

## A Survey of RFMO Vessel Monitoring Systems and Set of Best Practices

Holly Koehler, ISSF

### Introduction

1. The International Seafood Sustainability Foundation (ISSF) has recommended that purse seine and longline vessels (of both greater than 24m and less than 24m in length) participate in satellite vessel monitoring schemes that meet global standards.
2. The purpose of this technical paper is to survey the satellite vessel monitoring systems (VMS) that are in place in regional fisheries management organizations (RFMO), or requirements for national VMS systems for vessels that operate in RFMO convention areas, and identify a set of best practice elements for VMS programs, which could be used by States and RFMOs in the development of or strengthening of national, regional or sub-regional VMS programs for fishing vessels.
3. This technical paper is composed of three sections. Section I surveys the existing VMS programs or requirements in the Western and Central Pacific Fisheries Commission (WCPFC), the Indian Ocean Tuna Commission (IOTC), the Inter-American Tropical Tuna Commission (IATTC), the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Northwest Atlantic Fisheries Organization (NAFO), the North East Atlantic Fisheries Commission (NEAFC), the South East Atlantic Fisheries Organization (SEAFO) and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)<sup>1</sup>. This section also surveys the Automatic Identification System (AIS) and compares its operational and technical specifications to VMS programs. AIS is included in this technical survey because it has begun to be required by some States and fleets to track fishing vessel movements and monitor their activities, and some RFMOs are also considering the utility of AIS as part of their suite of monitoring, control and surveillance options. In addition, AIS is being advocated by some non-governmental organizations as an important tool to enhance the transparency and public accountability of fishing operations, combat illegal, unreported and unregulated fishing and strengthen compliance.<sup>2</sup> Section II identifies a set of best practices elements drawn from the surveyed programs. Section III provides recommendations and conclusions.
4. Publically available sources of information and documents or technical specifications provided by RFMO Secretariats were consulted and used for this technical paper. This paper also utilized the conventions, resolutions, conservation and management measures, rules and procedures, and other reports, memoranda of understanding, and standards-setting documents that are posted on the websites for the five tuna RFMOs (ICCAT, IOTC, CCSBT, IATTC and

---

<sup>1</sup> CCAMLR is not generally considered a RFMO in the same context as the other organisations profiled here. CCAMLR operates within a broader institutional framework -- the Antarctic Treaty System -- and its membership is divided among active fishing States and other States whose interest is confined to research and conservation.

<sup>2</sup> Personal communications with Pew Charitable Trusts, the World Wildlife Fund and SkyTruth.

WCPFC) and four non-tuna RFMOs (NAFO, NEAFC, SEAFO and CCAMLR), which were posted online or released by a national government authority or by private services providers.

## Section I

### What is a Vessel Monitoring System?

5. Vessel monitoring systems are programs that use on-board transceiver units (automatic location communicators (ALCs)) that transmit reports (at fixed or variable intervals) to satellites, which are then received by land-based fisheries monitoring centers (FMCs). The on-board transceivers typically transmit position, the vessel identifier, time, and date. Some VMS software can transmit catch (weekly and upon entry/exit from a specific area) and transshipment reports, port of landing, and other data. The information transmitted by a VMS in real time is considered commercially sensitive; as a result, the data from these programs is not publically available (except under certain circumstances and in line with confidentiality rules). Data from VMS reports can be mapped and displayed on a computer. VMS is primarily a surveillance tool used by national regulatory authorities, and some RFMOs, for compliance and enforcement purposes, managing sensitive areas (such a marine sanctuaries), monitoring arrivals in port and movements in and out of exclusive economic zones (EEZs), tracking and monitoring fishing effort and location, managing observer programs, cross-checking and validating data from other sources, identifying fishing vessels, and other safety and security purposes.<sup>3</sup> VMS use long-range radio technologies (GPS antenna and receiver for recording position and time), a computer and a transmitter, and there are many different kinds of VMS systems, which are composed of satellites, on board units and software and display options, available for fishing vessels. ALC units are designed to be highly resistant to tampering, which could result in false or fake position or other data reports. The low earth orbit or geosynchronous satellite systems that are typically used to report data to the FMCs include Inmarsat, Iridium, and Argos, among others. The Iridium system provides global real time coverage of all ocean regions, including at the poles. Some other systems only provide coverage of more limited areas.

6. In order to identify a set of best practices that can represent global standards, eight VMS programs in use in regional fisheries management organizations responsible for the conservation and management of either highly migratory fish stocks or straddling or discrete high seas fish stocks in the Atlantic, Pacific, Indian and Southern Oceans were reviewed. Table 1 summaries specific core requirements and programmatic elements for the Western and Central Pacific Fisheries Commission (WCPFC), the Indian Ocean Tuna Commission (IOTC), the Inter-American Tropical Tuna Commission (IATTC), the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Northwest Atlantic Fisheries Organization (NAFO), the North East Atlantic Fisheries Commission (NEAFC), the South East Atlantic Fisheries Organization (SEAFO and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

---

<sup>3</sup> [http://www.nmfs.noaa.gov/ole/about/our\\_programs/vessel\\_monitoring.html](http://www.nmfs.noaa.gov/ole/about/our_programs/vessel_monitoring.html)

## Highly Migratory Species RFMOs

7. WCPFC. Since 2009, the Western and Central Pacific Fisheries Commission (WCPFC) has operated a centralized VMS for all vessels that fish for highly migratory fish stocks on the high seas in the Convention Area. Article 24(8) of the Western and Central Pacific Fisheries Convention establishes that each member of the Commission shall require its fishing vessels that fish for highly migratory fish stocks on the high seas in the Convention Area to use near real-time satellite position-fixing transmitters while in such areas. The Convention also provides that the WCPFC will establish standards, specifications and procedures for the use of such transmitters. To implement Article 24(8), in 2007 the Commission adopted a Conservation and Management Measure on the Commission Vessel Monitoring System (CMM 2007-02, which was amended in 2011 (CMM 2011-02)). The Commission VMS program operates through an agreement with the Forum Fisheries Agency (FFA), which provides VMS services to the WCPFC. The VMS was been applied to the high seas areas in phases, primarily due to reported operational difficulties of some small vessels in complying with the VMS requirements. As a result, until 2012, the WCPFC VMS covered only the high seas waters of the Convention Area south of 20N and east of 175E in the area north of 20N<sup>4</sup>. However, vessels moving from southern and eastern quadrants into the northern quadrant must keep their ALC/MTU activated and continue to report to the WCPFC VMS.<sup>5</sup> Some members have opted to include waters under their national jurisdiction in the WCPFC VMS. The WCPFC has also adopted a set of VMS Standards, Specifications and Procedures (SSPs)<sup>6</sup> and a set of Standard Operating Procedures (SOPs). These SSP and SOPs set out detailed standards for the operation of the Commission VMS. Also, in 2012, the WCPFC established procedures for the application of the Commission VMS to waters under the jurisdiction of members, upon the request of the member, and the provision of those data (called “in-zone VMS data”) for vessels reporting to the Commission VMS who enter these waters under national jurisdiction.<sup>7</sup> These in-zone VMS data are to be used only for the same purposes as high seas Commission VMS data (monitoring, control and surveillance (MCS) and scientific purposes, in accordance with WCPFC rules and procedures<sup>8</sup>). The WCPFC has also adopted special provisions for VMS reporting relating to some of its conservation measures for tunas. The most recent of these, CMM 2013-01, stipulates that during the FAD closure periods purse seine vessels are not to operate under the manual reporting provisions of the WCPFC VMS SSPs and the VMS polling frequency is increased to every 30 minutes.<sup>9</sup> In 2015, the WCPFC adopted an amendment to the VMS SSPs to address compliance issues associated with ALC type approvals. The amendments make it possible for the Secretariat to recommend the removal of ALC models from its list of approved types if they don’t meet the

---

<sup>4</sup> See WCPFC9 Summary Report: WCPFC, paragraph 285: WCPFC9 endorsed the NC members commitment to implement VMS in the area north of 20N and west of 175E by 31 December 2013."

