fisheries, to participate in the training as a VMS expert. The training covered the following areas:

- Inmarsat-C system background.
- Assigning of DNID - 2763 to Australian (AU) vessels and DNID – 2764 to New Zealand (NZ) vessels.
- Allocation of member number to AU and NZ vessels.
- Creation of Inmarsat-C Automatic Location Communicator (ALC) in THEMIS.
- Uploading the DNIDs into the vessels.
- Checking status of the sent command for the selected vessel(s) in the Commands Report tab.
- Commands that were tested successfully during the training include:
    - DNID upload;
    - Programming and activation;
    - Polling;
    - (re)Programming and activation;
    - Stop programming.
- Troubleshooting.

6. Operation of the Commission VMS

Personnel

The Executive Secretary has nominated John Cheva as the Security System Administrator (SSA) for the Commission VMS. The SSA is responsible for managing requests to VMS data by Members or CNCPs which includes security provisions and implementing time/area restrictions, data retention, maintaining an electronic record of all requests to access the Commission VMS and issue a user ID and password to the Point of Contact (PoC). The log files generated by the Commission VMS are reviewed daily. To communicate the VMS data securely between the Members, CNCPs and the Secretariat or the VMS provider, all emails are encrypted (using Office 365 Message Encryption (OME), where the encrypted message is transformed from plain text into unreadable ciphertext while in transit and will be decrypted once the recipient's identity is validated). The SSA will receive and record all written confirmations from the Members and CNCPs relating to the deletion of the VMS data as mentioned in paragraph 24 (e) of CMM 06-2018.

Work Processes

- Investigating alerts including:
    - Overdue reports;
    - Underreporting;
    - Fishing without a license;
    - Vessel rendezvous alerts;
    - Fishing outside open areas (awaiting CMM revision).
- Processing Manual reporting.
- Responding to requests for VMS data.
- Merging duplicate vessels (in cases where the system does not automatically match vessels or when we receive VMS information prior to the vessel being placed in the Record).
- Check log entries in the Users actions report.
- Check the Statistics report for the number of vessels reporting to the Commission VMS.
- Generate a missing locations report and communicate with Member/CNCP in case their vessel(s) miss four consecutive automatic reporting of positions and take all reasonable steps to re-establish normal reception of VMS positions.
- Checking of bi-monthly invoices covering charges for DNID Upload, Polling, Periodic Rate Change and Position Reports for vessels belonging to Australia and New Zealand.

CMMs supported by the Commission VMS

Currently, the Commission VMS is being used to support the implementation of 12 of the 16 SPRFMO CMMs that are in place (CMM 01-2018 (*Trachurus murphyi*), CM 02-2018 (*Data Standards*), CMM 03-2018 (*Bottom Fishing*), CMM 05-2016 (*Record of Vessels*), CMM 06-2018 (*Commission VMS*), CMM 07-2017 (*Port Inspection*), CMM 08-2013 (*Gillnetting*), CMM 10-2018 (*CMS*), CMM 12-2018 (*Transhipment*), CMM 13-2016 (*Exploratory Fisheries*), CMM 14b-2018 (*Exploratory Potting*) and CMM 16-2018 (*Observer Programme*)).

7. Request for VMS Data

As per Paragraph 21 of CMM 06-2018, all requests for access to VMS data must be made to the Secretariat by electronic means by a VMS Point of Contact. A Member or CNCP may request VMS data for the following purposes:

- For their own flagged vessels (Para 22);
- For other flagged vessels if prior written consent has been provided (Para 21);
- Planning for active surveillance/inspections at sea (Para 23);

- Conducting active surveillance/inspections at sea (Para 23);
- Supporting search and rescue activities provided an arrangement is in place (Para 23);
- To the Scientific Committee (SC) for analysis to support specific scientific advice requested by the Commission (Para 8).

The table below (Table 4) gives the details of the Members and CNCP's that have requested to access VMS data from the Commission VMS.

Table 4 Commission VMS data access requests

Member/CNCP	Purpose	Date	Access period	Current Status
Australia	Planning for active surveillance/ inspections	July 2018	2 months	Withdrawn
New Zealand	Monitor own flagged vessels	Sept 2018	one year	Active
The Cook Islands	Monitor own flagged vessels	Sept 2018	one year	Active
Ecuador	Monitor own flagged vessels	Oct 2018	one year	Active

All requests to access the VMS data were done through their respective VMS Point of Contact electronically (through email). On receipt of the request through a form that was designed by the Secretariat, the login details were created and sent to the Point of Contact through an encrypted email. It is the responsibility of the Point of Contact to further allocate the login details to the authorised users (as per the request) of the Commission VMS system.

8. Security and Confidentiality

CMM 06-2018, ANNEX 2, paragraph 9 specifies the security and confidentiality requirements relevant to the Commission VMS and instructs the Secretariat to take appropriate measures.

Authorisation:

Access to the SPRFMO VMS will be provided to non-staff members that are authorised by the Commission in accordance with CMM 06-2018, paragraph 21. The access is provided to the requesting VMS point of contact in the instances as mentioned in Para 7 (Request for VMS Data) of this document.

