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Technical and financial considerations for the implementation of a SIOFA VMS

(online)

Relates to agenda item: 10 Working paper ☐ Info paper ☒

SIOFA Secretariat

Abstract:

The 7th Meeting of the Parties, held from 17 to 20 November 2020, recommended that the European Union (EU), with support from the SIOFA Secretariat, lead the intersessional work on developing a SIOFA Vessel Monitoring System (VMS) in advance of the next ordinary Meeting of the Parties (MoP7 meeting report, paragraph 123).

The Secretariat hereby presents the different technical and financial elements and options at its disposal concerning the implementation of a VMS System for the SIOFA.

Recommendations

The Secretariat recommends the MoP to examine the technical and financial considerations outlined in this information paper.

Introduction:
This paper sets out technical and financial considerations for the development of a SIOFA Vessel Monitoring System (VMS). These considerations are based on VMS studies carried out by other RFMOs, with a particular emphasis on the Indian Ocean Tuna Commission.
As most of the CCPs of the SIOFA are also members of the IOTC, the results of the IOTC study may be considered relevant for the implementation of a VMS system in SIOFA. However, differences between IOTC and SIOFA should also be taken into account, notably the yearly budget, the fleets' activities, the number of Secretariat staff and the size of the facilities available.
After enquiry, the factors that most influence the price of services are the number of vessels to monitor, the number of users of the centre and the accommodation configuration.

I. FACTORS TO BE CONSIDERED

A) Number of vessels monitored and associated data:

On 1 May 2021, 129 vessels were registered as authorised in the SIOFA Register of Authorised Vessels (figure 1). Of these, only about 70 vessels reported an active presence (transiting and/or fishing) in the Agreement Area last year, and only about 60 were fishing.

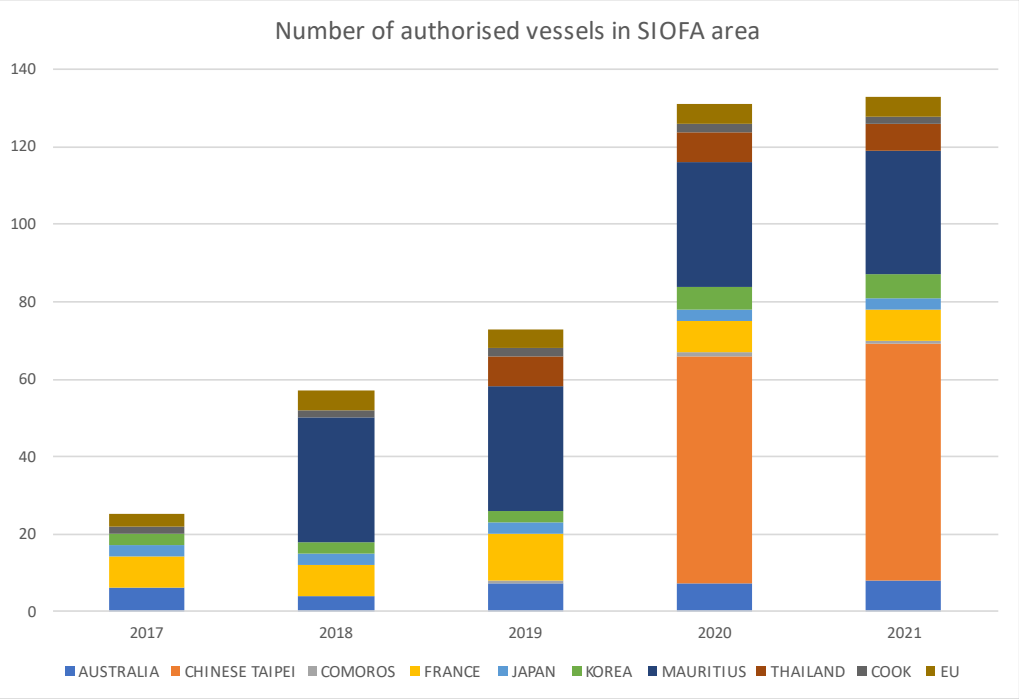

Figure 1: Number of SIOFA-authorised vessels in the SIOFA Area from 2017 to 2021

Note that the Secretariat was established in 2016 and the first list of authorised vessels was released in 2017.