<sup>5</sup> Annual Report for the Commission VMS (WCPFC-TCC9-2013-RP01, 13 September 2013)

<sup>6</sup> Standards, specifications and procedures (SSP) for the fishing vessel monitoring system (VMS) of the Western and Central Pacific Fisheries Commission (2008, amended in 2012)

<sup>7</sup> This policy is known informally as “Flick the Switch.” WCPFC9 Annual Meeting Summary Report (paragraph 234-239)

<sup>8</sup> Commission Rules and Procedures for the Protection of, Access to and Dissemination of High Seas Non-Public Domain Data and Information Compiled by the Commission for the Purpose of Monitoring, Control or Surveillance (MCS) Activities and the Access to and Dissemination of High Seas VMS Data for Scientific Purposes (Commission’s 2009 Rules and Procedures), paragraph 35.

<sup>9</sup> WCPFC CMM 2013-01, paragraphs 32 and 36.

standard, or do not have the ability to successfully report to the Commission VMS. Following this recommendation, CCMs have 3 years to ensure that its flagged vessels replace non-type approved ALCs with and approved ALC<sup>10</sup>.

8. IOTC. In 2006, the Indian Ocean Tuna Commission (IOTC) adopted Resolution 06/03 (*On Establishing a Vessel Monitoring System Programme*), which replaced its earlier Resolution that established a pilot VMS project (Resolution 02/02 *Relating to the Establishment of a Vessel Monitoring System Pilot Programme*). The IOTC amended this Resolution in 2015 (Resolution 15/03 *On the Vessel Monitoring System (VMS) Programme*). Each Contracting Party and Cooperating Non Contracting Party (CPC) is to adopt a satellite-based vessel monitoring system for all vessels flying its flag 24 m in length overall or above, or in case of vessels less than 24 meters, those operating in waters outside the Economic Exclusive Zone of the Flag State fishing for species covered by the IOTC Agreement within the IOTC area of competence. The Resolution provides that the IOTC may establish guidelines for the registration, implementation and operation of VMS in the IOTC Area with a view to standardizing VMSs implemented by each CPC. However, the IOTC has not yet adopted these guidelines, and thus the requirements of each CPC's VMS requirements vary except where provided for in the Resolution and its annex (e.g., data transmission frequencies, or procedures for when an ALC unit is not functioning). IOTC has a VMS report template for the use by CPCs in providing reports on the implementation of the VMS requirements to the Secretariat. Resolution 15/03 also includes provisions to accelerate implementation of the IOTC VMS by prescribing that those CPCs that do not have a VMS for any vessel now meeting the criteria for inclusion in the VMS, as per the amended in Resolution 15/03, must submit an implementation plan to the Compliance Committee in April 2016. This plan must set out a phased approach to full implementation of their national VMS within a maximum of 3 years, with at least 50% of all qualifying vessels compliant by September 2017. Further, the revised Resolution mandates that any CPC with vessels not yet equipped with VMS (as previous required under Resolution 06/03) shall be required to fully implement its national VMS obligation within a maximum of 1 year in respect of those vessels.

9. IATTC. In 2004, the Inter-American Tropical Tuna Commission (IATTC) adopted a requirement, through its Resolution C-04-06, that by January 1, 2005, or as soon as possible after that date, each Party with tuna fishing vessels 24 meters or more in length operating in the Eastern Pacific Ocean (EPO) and harvesting species for which the Commission has established conservation and management measures must establish a satellite-based VMS. The Resolution provides that those Parties that already had existing VMS programs were considered to have satisfied the Resolution requirement. Aside from the technical requirements elaborated in the Resolution itself<sup>11</sup>, the IATTC has not yet set operational standards for those VMS programs that were to be established and operated by Parties, or which were already established (and which

---

<sup>10</sup> <http://www.wcpfc.int/doc/tcc-02/vessel-monitoring-system-standards-specifications-and-procedures-ssps>

<sup>11</sup> Resolution C-04-06, paragraph 2: "While specific operational details of Parties' VMS requirements may vary, the Parties should seek to ensure that: (a) The information collected by the VMS for each vessel will include the vessel's identification and position (latitude and longitude) with an error of less than 500 meters at a confidence level of 99%, and the date and time and position information will be collected at least once every six hours and (b) VMS equipment on vessels will, at a minimum, be tamper proof, fully automatic for position data reporting, operational at all times regardless of environmental conditions, and, if possible, capable of manual transmission of reports and messages."

were *de facto* determined to have met the provision of Resolution C-04-06), and thus the requirements of each Party's VMS may vary. In 2014 IATTC adopted a number of amendments to C-04-06 to take account of recent developments in RFMOs with regard to VMS programs. This new resolution – C-14-02 – will take effect as of 1 January 2016. C-14-02 requires IATTC members and cooperating non-members of to ensure that all their commercial fishing vessels 24 meters or more in length operating in the EPO and harvesting tuna or tuna-like species are equipped, by 1 January 2016, with a satellite-based VMS; reduces the position error margin to less than 100 meters (from 500m), and requires the vessel's speed and course to be collected and transmitted. In addition, C-14-02 requires the collection of the required data at least every four hours for longliners and two hours for other vessels (C-04-06 specified once every 6 hours), and outlines procedures in the case of a technical failure or breakdown of the ALC device. The resolution also indicates that the Commission will consider the program and resolution again in 2015, including the possible development of a stand-alone IATTC VMS scheme. The Commission has not yet considered the resolution further.

10. ICCAT. In 2003 the International Commission for the Conservation of Atlantic Tunas (ICCAT) adopted Recommendation 03-14 that set minimum standards for VMS systems operated by Contracting Parties, Cooperating non-Contracting Parties, Entities or Fishing Entities for vessels flying their flags in the ICCAT Convention Area. In 2007 ICCAT adopted data exchange formats and additional specific VMS requirements for the Eastern Atlantic and Mediterranean bluefin tuna fishery<sup>12</sup> that built on the minimum standards set by Recommendation 03-14.<sup>13</sup> In particular, Recommendation 07-08 specified additional data that is to be transmitted in VMS reports, required that VMS data be sent to the ICCAT Secretariat, set stricter manual reporting rules in case of a ALC breakdown, provided that VMS data can be made available by the ICCAT Secretariat to Party inspection vessels operating under the ICCAT Scheme of Joint International Inspection and stipulated that 3-year old VMS data be sent to the ICCAT scientific committee on research and statistics (SCRS). Recommendations establishing a multi-annual recovery plan for bluefin tuna in the eastern Atlantic and Mediterranean (e.g., 10-04, 12-03 and 13-07) provide that the transmission of VMS data by fishing vessels included in the ICCAT bluefin tuna record of catching vessels shall start at least 15 days before the opening of the fishing seasons and shall continue at least 15 days after the closure of the fishing seasons unless the vessel is removed by the flag State authorities; that transmission of VMS data by bluefin tuna authorized fishing vessels shall not be interrupted when vessels are in port unless there is a system of hailing in and out of port; fishing vessels included in the ICCAT bluefin tuna record of other vessels shall transmit VMS data to ICCAT throughout the whole period of authorization; and the Secretariat is to immediately inform CPCs of delays or non-receipt of VMS transmissions and distribute monthly reports to all CPCs, which are to be weekly during the period 1 May to 30 July. In 2014, ICCAT adopted two specific amendments to Rec. 03-14. The first requires flag States to work with coastal States to ensure that the position messages transmitted by its vessels while fishing in waters under the jurisdiction of that coastal State are transmitted automatically and in real time to the FMC of the coastal State that has authorized the fishing activity. The second amendment changes the requirement that the required information

---

<sup>12</sup> ICCAT Recommendations 10-04, 12-03 and 13-07.