In all these instances, the request for access will be made by the official VMS Point of Contact. The VMS Point of Contact will be responsible for the secure distribution of the access details to the user(s) in accordance with CMM 06-2018, Annex 2, paragraph 3.

Notification:

Members and CNCPs will request the Secretariat, through their VMS Point of Contact, in writing (via email), to provide access to the Commission VMS using the following format:

Commission VMS - Data Request under CMM 06 (VMS)

Requesting Member/CNCP:	
Full name of authorised user:	

User email address:	
Purpose: 1. VMS data from our own vessels 2. For other flagged vessels (with prior written consent) 3. Planning for active surveillance/inspections at sea 4. Conducting active surveillance/inspections at sea 5. Supporting search and rescue activities 6. By SC to support scientific advice request from the Commission	
Start access date:	
End access date:	
Geographical area required:	
Flags requested:	
By completing this request, the above user hereby commits to respecting the Security & Confidentiality requirements as detailed in Annex 2 of CMM 06-2018 (VMS).	

Such a request must be submitted at least five (5) working days in advance, except as otherwise defined in CMM06.

Security considerations:

Login details which will include the username, password and website link will be communicated to the VMS Point of Contact using encrypted email.

In addition, the Secretariat will implement the following security measures:

a. Each authorised user shall be assigned a unique user identification and associated password valid for a maximum of one year.
   - The user ID must be person specific and not generic. This will allow for the identification of the person to whom the access to Commission VMS has been provided
   - The password will consist of at least eight alphanumeric characters (with at least one uppercase letter, with at least one lowercase letter and with at least one number) and be different from previous passwords and from the ID/User Name.
   - Each user is responsible that their respective ID and password are secure. They have to ensure that the password is stored securely in a place to which nobody else has access to. If a user has reason to suspect that his/her password has been compromised, he/she must inform his/her VMS Point of Contact immediately. The Secretariat's System Security Administrator will be notified without delay and promptly disable the compromised password (during work hours).
   - If an incorrect password is entered more than three times within 30 minutes, the system will not allow access to that user ID for at least one hour. If the user has forgotten his/her password, the VMS Point of Contact may request a new password from the Secretariat's System Security Administrator.

b. The Secretariat's System Security Administrator will maintain an electronic record of all issued user IDs and passwords.

c. A user will be given access to those and only those functions and data that he/she is authorised to have access to.

d. In the instance of a request for access for surveillance operation, the VMS Point of Contact will inform the Secretariat via email of the date and time at which the downloaded VMS data have been deleted after the conclusion of the surveillance operation in accordance with CMM 06.

Access restrictions: User access to the Commission VMS can be limited by the Secretariat's Security System Administrator using several criteria (some combinations are possible):

- Mobiles or fleet restriction: The user can only view certain fleets defined by the flag.
- Geographical restriction: The user can only access VMS data in a defined geographic area.
- Time restriction: The user can only access VMS data for defined time periods.

9. Manual Reporting

CMM 06-2018, Annex 3, specifies the rules on manual reporting in the event of non-reception of four consecutive, expected programmed VMS positions and where the Secretariat has exhausted all reasonable steps to re-establish normal automatic reception of VMS positions.

During November the Secretariat followed up with the Cook Islands, China and Panama as some of their vessels had missed 4 consecutive VMS reports. Those flags were able to identify and correct the problems that were preventing the automatic transmission and the communication link to the Commission VMS was re-established. All missing positions were subsequently sent to the Commission VMS via their respective FMC using the established communication processes. Thus, the provisions of Annex 3 (manual reporting) have not been applied because the Secretariat (& the flag) were able to re-establish normal automatic reporting prior to exhausting all reasonable steps.

However, since June 2018 we have noted that some Members and CNCPs have independently forwarded "*Undefined reports*" to the Secretariat via their FMC.

Table 5 VMS Undefined vs delay vs relative amount

Month	All Vessels		
	Automatic		Manual (Undefined)
	Delay > 3600secs	Total	
Jun-18	6 031	27 556	258
	21.89%		
Jul-18	8 433	31 741	434
	26.57%		
Aug-18	9 860	55 195	2 247
	17.86%		
Sep-18	15 572	55 409	10 132
	28.10%		
Oct-18	16 481	83 712	3 006
	19.69%		
Total	**56 377**	**253 613**	**16 077**
Percentages	**22.23%**		**6.34%**

From the above table (Table 5), the total number of positions sent by vessels is 253613. Of which, 16077 positions (6.34%) were manual positions. 56377 positions (22.23%) were automatic positions with a delay greater than 1 hr (3600sec). 331 vessels were involved in undefined (manual) reports.

On 24th September 2018, the number of vessels reporting for China to the Commission VMS decreased to 215 from 428 vessels on 23rd September 2018. Upon passing on the information to China's Point of Contact, the Secretariat was informed that they had advised the vessel owners to report manually. This is the reason for the increase in the number of manual positions in the month of September 2018 as compared to other months.

