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LEGAL ISSUES RELATING TO VESSEL MONITORING SYSTEMS

Philippe Cacaud²

TABLE OF CONTENTS

1. Introduction
2. Legal basis for the use of VMS
 - 2.1 International law
 - 2.2 Multilateral and bilateral fishing agreements
 - 2.3 National law
3. Legal issues
 - 3.1 Confidentiality of VMS information
 - 3.1.1 VMS information
 - 3.1.2 Disclosure
 - 3.1.3 Access
 - 3.1.4 Use
 - 3.2 Intellectual property
 - 3.3 Evidence
 - 3.4 Maritime boundaries
4. VMS regulations
 - 4.1 As a condition of fishing licences
 - 4.2 Scope
 - 4.3 Standards and requirements relating to VTUs
 - 4.3.1 VTU minimum performance standards
 - 4.3.2 Approval
 - 4.3.3 Registration
 - 4.3.4 Procedures in case of VTU failure
 - 4.4 Responsibilities of permit holder and master
 - 4.5 Offences and penalties

1. [Inter-regional Programme of] Assistance to developing countries for the implementation of the *Code of Conduct for Responsible Fisheries* – Sub-programme C: Assistance to developing countries for upgrading their capabilities in monitoring, control and surveillance (MCS)

2. Legal Consultant, FAO

5. Elements required in VMS regulations

- 5.1 Definitions
- 5.2 Scope
- 5.3 Fisheries monitoring agency
- 5.4 Minimum performance standards
- 5.5 Approval
- 5.6 Registration
- 5.7 Procedure to be applied in case of VTU failure or malfunction
- 5.8 Offences and penalties

6. Conclusions

ACRONYMS AND ABBREVIATIONS USED

AFMA	Australian Fisheries Management Authority
ALC	automatic location communicator
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
EEZ	exclusive economic zone
FFA	South Pacific Forum Fisheries Agency
FMC	fisheries monitoring centre
FMP	fisheries management plan
MAF	[New Zealand] Ministry of Agriculture and Fisheries
MCS	monitoring, control and surveillance
NAFO	Northwest Atlantic Fisheries Organization
NEAFC	North East Atlantic Fisheries Commission
NMFS	National Marine Fisheries Service (USA)
TAC	total allowable catch
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
VMS	vessel monitoring system
VTU	vessel tracking unit
1 st FFA VMS Legal Workshop	First VMS Legal Workshop, organized by the South Pacific Forum Fisheries Agency (FFA), held in Nadi, Fiji, 22-26 September 1997
2 nd FFA VMS Legal Workshop	Second VMS Legal Workshop, organized by FFA in Nadi, Fiji, 16-18 February 1998
1995 Agreement	Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea (10 December 1982) Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks

1. INTRODUCTION

The need to improve the effectiveness of monitoring, control and surveillance (MCS) and enforcement schemes to ensure the sustainable use of the world's fisheries, both on the high seas and within national jurisdictions, has become a question of crucial importance in the recent years. The fact that most of the traditional fishing grounds the world over are either overfished or in a threatened state calls for the development of new MCS and enforcement mechanisms to remedy this situation. A consensus seems to have formed among fisheries managers and enforcement officers that vessel monitoring systems (VMS) may be one of the key mechanisms to reverse the current state of the world's fisheries.

Increasingly, the limitations of conventional MCS measures are being recognized, essentially the prohibitive costs of carrying out such measures, especially observer programmes and naval and aerial surveillance operations throughout extensive exclusive economic zones (EEZs), marine areas which in certain cases exceed several fold the national land area. It is also recognized that VMS should not be considered as an alternative to conventional MCS measures, but rather as one element of a broader package of management tools. The purpose of MCS schemes is twofold: to ensure compliance with fisheries management rules, and to collect scientific data relating to fishing activities to provide a basis on which sound fisheries management measures can be devised.

Compliance with fisheries management rules, which is crucial to ensure the sustainable use of world's fisheries, can only be achieved if an effective MCS regime is in place. It is this application for which VMS has mostly been proposed, due to its potential for providing timely and accurate information on the position of fishing vessels. Upon receiving such information, enforcement officers from the monitoring agency, if they believe that a vessel is conducting illegal fishing operations, can immediately dispatch a patrol boat or aircraft to the reported place of suspected violation so as to observe the activity of the suspect fishing vessel and, if warranted, inspect it. VMS will complement conventional MCS measures by making them more effective, but could also imply a need for redesigning aerial and naval patrol schemes. However successful a VMS scheme could be at the local or regional level, one should keep in mind that, in view of the increasing mobility of the world's fishing fleets, the issue of compliance with fisheries management rules is global in scope and will thus require a high level of international cooperation to restore the health and assure the sustainability of the world's marine living resources throughout their range.