<sup>13</sup> ICCAT Recommendation 03-14 (Concerning Minimum Standards for the Establishment of a VMS in the ICCAT Convention Area) and Recommendation 07-08 (Concerning Data Exchange Format and Protocol in Relation to the VMS for the Bluefin Tuna Fishery in the ICCAT Convention Area).

be collected at least every 6 hours and transmitted daily to a requirement that the data is collected and transmitted to at least every 4 hours (see Rec. 14-09). Rec. 14-09 is to be reviewed no later than 2017, and at that time the ICCAT SCRS is to provide advice on the VMS data that would assist the SCRS in carrying out its work, including frequency of transmission for different ICCAT fisheries.

11. CCSBT. The Commission for the Conservation of Southern Bluefin Tuna (CCSBT) VMS came into effect in October 2008. It requires CCSBT members and cooperating non-members to adopt and implement satellite-linked VMS for vessels fishing for southern bluefin tuna that complies with the relevant VMS requirements of the RFMO in which the fishing for southern bluefin tuna<sup>14</sup> is being conducted (i.e., IOTC, WCPFC, CCAMLR or ICCAT)<sup>15</sup>. The CCSBT VMS resolutions<sup>16</sup> requires that when members and cooperating non-members are fishing for southern bluefin tuna outside of these RFMO convention areas, the IOTC VMS requirements must be followed. The CCSBT has adopted its own reporting requirements for when an ALC unit is not functioning.<sup>17</sup>

### **Straddling Fish Stocks and Discrete High Seas Stocks RFMOs**

12. NAFO. The Northwest Atlantic Fisheries Organization (NAFO) VMS regulations (Article 26 of the NAFO Conservation and Enforcement Measures<sup>18</sup>) require that NAFO Parties implement a satellite-based VMS for all fishing vessels used or intended for use for the purposes of commercial fishing activities conducted on fisheries resources in the NAFO Regulatory Area. Flag States establish and operate the VMS for vessels flying their flag and fishing in the NAFO Regulatory Area. The NAFO regulations also prescribe a number of operational requirements for these national programs. In contrast to most other RFMOs, the data from NAFO Parties are sent from the flag State FMC to the NAFO Secretariat in near-real time (not later than 24 hours after receipt), and vessels may submit VMS data directly to the Secretariat. VMS reports are also examined in the annual NAFO Compliance Review. The NAFO regulations also require that Parties maintain VMS reports received from vessels flying their flag in a computer readable format for not less than three years.

13. NEAFC. The Northeast Atlantic Fisheries Commission (NEAFC) approved its Scheme of Control and Enforcement<sup>19</sup> in 1998, which contains its VMS requirements, and it came into force on 1 July 1999. Although the VMS specific requirements could be implemented up to 1 January 2000, most flag States were implementing a consistent VMS data transfer in 1999. NEAFC's VMS regulations (Article 11 of the Scheme of Control and Enforcement) require that NEAFC Parties implement a satellite-based VMS for all fishing vessels used or intended for use

---

<sup>14</sup> These other tuna RFMOs have the competence to manage tropical tuna species and certain other highly migratory tuna species, such as albacore. CCSBT is recognized by these RFMOs as having the primary responsibility for the conservation and management of southern bluefin tuna stocks.

<sup>15</sup> [http://www.ccsbt.org/site/monitoring\\_control\\_surveillance.php](http://www.ccsbt.org/site/monitoring_control_surveillance.php)

<sup>16</sup> Resolution on the Development and Implementation of a Vessel Monitoring System, adopted at the Thirteenth Annual Meeting - 10-13 October 2006. Resolution on Establishing the CCSBT Vessel Monitoring System, adopted at the Fifteenth Annual Meeting - 14-17 October 2008.

<sup>17</sup> *Ibid.*

<sup>18</sup> Serial No. N6001, NAFO/FC Doc. 12/1

<sup>19</sup> <http://www.neafc.org/book/export/html/1342>

for the purposes of commercial fishing activities conducted on fisheries resources in the NEAFC Regulatory Area. Flag States establish and operate the VMS for vessels flying their flag and fishing in the NEAFC Regulatory Area. The NEAFC regulations also prescribe a number of operational requirements for these national programs. The data from NEAFC Parties are sent from the flag State FMC to the NEAFC Secretariat “without delay,”<sup>20</sup> and vessels may submit VMS data directly to the Secretariat. The NEAFC regulations also require that Parties maintain VMS reports received from vessels flying their flag in a computer readable format for not less than three years.

14. CCAMLR. The Commission for the Conservation of Antarctic Living Resources (CCAMLR) adopted its VMS in 1998 (and began to operate it in 2001), and amended these requirements most recently in 2013.<sup>21</sup> The CCAMLR VMS regulations require that CCAMLR Parties implement a satellite-based VMS for all fishing vessels licensed to operate in the CCAMLR Convention Area that allows for the continuous reporting of their position in the Convention Area for the duration of the license. Flag States establish and operate the VMS for vessels flying their flag, but CCAMLR Conservation Measure 10-04 prescribes a number of detailed operational requirements. Similar to NEAFC and NAFO, each CCAMLR Party must forward VMS reports and messages received to the CCAMLR Secretariat as soon as possible, but not later than 4 hours after receipt for certain exploratory longline fisheries, or not later than 10 working days after departure from the Convention Area for all other fisheries. In addition, vessels may submit VMS data directly to the Secretariat. CCAMLR has adopted its own reporting requirements and procedures for when an ALC unit is not functioning and established data formats for VMS reports/messages (Annex A to Conservation Measure 10-04) and protocols for the security and confidentiality of VMS information (Annex B of Conservation Measure 10-04).

15. SEAFO. The South East Atlantic Fisheries Organization (SEAFO) adopted its VMS requirement through Conservation Measure 07/06, which required members to operate a satellite-based VMS for vessels flying their flag in April 2006. The SEAFO VMS requirements are now part of its System of Observation, Inspection, Compliance and Enforcement (Articles 11 and 13)<sup>22</sup> (most recently amended in December, 2013). SEAFO’s VMS regulations require that SEAFO Parties implement a satellite-based VMS for all fishing vessels used or intended for use for the purposes of commercial fishing activities conducted on fisheries resources in the SEAFO Convention Area. Flag States establish and operate the VMS for vessels flying their flag and fishing in the SEAFO Area. The SEAFO regulations also prescribe a number of operational requirements for these national programs, including manual reporting in the event of a unit breakdown, reporting frequencies, etc. The VMS reports received by SEAFO Parties are to be sent to the SEAFO Executive Secretary as soon as possible after receipt, but not later than 24 hours after receipt by the flag State FMC. SEAFO has adopted data exchange formats for VMS

---

<sup>20</sup> In practice, “without delay” for VMS data equals a time frame of up to 2 minutes with the majority of VMS messages being transmitted within seconds. The exception is for vessels operating north of parallel 70° in the winter when, during that period and on those latitudes, the INMARSAT system (geostationary) is normally replaced by the ARGOS system (orbital) and the “delivery” time for data transmission (vessel/satellite/LES/flag State) increases. (NEAFC Secretariat, *personal communication*).