10. VMS Associated Issues

China – Satellite Migration

On 28th June 2018, there was a noticeable decrease in the number of data files that they were being received from China's FMC to the Commission VMS. When this information was passed on to China's Point of Contact, we were informed the following: *"After checking with technical staff of our FMC, I would like to advise that the third generation satellites of INMARSAT-C were launched in 1996-1997, they work in orbit more than 20 years, are approaching the end of their life, therefore INMARSAT plans to complete Satellite migration from third generation to fourth in 2018. The Satellite migration led to unnormal reporting of vessels from 25th Jun 2018 to 3rd Jul, now it is reporting normally. Therefore, we do not have the position reports of the vessels that have stopped reporting to the Commission VMS from the 25th June."*

Insufficient information for simultaneous reporting vessels

In some cases, the information provided by the flag state was insufficient to enable the Secretariat to upload the DNID and thus establish automatic reporting to the Commission VMS. This is because the THEMIS interface requires both the IMN (Inmarsat Mobile Number) and the corresponding ISN (Inmarsat Serial Number). Often an IMN was provided but the corresponding ISN of the ALC was absent.

The Commissions Service provider CLS has been able to assist obtaining ISNs via their internal sources however this is outside their scope of service and the Secretariat appreciates the efforts made by CLS in this regard.

The requirement for an ISN is relatively recent and was implemented by Inmarsat-C for additional security.

- List of minimum vessel details that are required to enable VMS setup:
    - Vessel Name
    - Vessel ID
    - Call Sign
    - Operator Legal Name
    - ALC IMN
    - ALC Product
    - ALC Model
    - ALC Software Version
    - IMN Serial Number
    - IMO Number

ALC operational issues

The Secretariat has observed some situations involving older Inmarsat-C ALCs units (particularly those > 15 years old) are apparently reporting normally to flag states, but either intermittently or rarely to the Commission VMS despite successful DNID set-up and subsequent individual polling. This lack or intermittent

reporting is frustrating the Secretariat 's attempts to properly monitor the activities of those vessels while they are in the SPRFMO area.

The Secretariat encourages flag states to consider requiring their vessels to replace older ALCs to avoid operational issues like those described above.

11. Airtime Fees for Simultaneous Reporting

As per Paragraph 9 b) of CMM 06-2018, Australia and New Zealand chose to report VMS data automatically simultaneously to both the Secretariat and its FMC.

At the 6th Meeting of the Commission, Lima, Peru, *"the VMS WG recommended that the Secretariat would establish DNID connections for Australia and New Zealand for vessels which are polling directly to the Secretariat and that these costs (approximately $200) shall be absorbed by Australia and New Zealand."* In compliance with this recommendation, the Secretariat established DNID connections for both Australia and New Zealand vessels which are polling directly to the Secretariat. In addition, the VMS WG *"noted that based on quotes provided by CLS the annual costs of position reporting and DNID activation/deactivation would be approximately $2100".* Furthermore, *"the VMS Working Group recommended that for 2018 Australia and New Zealand shall absorb their respective airtime hosting fees. The VMS WG further recommended this matter to be reviewed at the annual commission meeting in 2019 to ensure that this was capable of being a cost-effective administrative process for the Secretariat."*

Australia and New Zealand have informed the Secretariat to continue polling/programming their vessels until and unless advised otherwise.

CLS sends bi-monthly invoices covering charges for DNID Upload, Polling, Periodic Rate Change and Position Reports. These invoices are checked at the Secretariat by the SSA against a report extracted from the Commission VMS. As the amounts on these bi-monthly invoices are relatively small compared with international transfer charges, both the Secretariat and CLS have agreed to pay these invoices on a half-yearly time frame (i.e. after 3 bi-monthly invoices).

Proposed vs Actual Cost of Inmarsat-C Service Fees

Proposed Inmarsat-C Service Fees ($NZ) (as per COMM 6 – Report – Annex 8b: Airtime Fees)

Flag	DNID Connection	Position Report	Polling & Command	Annual estimate
Australia	100.00	477.12	88.40	**665.52**
New Zealand	100.00	1347.36	182.00	**1629.36**

Actual Inmarsat-C Service Fees ($NZ) (6-month cost)

Australia	DNID Connection	Position Report	Polling & Command	Total
May & June 2018	100.00	59.08	12.35	171.43
July & Aug 2018		161.84	16.90	178.74
Sep & Oct 2018		824.18	1.95	826.13
Total	**100.00**	**1045.10**	**31.20**	**1176.30**

New Zealand	DNID Connection	Position Report	Polling & Command	Total
May & June 2018	100.00	415.52	31.85	547.37
July & Aug 2018		360.22	14.30	374.52
Sep & Oct 2018		660.94	13.00	673.94
Total	**100.00**	**1436.68**	**59.15**	**1595.83**

The increase in actual vs expected costs are because most of the Australian and New Zealand vessels are continuously reporting to the Commission VMS regardless of location.

The above costs for a period of 6 months (May 2018 to October 2018) have been informed to both Australia and New Zealand. Both have indicated to the Secretariat that they will be paying the Inmarsat-C fees on a yearly basis.