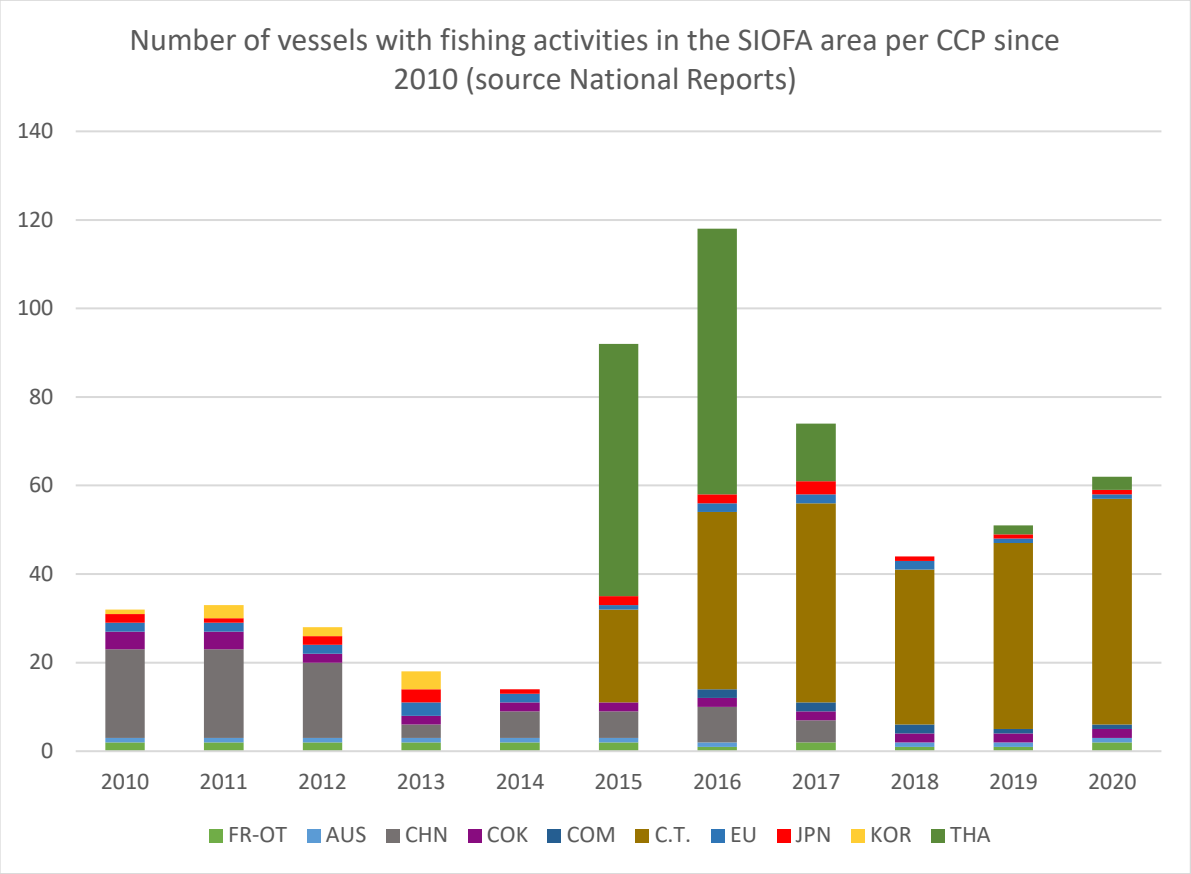

Figure 2: Number of vessels that were fishing in the SIOFA Agreement Area from 2010 to 2021

The figures of this chart are available in Annex 2.