<sup>21</sup> Conservation Measure 10-04 (2013) Automated satellite-linked Vessel Monitoring Systems (VMS)

<sup>22</sup> [http://www.seafo.org/ConservationMeasures/2014%20CM/SEAFO\\_SYSTEM\\_2014.pdf](http://www.seafo.org/ConservationMeasures/2014%20CM/SEAFO_SYSTEM_2014.pdf)

reports/messages (Annex III to its System of Observation, Inspection, Compliance and Enforcement).

### **Automatic Identification System (AIS)**

16. Automatic Identification System (AIS) is a system used on ships and by vessel traffic services for tracking, identifying and locating vessels by automatically and electronically broadcasting and exchanging position, course, speed and other data with ships that are nearby, AIS land-based stations, aircraft and satellites. AIS is a supplement to other systems, such as marine radar, for collision avoidance. AIS is composed of a radio transceiver and a positioning system, and can be integrated with other navigation equipment on board a ship. Vessels with AIS can be tracked by land-based AIS stations when within range of the coast, and farther out at sea by satellites that are fitted with special AIS receivers. Unlike VMS units, AIS units can be individually programmed by vessel operators to transmit additional data attributes (e.g., vessel type, size, length, flag State) and thus are not tamper-proof. There are currently several civilian satellites that receive AIS transmissions that are then sold to the public through subscriptions, a practice that has been controversial within the IMO.<sup>23</sup> The limited number of civilian satellites in orbit capable of receiving and processing AIS signals may result in gaps in global coverage of transmissions (i.e., 2-3 hours between data reports). As new satellites are deployed with AIS receivers, these gaps should be reduced in the future.<sup>24</sup> The International Maritime Organization International Convention for the Safety of Life at Sea (SOLAS)<sup>25</sup> requires that international voyaging ships of 300 GT or greater, cargo ships of 500GT or greater not engaged in international voyages, and all passenger ships (regardless of size) carry AIS.<sup>26</sup> Regulation 19 requires that AIS automatically transmit information on the ship's identity, type, position course, speed, and other safety related information, automatically receive such data from other ships and exchange data with shore based stations. At present thousands of fishing vessels are carrying and reporting position data through AIS across the world's oceans.<sup>27</sup> As a result, while not a suitable substitute for VMS given particular characteristics (e.g., that the units are not tamper-proof, there are no procedures for manual reporting if the unit fails, data confidentiality challenges, etc), AIS can serve to complement VMS and provide for public oversight of vessel movements at sea that is not possible with current RFMO VMS programs that are closed systems

---

<sup>23</sup> At its 79th session in December 2004, the IMO Maritime Safety Committee (MSC) agreed that, regarding freely available AIS-generated ship data, on the world-wide web and the publication on the world-wide web or elsewhere of such data transmitted by ships could be detrimental to the safety and security of ships and port facilities. The MSC further agreed that this practice was undermining the efforts of the Organization and its Member States to enhance the safety of navigation and security in the international maritime transport sector. The Committee condemned this publication of AIS data transmitted by ships and urged Member Governments, subject to the provisions of their national laws, to discourage those who make available AIS data to others for publication on the world-wide web, or elsewhere from doing so. (<http://www.imo.org/OurWork/Safety/Navigation/Pages/AIS.aspx>)

<sup>24</sup> SkyTruth, *personal communication*.

<sup>25</sup> Regulation 19 of SOLAS Chapter V – Carriage requirements for ship borne navigational systems and equipment; Resolution A.917(22) – Guidelines for the onboard operational use of ship borne automatic identification systems (AIS); MSC.74(69) - Recommendation on Performance Standards for Universal Automatic Identification System (AIS)

<sup>26</sup> [http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Safety-of-Life-at-Sea-\(SOLAS\)-1974.aspx](http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Safety-of-Life-at-Sea-(SOLAS)-1974.aspx)

<sup>27</sup> SkyTruth, *personal communication*.



where data is not publically accessible.

## Section II

### Best Practice Elements

17. Section I reviewed the VMS programs in use in nine RFMOs and AIS. Based on this review, the following set of best practice elements for VMS programs that can represent global standards have been identified and categorized below. These elements are consistent with and build on the operational performance requirements outlined in the VMS Supplement of the Food and Agriculture Organisation (FAO) Technical Guidelines for Responsible Fisheries No. 1 (Fishing Operations),<sup>28</sup> which also made specific recommendations on common data exchange formats and protocols for VMS. The elements outlined in this Section were identified as those that promote transparency, ensure the availability and utility of VMS data to monitor the implementation of conservation measures and combat IUU fishing, support scientific analyses or research programs, and minimize the risk of false reports, gaps in position reporting, or tampering with the ALC units.

18. Applicability to vessels sizes and types. The VMS should apply to all those vessels operating in the RFMO convention area that are required to be on the RFMO's vessel record (with the exception of artisanal and recreation vessels), including supply or cargo vessels, reefers and carriers, or are authorized to engage in fishing-related operations, such as transshipment. If the VMS is limited to those fishing in areas beyond national jurisdiction only, when the RFMO Convention Area includes both the high seas and waters under national jurisdiction, the program should include provisions for making high seas VMS data available to coastal States for MCS activities within areas under such States' national jurisdiction. In addition, for RFMO VMS programs that are limited to the high seas, and so data that are collected from vessels when they are operating in EEZs are quarantined, the RFMO should consider developing procedures to allow access by authorized coastal State entities to those VMS data that pertain to vessels operating in waters under the national jurisdiction of that coastal State. In NEAFC, for example, VMS data transmission between flag States and coastal States is a requirement through bilateral agreements between all NEAFC Contracting Parties.<sup>29</sup> In general, RFMO VMS programs should be designed to enhance, to the extent practicable, the utility of VMS data in supporting and meeting the RFMO's objectives.

19. Data to be transmitted and formats. At a minimum, VMS programs should require that the unique vessel identification (such as IMO number), position (latitude/longitude), date and time are transmitted from each fishing vessel. It is also recommended that States and RFMO's consider requiring vessel name, course, speed, and in more advanced VMS programs, activity (fishing, transshipping, searching, etc) and catch (such as via an electronic logbook or e-form integrated with the VMS<sup>30</sup>) to be reported from each vessel through the VMS. IATTC

---

<sup>28</sup> <ftp://ftp.fao.org/docrep/fao/003/w9633e/w9633e00.pdf> (1998)

<sup>29</sup> NEAFC Secretariat, *personal communication*.

<sup>30</sup> The Secretariat of the Pacific Community's Oceanic Fisheries Program (SPC-OFP) has developed and is trialing an electronic catch reporting form ("e-TUNALOG"), which allows catch data to be transmitted by email to multiple

encourages the use of VMS to transmit the weekly data report required in the Resolution on At-Sea Reporting (C-03-04). In 1999, NEAFC began to require some vessels to submit catch data using VMS; however, now most vessels use electronic logbooks (Electronic Reporting System). In 2011, NAFO began to require fishing vessels to transmit daily catch notifications of catch quantities by species and location while fishing in the Regulatory Area. SEAFO also requires catch reports be submitted electronically every five days. In developing requirements and tools for electronic catch reporting using VMS, it would be optimal if formats and communications protocols were standardized so that when vessels move between jurisdictions (such as between waters under the national jurisdiction of one or more coastal State or between waters of a coastal State and the high seas) to avoid confusion among vessel operators or the need to carry more than one type of software or tool, and to avoid inoperability between existing coastal State, RFMO, regional or sub-regional arrangement catch and effort databases.

20. Recipients of the VMS reports/messages. RFMO Secretariats should receive individual vessel VMS reports, ideally simultaneously to the flag State FMC. If the VMS reports are sent first to flag State FMCs, then the RFMO Secretariat should receive the individual reports on a “near-real time” basis (e.g., within 24 hours via an automated process that does not involve human intervention). Coastal States should also be able to receive, and use for prescribed purposes, VMS reports for foreign-flagged vessels when they are present in their EEZs, or within a prescribed distance from waters under their national jurisdiction, when those vessels are reporting to an RFMO VMS and those VMS reports do not automatically go to the coastal State.

21. Reporting frequency. VMS programs should require that ALCs used by flag States be continuously operating while in the applicable RFMO convention or regulatory area, or subareas, and capable of transmitting data at least hourly. The precise frequency of the transmission of the VMS data to the RFMO Secretariat and/or the flag State and, where appropriate, coastal States can vary depending on the types of fishing operations and conservation measures being monitored or other MCS needs. One to two hourly transmissions have been recommended for scientific purposes<sup>31</sup> to estimate fishing effort and a typical purse seine set takes approximately 3 hours. Therefore, as a standard, data should be transmitted on a frequency of 3 hours or less.

22. Procedures for defective or inoperable ALC units and alternative reporting. VMS programs should have clear procedures for addressing when an ALC unit malfunctions. These procedures should identify specific time-frames within which the unit must be repaired or replaced, or the vessel returns to port, and how position reports are to be provided to the flag State and/or RFMO and, where appropriate, coastal States by other means and at what interval.

23. Approved ALC types. VMS programs should establish minimum standards for the operational performance, design specifications and security features of ALCs that can be used by vessels reporting to a VMS to ensure consistency and overall integrity of the system.

---

recipients in a format that can be integrated into coastal State or SPC-OFP catch and effort database. It also uses the same form currently required regionally and the data is integrated with a vessel’s VMS data once in the databases.

<sup>31</sup> ISSF Technical Report 2012-10: Report of the 2012 ISSF Stock Assessment Workshop: Understanding Purse Seine CPUE (Rome, Italy, July 16-19, 2012)

24. Tamper-proof requirements. VMS programs should mandate that all ALC units must be sealed, and include official seals or other “tamper evident” mechanisms that will indicate whether the unit has been accessed or tampered with, so as to preserve the security and integrity of data.

25. Use of VMS data and data exchange formats. RFMO VMS programs should establish procedures for the transmission and use of VMS reports by the RFMO Secretariat and RFMO subsidiary bodies for scientific purposes, such as for monitoring the implementation of conservation and management measures and verifying catch or transshipment documentation. These procedures should also facilitate the use of near-real time VMS data for authorized enforcement and inspection purposes that are in accordance with an RFMO MCS scheme. In order to ensure usability of VMS data and the transmission of data between flag States and/or RFMOs, if they have not yet been established,<sup>32</sup> standard reporting formats for VMS messages and protocols and exchanging such data should be developed.

26. Confidentiality rules. The rules to protect the confidentiality and security of VMS data transmitted to the RFMO Secretariat or Contracting Parties should not be overly restrictive such that those data are of limited use for scientific or compliance purposes. For example, each release of VMS data to other Parties for specific defined purposes should not require the consent of the flag State of the vessel providing the VMS reports. As a standard, RFMOs should develop different confidentiality rules for “near-real time” VMS data and “historical” VMS data (e.g., data that is 2 years old or more) that provide more flexibility in the use of collected VMS data, such as for scientific purposes.<sup>33</sup> In addition, a practice in three RFMOs (NEAFC, ICCAT and NAFO) is to require flag States to maintain VMS data for vessels flying their flag in a computerized readable form for at least 3 years. States and other RFMOs should consider such a requirement so that historical VMS data can be used for scientific purposes or other purposes, as appropriate.

27. Two-way systems and polling. VMS programs can be designed to allow for remote polling of the vessel by an operator (such as in the management authorities of the flag State, coastal State or RFMO Secretariat). The WCPFC program addresses polling and in NEAFC some flag States also monitor their flagged vessels by specifying that the vessel’s VMS system be capable of being polled. Such two-way systems that allow for remote polling allow an operator to vary the frequency of the position information it receives in response to changes in the behavior and geographic location of a vessel. This can be of value to fisheries managers and enforcement authorities. For instance, single daily reports may be sufficient verification when a

---

<sup>32</sup> For instance, ICCAT, NEAFC, NAFO and SEAFO use the North Atlantic Format (NAF).

<sup>33</sup> For example, both the WCPFC and ICCAT allow access to VMS data by their scientific experts or service providers. The WCPFC Rules and Procedures for the Protection, Access to, and Dissemination of High Seas Non-Public Domain Data and Information Compiled by the Commission for the Purpose of MCS Activities and the Access to and Dissemination of High Seas VMS Data for Scientific Purposes (2009) prescribes a two-year time lag for access to high seas VMS data by the Authorized Management Entities and Personnel of Members. For near-real time high seas VMS data, the WCPFC allows these data to be made available for planning tagging programs, in accordance with those rules and procedures, and only with the consent of the Member(s) who provided the data to the Commission. The ICCAT Rules and Procedures for the Protection, Access to, and Dissemination of Data Compiled by ICCAT (2010) authorize the Standing Committee on Research and Statistics (SCRS) to use VMS data for scientific purposes, after signing the Commission’s confidentiality protocol.

vessel is in port. However, while the vessel is underway and engaged in fishing activities at sea, higher frequency reports can be helpful for monitoring compliance with certain measures, such as closed areas.<sup>34</sup> RFMOs should consider such a requirement for their VMS programs, if they do not already have them.

### Section III

#### Recommendations/Conclusions

28. Section I surveyed existing RFMO VMS programs in the Atlantic, Pacific, Indian and Southern Oceans and from these programs Section II identified a set of best practice elements that could represent a set of global VMS standards.

29. Using the best practices identified, while there is room to improve in some areas in several of the programs reviewed, the VMS programs in the north Atlantic (NAFO and NEAFC) and south Atlantic (SEAFO), western Pacific (WCPFC) and Southern Ocean (CCAMLR) set a high standard. The programs in CCSBT, IOTC and IATTC and ICCAT also exhibit many of the best practices outlined in Section II, but have room to improve in the coverage of the program (e.g., in ICCAT many of the more progressive elements apply only to the bluefin fishery), the use and availability of VMS data to the Secretariat, scientists or for compliance purposes (IATTC, IOTC, and CCSBT), and the establishment of procedures and standards, such as in the event of an ALC breakdown (IATTC and IOTC).