Note that several CCPs had fishing vessels operating in the SIOFA area but were not registered as authorised vessels (case of Thailand which became a CP in 2017 and Chinese Taipei that has a history of pelagic longline fishing and became a PFE only in 2019)

The Secretariat estimated the need to accommodate 100 different vessels, 500 entries and exit reports and 100,000 vessel-hours per year. If vessels are required to transmit positions every two hours that totals to about **50,000 messages per year.**

B) Potential Services from:

After enquiries with the various external service providers and their websites, we identified two types of services: the minimum services provided and additional services that are usually rather expensive.

Table 01: Potential Services to SIOFA

Minimum Services	Additional Services

- Vessel operation alerts: zone entry/exit Reports (cell or port); speed in zone, etc. - Delimitations of Restricted areas with alerts if leaving roads/entering the restricted area. - Powerful geographical information system (GIS) with distance calculation, area definition and an Estimated Time Arrival (ETA) - Database to record vessel data (ID, MMSI, IMO, owner, type of fishing, licences, etc.), - Automated data-reporting and standardised data management. - A system for managing alerts of entry into prohibited zones, entry and exit from zones, - Technical alerts: loss of GPS, disconnected antenna, etc. -Possibility to add pictures, validity date of the vessels.	Extra modules for specific needs: ➔ To have in addition to the VMS display, AIS data collection / to monitor transhipment: *Expensive (double the cost)* ➔ Radar module ➔ Oceanographic data module ➔ Electronic logbook reporting inclusion

II. <u>Estimated costs of license (initial or yearly) and IT:</u>

These costs have been estimated after information from several external providers as well as the costs mentioned in the IOTC study.

Option 1: If the VMS is provided as a cloud-based service by a Service Provider.
In such a case, the technical maintenance and the set-up and hardware of the system would be delegated to the Service Provider who will host all the IT infrastructure. The SIOFA Secretariat would access the VMS data through a secure web portal from any workstation. This VMS system option is implemented in RFMOs like GFCM or NPFC.

1. **VMS License is charged as service each year**:

It is estimated about 58,000€ +/- 20%, including online support 5 days/week, 8 hours/day. In case of emergency, there is a 24/7 contact.

2. **Interface with the SIOFA Digital Vessel Register**: 25,000 € (one-off)

The VMS needs to use and be linked to established vessel registry. The Secretariat vessels database can be used and interfaced with the VMS.

3. **Initial system setup and initial training**: 25,000 € (one-off):

The training service is included in the amount indicated and generally includes approximately 2 sessions of 4 days each. The price does not depend on the number of people trained in each session. The cost depends on the location, the preparation required and therefore the duration of the training.
Additional costs for accommodation and travel of trainees outside Reunion are estimated at around 9,000 euros (2 people x 10 days).

4. **Minimal IT configuration:**

The Secretariat will need 2 workstations with 2 large monitors each, along with desks, chairs etc. They may be procured from a local source (same as for other computers in SIOFA).

Option 2: If the VMS infrastructure is hosted in SIOFA premises:

1. **VMS License initial investment**: for a VMS based on generic specifications, we estimate a (one-off) cost of 206,000 € +/- 20%, including installation, commissioning & training.
2. **Interface with the SIOFA Digital Vessel Register**: 25,000 € (one-off)
3. **Yearly Maintenance and Support**:

In the case of servers hosted by the SIOFA, a contract must be signed with the VMS servers' provider. This does not apply in the case of the provider-hosted service since the only computers that the SIOFA need would be the current PCs. The general maintenance of servers is about 6,600€ per year.