30. New RFMO VMS programs, or existing programs that are being enhanced or could be strengthened, are encouraged to consider the best practices standards outlined in Section II of this technical paper as a guide in the development, improvement and harmonization of those VMS programs. Harmonization appears to be one of the more critical needs, particularly for those RFMOs that manage similar species, share the same oceans or have overlapping convention areas. For example, the CCSBT program utilizes the requirements of the relevant VMS program of the RFMO in which the fishing for southern bluefin tuna is being conducted (i.e., IOTC, WCPFC, CCAMLR or ICCAT), and identifies the IOTC VMS requirements as a default. Therefore, the requirements vary among vessels active in the fishery resulting in a lack of consistency in the functioning and application of core elements of a VMS, such as applicable vessel size, reporting frequencies, recipients and use of the data as the vessel move between ocean areas. However, nearly all CCSBT vessels are simultaneously fishing under the jurisdiction of two RFMOs (the CCSBT and the RFMO in whose Convention Area they are fishing at the time). As a result, the CCSBT has taken the approach that requiring a vessel to conform to the particular RFMO's VMS rules and procedures, as opposed to adopting its own set, is preferable to creating a situation where a vessel may have to implement two different VMS systems simultaneously.<sup>35</sup> The CCSBT case exemplifies why harmonizing VMS programs across RFMOs, particularly tuna RFMOs where vessels routinely move between Convention Areas, would be advisable to reduce inconsistencies and MCS lacunae. In addition, with

---

<sup>34</sup> <ftp://ftp.fao.org/docrep/fao/003/w9633e/w9633e00.pdf> (1998)

<sup>35</sup> *CCSBT Secretariat, personal communication.*

advances in VMS and electronic reporting technologies, the use of, or integration with, VMS to transmit catch data is another area RFMOs and States are encouraged to operationalize.

31. In addition, recognizing that the effectiveness of VMS in monitoring the activities of fishing vessels is well documented, and given the prevalence of RFMO requirements for fishing, and in some cases carrier or supply vessels, to install VMS units and report specific data at specific intervals, coastal States have a powerful tool available to increase the effectiveness of their MCS in their EEZ. For instance, coastal States could require, as a condition of licensing or chartering agreements, that all foreign fishing vessels operating in waters under their national jurisdiction carry VMS and report simultaneously to the coastal State and the flag State FMCs.

### **Acknowledgments**

The author wishes to thank and acknowledge the nine international subject matter experts with decades of experience in RFMO (SEAFO, NEAFC, IOTC, WCPFC, CCAMLR, CCSBT and IATTC) and national (United States, NOAA) VMS programs that reviewed, in their personal capacities, earlier versions of this technical paper, and provided valuable comments.

**Table 1. Summary of Core Operational Elements of Existing RFMO VMS Programs and AIS**

	WCPFC	IATTC	IOTC	CCSBT	ICCAT	NAFO	SEAFO	NEAFC	CCAMLR	AIS
<b>Applicable vessel size</b>	Any fishing vessel operating on the high seas of the Convention Area (and within EEZs under specific circumstances, see para 7)	24m or greater LOA	Vessels >24m fishing on the high seas for species covered by the IOTC and vessels <24m operating outside of its EEZ and fishing for species covered by the IOTC Agreement	Varies with RFMO Convention Area where SBT vessels are fishing	20m between perpendiculars or 24 m LOA  >15m for vessels fishing for Eastern Atlantic and Med bluefin	Any fishing vessel operating in the NAFO Regulatory Area	Any fishing vessel operating in the SEAFO Regulatory Area	Fishing vessels > 20m between perpendiculars or 24 m LOA which fish, or plan to fish, in the Regulatory Area	All fishing vessels licensed in accordance with Conservation Measure 10-02	Required by IMO on vessels >100GT (exempts most fishing vessels)
<b>Applicable vessel type</b>	All fishing vessels (as defined by the Convention) authorized to operate in the Convention Area that must be on the Record of Fishing Vessels and that are covered by the VMS CMM.	All commercial fishing vessels operating in the EPO and harvesting tuna or tuna-like species.  All carrier vessels authorized for at-sea transshipment under Resolution C-12-07	Fishing vessel  All carrier vessels authorized for at-sea transshipment under Resolution 12/05	Varies with RFMO Convention Area where SBT vessels are fishing	Fishing vessel  For bluefin tuna, VMS requirements apply also to vessels other than fishing vessels (supply, towing, etc)  All carrier vessels authorized for at-sea transshipment under Rec. 12-06  For bluefin, all tugs and towing vessels (Rec.06-07)	Any vessel equipped for or engaged in fishing activities, including fish processing, trans-shipment or any other activity in preparation for or related to fishing, including exploratory fishing	Fishing vessels, include all support/reefer/cargo vessels involved in trans-shipments.	Fishing vessels, include all support/reefer/cargo vessels involved in trans-shipments or factory/processing vessels.  Some NEAFC Contracting Parties apply the VMS regulation to commercial fishing vessels of all sizes; others apply it to vessels from 12m.	Fishing vessels only that are licensed in accordance with Conservation Measure 10-02	Depends on the size of the vessel or ship.
<b>Required</b>	Vessel ID (WIN): vessel	Vessel ID; position	Vessel ID; position	Vessel ID; geographic	Vessel ID; most recent	Vessel ID; most recent	Vessel ID; most recent	Vessel ID; (longitude.	Vessel ID; position	14 standard attributes:

ISSF Technical Report 2016-02

	WCPFC	IATTC	IOTC	CCSBT	ICCAT	NAFO	SEAFO	NEAFC	CCAMLR	AIS
<b>recipients (flag State, coastal State and/or RFMO)</b>	<p>date and time; activity</p> <p>To flag State &amp; Commission simultaneously (per Article 24(8))</p> <p>Coastal States also have access to high seas and “in-zone” VMS data via specific measures and data rules (e.g., 100 nm buffers and special high seas management area, and “Flick the Switch”)</p>	<p>of error less than 100m; date and time, and speed and course.</p> <p>If practicable, the VMS equipment may be used to transmit to the Director the data for weekly at-sea reports (C-03-04 <i>Resolution on At-Sea Reporting</i>)</p>	<p>less than 500 m; date and time</p>	<p>data requirements vary with RFMO Convention Area where SBT vessels are fishing</p>	<p>margin of error less than 500m; date and time</p> <p>For the bluefin fishery, also must report: radio call sign; trip number; vessel name, Contracting Party vessel registration details; and IMO or vessel side number</p> <p>To flag State FMC.</p> <p>Also, flag States are to cooperate with coastal State, to ensure that the position messages transmitted by its vessels while fishing in waters under the jurisdiction of that coastal State are transmitted automatically and in real time to the FMC of the coastal State that has authorized the fishing activity.</p>	<p>with margin of error less than 500 m; date and time; vessel course and speed</p> <p>Flag State FMCs receive the data.</p> <p>Parties send position reports to the SEAFO Secretariat in near-real time (no later than 24 hours after it receives them).</p> <p>Parties send position reports to the NAFO Secretariat in near-real time (no later than 24 hours after it receives them).</p> <p>Flag States may authorize its vessels to transmit VMS data directly to the Secretariat</p>	<p>than 500 m; date and time; vessel course and speed</p> <p>Flag State FMCs receive the data.</p> <p>Parties send position reports to the SEAFO Secretariat in near-real time (no later than 24 hours after it receives them).</p>	<p>less than 500 m; date and time; and, where applicable, data relating to the catch on board and data relating to trans-shipment</p> <p>Flag States FMCs receive data.</p> <p>Flag States may authorize vessels to transmit VMS data directly to the Secretariat.</p> <p>Parties must communicate VMS reports and messages to the NEAFC Secretariat without delay.</p> <p>If there is a technical malfunction, VMS reports must be transmitted to the Secretary within 24 hours of receipt.</p>	<p>less than 500m; date and time</p> <p>To flag State FMC.</p> <p>Each Party must forward VMS reports and messages received to the CCAMLR Secretariat as soon as possible, but not later than 4 hours after receipt for certain exploratory longline fisheries; or not later than 10 working days after departure from the Convention Area for all other fisheries.</p> <p>Flag State also notify by email or other means the CCAMLR Secretariat within 24 hours of each entry to, exit from and movement between subareas and divisions by each of its fishing vessels. When a vessel intends to enter a closed area, or an area for</p>	<p>position, heading, course, speed</p> <p>Can be programmed to transmit other data types (vessel type, size, length, flag State, etc.)</p> <p>Radio frequency broadcasts can be received by land-based receiving stations, other vessels and satellites</p>

ISSF Technical Report 2016-02

	WCPFC	IATTC	IOTC	CCSBT	ICCAT	NAFO	SEAFO	NEAFC	CCAMLR	AIS
									<p>which it is not licensed to fish, the Flag State shall provide prior notification to the Secretariat of the vessel's intentions.</p> <p>The flag State may permit or direct that notifications be provided by the vessel directly to the Secretariat.</p>	
<b>Data collection frequency and polling</b>	<p>Polling: Any request by the WCPFC monitoring authority for a vessel's current position must receive a response within 90 minutes</p> <p>For vessels carrying an ALC using the ARGOS system, the Commission VMS uses the ARGOS proprietary positioning system to verify the GPS calculated positions provided by the vessel's ALC</p>	Data is to be collected every 4 hours for longliners and 2 hours for other vessels	Data is to be collected at least once every 4 hours	Varies with RFMO Convention Area where SBT vessels are fishing	<p>Collected and transmitted every 4 hours.</p> <p>For the bluefin fishery, reports are also sent to the Secretariat by the FMC</p>	Position reports are transmitted at one hour intervals	Position reports are transmitted at least two hour intervals	Position reports are transmitted at least once every hour when operating in the NEAFC Regulatory Area	Communicate required data to flag State FMC at least every 4 hours	Broadcasts 5 times a minute with a 20-30nm range



ISSF Technical Report 2016-02

	WCPFC	IATTC	IOTC	CCSBT	ICCAT	NAFO	SEAFO	NEAFC	CCAMLR	AIS
	Reporting frequencies: ALCs must be capable of transmitting data hourly. This standard can vary depending upon the fishery, applicable measures or for MCS purposes.									
<b>Requirements in case of VMS/ALC breakdown (including manual reporting)</b>	<p>Report to the Secretariat every 6 hours.</p> <p>If automatic reporting to the Commission VMS has not been re-established within 30 days, the flag state shall order the vessel to cease fishing, stow all fishing gear and return to port.</p> <p>The vessel cannot start fishing on the high seas until the ALC/MTU is confirmed as operational.</p> <p>In exceptional circumstances, the flag State</p>	<p>VMS device must be repaired or replaced within 1 month; vessel cannot start new trip until unit is operational.</p> <p>When a device stops functioning or has a technical failure during a fishing trip lasting more than 1 month, the repair or replacement has to take place as soon as the vessel enters a port; the vessel cannot start new trip until unit is operational.</p>	<p>VMS unit must be repaired or replaced within 1 month; vessel cannot start new trip until unit is operational</p> <p>Manual reporting via alternative means (radio, email, fax) every 4 hours</p> <p>The master or the owner of the vessel communicate immediately to the FMC of the flag State, and if the Flag State so desires also to the Secretariat, giving the time they detected the failure or non-functioning of</p>	<p>Manual reporting to the flag State, at a frequency that allows the fishing activity of a vessel to be identified, the vessel's identification, its geographical position, and the date and time.</p> <p>Other requirements vary with RFMO Convention Area where SBT vessels are fishing.</p>	<p>VMS unit must be repaired or replaced within 1 month; vessel cannot start new trip until unit is operational</p> <p>Manual reporting via alternative means (radio, fax) at least daily</p> <p>For the bluefin fishery, manual reports are to be sent within 24 hours</p> <p>For time/area closure in Rec. 11-01 (bigeye and yellowfin tuna), if the VMS stops functioning or has a technical failure when the vessel is</p>	<p>VMS unit must be repaired or replaced within 1 month; vessel cannot start new trip until unit is operational</p> <p>Manual reporting via alternative means (radio, email, fax) at least once every four hours</p> <p>When an inspector observes a fishing vessel in the Regulatory Area and has not received VMS data they shall</p>	<p>In the event of a technical failure or non-operation of the VMS unit, the device must be repaired or replaced within 1 month. After this period, the vessel is not authorized to begin a new trip with a defective unit.</p> <p>If the trip is lasting more than one month, the repair or the replacement has to take place as soon as the vessel enters a port; vessel not authorized to begin a new trip without the VMS unit repaired or replaced.</p> <p>A vessel with a non-functioning unit must manually report to the flag State FMC at least daily.</p>	<p>VMS unit must be repaired or replaced within 1 month; vessel cannot start new trip until unit is operational</p> <p>Where a VMS stops functioning and a trip lasts more than 1 month, the repair or the replacement has to take place as soon as the vessel enters a port; cannot start new trip until unit is operational</p> <p>Starting in March 2014, the requirement is that vessels with a defective transponder will have to report manually at least every 4 hours.</p>	<p>VMS unit must be repaired or replaced within 2 months; vessel cannot start new trip until unit is operational</p> <p>Manual reporting via alternative means (radio, email, fax) every 6 hours</p> <p>Otherwise, same as IOTC.</p>	<p>Only if required by a flag State, captain or shipping insurance company, etc.</p>

ISSF Technical Report 2016-02

	WCPFC	IATTC	IOTC	CCSBT	ICCAT	NAFO	SEAFO	NEAFC	CCAMLR	AIS
	<p>may extend the time before returning to port by an additional consecutive 15 days. During this time the vessel will report its position manually every 4 hours to the Secretariat while on the high seas.</p>		<p>the VMS.</p> <p>If the flag State has not received for 12 hours VMS data transmissions or has reasons to doubt the correctness of the data, it shall as soon as possible notify the master or the owner or the representative of the vessel.</p> <p>If this occurs more than 2 times within 1 year, the flag State must investigate the matter, including having an authorized official check of the ALC, so to establish whether it has been tampered with.</p> <p>The results of the investigation to be sent to the IOTC Secretariat within 30 days of completion.</p> <p>Parties must, as soon as</p>		<p>inside the area/time closure area the flag State is to require the vessel to exit immediately and it is not to be authorized to re-enter the area again without the VMS being repaired or replaced.</p>	<p>inform the master of the vessel and the Executive Secretary.</p> <p>The flag State must ensure that the vessel is informed when its VMS appears defective or non-functional</p>				

ISSF Technical Report 2016-02

	WCPFC	IATTC	IOTC	CCSBT	ICCAT	NAFO	SEAFO	NEAFC	CCAMLR	AIS
			possible but no later than 2 working days following detection or notification of technical failure or non-functioning of the VMS, forward the geo-graphical positions to the Secretariat, or ensure that these positions are forwarded to the Secretariat by the master or the owner of the vessel, or their representative.							
<b>Requirement for specific ALC set types</b>	Yes, minimum standards for ALCs and a list of approved ALCs.  The Secretariat may recommend the removal of ALC models from the list if they don't meet the standard, or do not have the ability to successfully report to the Commission VMS. CCMs then have 3	No	No	Varies with RFMO Convention Area where SBT vessels are fishing	No	No	No	Yes	No	No