Consider 15% of the initial license cost (25,000-37,000 €) for corrective maintenance provided by the Service Provider, and online support 5 days/week, 8 hours/day (excluding the IT under local contract by SIOFA). In case of emergency, there will always a 24/7 contact. The Corrective maintenance involves correcting any software BUGs (VMS application) as well as ensuring software compatibility with its environment. We specify corrective, as opposed to evolutionary, to indicate that the application remains with constant functionality.
Any new functionality specifically requested by the RFMO would be subject to a specific development quote. At this point, additional costs may or may not be incurred, depending on the required functionalities.

Training for new personnel and any person in charge of VMS data should also be budgeted (VMS manager and technical IT support) and may be reconsidered every year depending on the VMS technical learning needs of the Secretariat.

4. **Minimal private IT configuration (Hardware)**:

The usual minimal Hardware sold by external providers includes a package of 1 rack, 4 servers + 2 workstations with 2 large monitors each. The total is estimated at 42,000 €.
These 4 servers include one **map server**, one application **server** and **2** Database **servers in redundancy**. **These servers must be installed in a locked cabinet, with UPS and networking devices.**

The definitive costs of setting up a computer room depend strongly on the current state of the space provided for this purpose and on local costs. For basic safety reasons and to ensure that the server is properly air-conditioned, it cannot be placed in a closed cabinet in our offices. It must be placed in a separate room. If it is at the supplier's, then it is the supplier who must produce the security credentials. If the SIOFA considers allocating an operating room (PCs in a

dedicated room), then yes, it is conceivable that a lockable cabinet could be sufficient to store the PCs. IT security awareness and clear procedures should be in place. Allocating a closed, air-conditioned, with a smoke detector, secured room with CCTV and security devices to host the system could be sufficient. Additional options can be considered such as the installation of deterrent alarms. This cost is difficult to estimate as it is highly dependent on the existing premises and the costs of the various components in Reunion Island.

5. **Data Recovery Services:**

These services are difficult to estimate.
However, 3 scenarios appear:

1.The Service is hosted at SIOFA (which is responsible for the data recovery) with our current Security System. It would therefore be free but risky.

2. The Service is hosted at SIOFA, but we subscribe to a Disaster Recovery Centre at a provider, expensive and contractually complex. Without more precision of the configuration system (working hour/24h and contractual timeframe for service and data restoration), it would be exceedingly difficult to put forward prices for services.

3. The Service from a provider with a Disaster Recovery Centre service request (to be specified in the tender, between 10k€ and 30k€/year).

6. **Other Challenges highlighted for Option 2:**

The Secretariat would like to point out the possible inter-annual variation in server maintenance costs and the maintenance of the server would require specialist knowledge which is not currently available in the Secretariat.

Remote uploads and configuration of equipment via VPN are possible but would require the presence of a staff member on-site. The additional training of an administrator and the cost of reinforcing the Secretariat should be considered at this stage.

This VMS system option 2 is implemented in RFMOs like ICCAT, CCAMLR or SPRFMO. The IOTC has a completely decentralized system, unlike the previously mentioned RFMOs.

The table below provides a summary comparison of the inception and recurring yearly costs of each option, along with an estimation of the total cost of ownership over 3 years (first contract).

Table 02. Comparison of costs for the two VMS hosting options

Option	Inception costs (1st year)	Recurring costs (yearly)	Total Cost of Ownership over 3 years	**Pros +**	**Cons -**
VMS hosted at the Secretariat	VMS License: € 230,000 ±20% IT configuration: € 32,000 Usual minimum hardware: 42,000	IT Overall maintenance: € 6,600 Corrective maintenance: € 25,000-37,000 Cost Training: **Undetermined** Data recovery system: 10,000-30,000€	€ 382,000-570,800		Needs a dedicated server room, with security, access control. Costs for training are not included. Servers must be maintained yearly and replaced every 5 to 6 years, with budget fluctuations, Requires specific IT staff at the secretariat. Risk of data loss without Data Recovery Services: (Expensive and difficult to precisely estimate so far)
VMS as service ("cloud based")	System setup: € 25,000 Vessel Registry: € 25,000 IT configuration: € 12,000 Training Staff Additional costs: € 9,000	Total: € 50,000-75,000	€ 221,000-296,000	VMS system as a Service: Easy and quick to implement. No need for specific IT knowledge and staff at the secretariat. No maintenance by the Secretariat. Secured solution. Possibility to procure a Disaster Recovery Service. Fixed yearly budget	The data is saved in an external private service company- need to signed data property and right agreements.