ISSF Technical Report 2016-02

	WCPFC	IATTC	IOTC	CCSBT	ICCAT	NAFO	SEAFO	NEAFC	CCAMLR	AIS
	years to ensure that its flagged vessels replace non-type approved ALCs with and approved ALC.									
<b>Tamper-proof and operational at all times</b>	<p>Yes. VMS must include an automated alert to report when vessels enter or exit the high seas of the Convention Area.</p> <p>Approved ALCs must be fitted with a physical security mechanism to prevent access to the processing unit.</p>	Yes	<p>Yes. Unless in port for more than one week, (with prior notification and approval of the flag State), and first position report following the re-powering shows the vessel has not changed position compared to the last report.</p> <p>Must be in a sealed unit with official seals that indicate whether the unit has been accessed or tampered with.</p>	<p>Yes. Must be in a sealed unit with official seals that indicate whether the unit has been accessed or tampered with.</p> <p>Other requirements vary with RFMO Convention Area where SBT vessels are fishing.</p>	<p>Tamper proof requirement is not explicit.</p> <p>Requirement for an autonomous system able to automatically transmit a message to the FMC of the flag CPC allowing for continuous tracking of position.</p>	Yes	<p>Yes.</p> <p>Requirement for vessels to be equipped with a Vessel Locating Device able to automatically transmit VMS data to the flag State FMC; allowing continuous tracking of the position of the vessel by the flag State.</p>	Yes	<p>Yes. Unless in port for more than one week, (with prior notification and approval of the flag State), and first position report following the re-powering shows the vessel has not changed position compared to the last report.</p> <p>ALC must be of a type and configuration that prevent the input or output of false positions, and that are not capable of being overridden, whether manually, electronically or otherwise.</p> <p>ALC device must be located within a sealed unit protected by official seals that indicate</p>	Not tamper-proof. Units can be individually programmed.

ISSF Technical Report 2016-02

	WCPFC	IATTC	IOTC	CCSBT	ICCAT	NAFO	SEAFO	NEAFC	CCAMLR	AIS
									whether the unit has been accessed or tampered with.	
<b>Use of data: Science Committee</b>	<p>May be used by the Commission and Members for scientific purposes.</p> <p>VMS data shall be made available to Authorized Management Entities of members for scientific purposes with a two-year time lag.</p> <p>Near-real time high seas VMS data will be made available to Authorized Management Entities of members for planning tagging programs only with the consent of the member(s) who provided the VMS data to the Commission.</p>	Article XVIII provides scope for provision of data to the Secretariat, but currently no explicit provisions providing for the use by the Scientific Committee	Currently no explicit provisions providing for the use by the Scientific Committee	No.	The Secretariat may provide VMS data provided by CPCs to the SCRS, at its request.	Summary VMS data may be available to the Scientific Council.	Summary VMS data may be available to the Scientific Committee.	<p>Summary VMS data may be available to the Permanent Committee on Management and Science.</p> <p>VMS data is also sent to ICES who provides NEAFC with scientific advice.</p>	VMS data may be used for scientific purposes, with the consent of the Party that provided the data.	<p>Data is publicly available with a subscription (~\$18k/year).</p> <p>Such data could be voluntarily provided to an RFMO scientific committee.</p>
<b>Use of data: Compliance Committee</b>	Maybe used by the Commission and Members for compliance purposes.	Not currently reviewed in the IATTC Review Committee	Compliance Committee reviews implementation of Resolution 06/03 for	VMS summary reports are provided to the CCSBT Compliance	Executive Secretary reports to the Compliance Committee annually on	VMS position reports are examined by NAFO in their Annual	SEAFO's Compliance Committee reviews implementation of the VMS measures and reporting	NEAFC Permanent Committee on Control and Enforcement reviews the	CCAMLR Standing Committee on Implementation and Compliance	Such data could theoretically be used in an RFMO compliance

ISSF Technical Report 2016-02

	WCPFC	IATTC	IOTC	CCSBT	ICCAT	NAFO	SEAFO	NEAFC	CCAMLR	AIS
			VMS.	Committee.	any issue related to the implementation of the VMS, and the results of relevant investigations made by the flag CPCs concerned.	Compliance Review to assess compliance with NAFO measures and reporting obligations.	obligations.	implementation of the Scheme of Control and Enforcement, including VMS	reviews the implementation of the VMS conservation measure.  Compliance with 10-04 is monitored and reported annually on as part of the CCAMLR Compliance Evaluation Procedure (CM 10-10).  Data from individual vessels is used by States only for compliance and search and rescue purposes.	committee.
<b>Use of data: Secretariat and/or States</b>	Members may get access to near-real time high seas VMS reports for conducting high seas MSC activities when they have an MCS presence or capability on the high seas.  Coastal State may also have access to high seas VMS reports for a 100nm buffer outside their	For flag States only.	For Flag States only.	Members and CNMs can request another member or CNM to provide VMS data on certain vessels if there is a suspected infraction of CCSBT measures.	Generally for flag States only.  For the bluefin fishery, reports can be made available by the Secretariat to Parties engaged in at sea operations under the ICCAT Scheme of Joint International inspection.	VMS data is provided to all Parties with an inspection presence under the Scheme of Joint International inspection, and for search and rescue and maritime safety purposes.	Generally for flag States only, but may be released under the Rules for Access and Use of SEAFO Data	Secretariat shall make available as soon as possible VMS data to Parties with an active inspection presence in the NEAFC Regulatory Area. This requirement is fully automated and operates 24/7.	Secretariat monitors VMS data. If there is vessel in an area or subarea for which no license details have been provided by the flag State, or if the vessel is in any area or subarea for which the flag State or fishing vessel has not provided prior notification, then the Secretariat notifies the flag	Such data could be voluntarily provided to an RFMO Secretariat,  Any State could have access if they purchase a subscription.

ISSF Technical Report 2016-02

	WCPFC	IATTC	IOTC	CCSBT	ICCAT	NAFO	SEAFO	NEAFC	CCAMLR	AIS
	EEZ, and “in zone” VMS data in accordance with specific rules and provisions								<p>State. Its explanation is reviewed at the next annual meeting.</p> <p>The CCAMLR Secretariat also daily maintains a list of vessels submitting VMS reports and messages on a password-protected section of the CCAMLR website. This list is divided into subareas and divisions, without indicating the exact positions of vessels, and is updated when a vessel changes subarea or division.</p> <p>States may have access to VMS data for planning or engaging in active surveillance presence and/or inspections in a specified subarea or division; verifying <i>Dissostichus</i> catch document (DCD); or supporting</p>	

ISSF Technical Report 2016-02

	WCPFC	IATTC	IOTC	CCSBT	ICCAT	NAFO	SEAFO	NEAFC	CCAMLR	AIS
									search and rescue activities.	
<b>Rules for the use of VMS data</b>	Yes. Specified in <i>the 2009 MCS Data Rules and Procedures</i> (see footnote 31)	Any VMS information provided to IATTC must be maintained in line with the IATTC rules on data confidentiality	No.	Yes. Specified in Annex I of the 2008 CCSBT Resolution	Yes. Use limited only to Joint International inspections.  Data 3 years old or more is provided to the science committee (SCRS) for scientific purposes only for eastern bluefin	Yes. Specified in Annex II.B of the NAFO Conservation and Enforcement measures	Yes. Rules for Access and Use of SEAFO Data (2012)	Yes. Specified in Appendix I of Annex IX (Secure and confidential treatment of electronic reports and messages) and Rec.11 (2013) establishing an Information Security Management System for NEAFC	Yes. The CCAMLR Secretariat and all Parties receiving VMS data must treat data received in accordance with confidentiality rules established by the Commission (in Annex 10-04/B)	No privacy restrictions.  Data is publically available with a subscription (approximately \$18k/year)