7. Consideration of Secretariat Capacities:

For both options, hosting by SIOFA or by a Service Provider, the establishment of a SIOFA VMS will require extra staffing. It is hard to estimate the workload.

Based on comparison with other RFMOs, at least a 25% FTE should be considered if the VMS is hosted by an external provider and could be supported by a Compliance Manager. Indeed, the management of the VMS requires almost daily action 7 days a week to deal with alarms, anomalies etc. For comparison, the NPFC (1,000 to 2,000 vessels) and the GFCM (up to 80,000 fishing vessels) employ one or more full-time staff for this purpose.

Based on existing positions in other RFMOs (IOTC and CCAMLR), this would likely be a P3 level position, with a cost of between 80,000 and 110,000€. Additional IT capacity is also likely to be required – particularly during the start-up period where the Secretariat will need new databases, hardware, and procedures during the initial implementation.

If the use of the VMS evolves and potentially expands, staff resources may need to be increased.

As mentioned above, the working environment to meet data security requirements is a dedicated, climatized and secure room. This room must be strictly restricted, and visitors should

not be allowed to visit the VMS center without prior agreement and proper supervision. Currently, SIOFA does not dispose of this capacity.

ANNEX 1: List of Studies and Comparison studies used:

- Barber, K. (no date) 'Overview on the status of implementation of the GFCM Pilot regional VMS and control system', p. 33.
- CCAMLR Secretariat Strategic Plan 2019–2022 (2019), p. 7. Available at: https://www.ccamlr.org/en/document/organisation/ccamlr-secretariat-strategic-plan.
- CLS Fisheries : VMS and ERS (Monitor catch efforts and track vessels). Available at: https://fisheries.groupcls.com/en
- IOTC : Report of the vessel monitoring study – Options paper for strengthening the IOTC Vessel Monitoring System (2019). https://www.iotc.org/sites/default/files/documents/2019/04/IOTC-2019-WPICMM02-VMS_StudyE.pdf
- SPRFMO (2020) CMM 06-2020 Conservation and Management Measure for the Establishment of the Vessel Monitoring System in the SPRFMO Convention Area. Available at: https://www.ofdc.org.tw:8181/web/components/Editor/SPRFMO/files/CMM-06-2018-VMS-8March2018.pdf.
- The North Pacific Fisheries Commission (NPFC), (2021) CONSERVATION AND MANAGEMENT MEASURE ON THE VESSEL MONITORING SYSTEM (VMS)CMM 2021-12 .pdf. Available at: https://www.npfc.int/cmm-2021-12-vessel-monitoring-system-vms

ANNEX 2: Active fishing vessels by year and CCPs (source CCPs National Reports)

Year	FR-OT	AUS	CHN	COK	COM	C.T.	EU	JPN	KOR	THA	Grand Total
2010	2	1	20	4			2	2	1		32
2011	2	1	20	4			2	1	3		33
2012	2	1	17	2			2	2	2		28
2013	2	1	3	2			3	3	4		18
2014	2	1	6	2			2	1	0		14
2015	2	1	6	2		21	1	2	0	57	92
2016	1	1	8	2	2	40	2	2	0	60	118
2017	2	0	5	2	2	45	2	3	0	13	74
2018	1	1	0	2	2	35	2	1	0	0	44
2019	1	1	0	2	1	42	1	1	0	2	51
2020	2	1	0	2	1	51	1	1	0	3	62