Catch and effort data are a primary source of information on the status of fisheries, and provide the basis upon which fisheries management measures are established. One of the major benefits of collecting catch and effort data through VMS is the improvement in timeliness of delivery of data to the monitoring agency. This, for instance, can dramatically improve the monitoring in almost real time of exhaustion of allocated quotas or total allowable catch (TAC). It should be noted, however, that, to date, catch and effort reporting has not been a major focus of VMS implementation.

Prior to any further consideration, it is necessary to determine precisely what the concept of VMS refers to. Despite the common assumption, VMS and satellite surveillance are not synonymous. A VMS is a "cooperative" system: i.e., only participating vessels are monitored, since they are the only ones required to carry the appropriate equipment, in contrast to a "non-cooperative" system such as satellite surveillance, aerial and naval surveillance, land-based radar and sea-based sonar, which will detect any vessels located within their operating range.

A VMS Legal Workshop, organized by the South Pacific Forum Fisheries Agency (FFA), held in Nadi, Fiji, 22-26 September 1997 (hereinafter referred to as the 1st FFA VMS Legal Workshop) recommended that, for its purposes, VMS be defined as:

“VMS means the satellite-based reporting system approved by FFA that is capable of monitoring fishing and related activities of fishing vessels, including, but not limited to, the determination of a vessel's identity, GPS position, course and speed, and special codes.”

A VMS consists of several components, namely a transmitter or receiver which is capable of fixing a position (i.e., the transmitter or receiver must have an integral fixing position device, usually based on Global Positioning System (GPS) technology); and an automated reporting system that controls the transmission of the position data, and possibly other data, via a communications system to a fisheries monitoring centre (FMC). The communications system conveys data between the transceiver or transmitter on the vessel and the monitoring agency. For the purpose of monitoring of fishing vessels, satellite-based communications systems are considered as the most suitable since they offer global coverage and high reliability. The most commonly used satellite communications systems for the purpose of fisheries MCS are Inmarsat, Argos and Euteltracs.

The use of VMS in fisheries MCS dates from the early 1990s, when the first trials were implemented in Australia, Canada, European Union (EU), New Zealand and USA. Since then, and despite the fact that most of these trials are still in their early stages and therefore their level of success or failure still unclear, one can observe that more and more countries have expressed interest in developing their own VMS at either the national or regional level. The driving force behind this trend resides in the availability of the technology at an affordable price combined with the fact that, up to now, conventional MCS measures have not proved to be effective.

The main purpose of this paper is to identify and discuss, from a legal perspective, the problems arising from the implementation of VMS, and to offer a comparative analysis of VMS regulations. This analysis is based on information made available to the author various countries or entities, including Argentina, Australia, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), EU, FFA, New Zealand, Norway, South Africa and USA. It is recognized that matters of both international and national law are at issue, and consideration of both is provided. It should be noted that the study focuses primarily on VMS using satellite-based communications systems, since this is the most suitable technology for fisheries MCS and therefore the one likely to be adopted by a growing number of countries in the near future. Lastly, it attempts to inventory all issues that must be addressed by law-makers when drafting VMS regulations.

2. LEGAL BASIS FOR THE USE OF VMS

2.1 INTERNATIONAL LAW

It is intended in this chapter to identify the key provisions of international legal instruments that either deal directly with VMS or provide the basis for its utilization.

2.1.1 The United Nations Convention on the Law of the Sea (UNCLOS)

UNCLOS was adopted on 10 December 1982, and entered into force on 16 November 1994. It is the principal convention governing the international use of the seas and oceans. While it does not contain any provisions that are directly related to the use of VMS, it establishes a number of important principles of relevance for this study, relating to the conservation and management of living resources, both within national jurisdictions and on the high seas.

UNCLOS recognizes, *inter alia*, the sovereign rights of a coastal state over living and non-living aquatic resources, including fish stocks, occurring within a 200-nautical-mile EEZ. Article 56 specifies that the coastal state has sovereign rights for the purpose of exploring, exploiting, conserving and managing the natural living resources of the water column and that of the sea-bed and its subsoil. Coastal states, taking into account the best scientific evidence available, must ensure through proper conservation and management measures the sustainable utilization of the living resources within their EEZs (Article 61(2)). To this end, states are required to contribute and exchange on a regular basis through competent international organizations available scientific information, catch and fishing effort statistics, and any other data relevant to the conservation of fish stocks (Article 61(5)). Such obligation is also applicable to foreign vessels operating within the EEZ of a coastal state. Such vessels are required to provide information on their fishing activities, including catch and effort statistics and vessel position reports (Article 62(4)(e)).

In contrast, the high seas beyond the EEZ were left to an open access regime in accordance with the customary international law of the sea. It should be noted, however, that the traditional freedom of high seas fishing is duly qualified and conditional to the respect of specific obligations. Article 116 stipulates that the right to fish on the high seas is subject, *inter alia*, to states' treaty obligations and to the rights and duties as well as coastal states' interest in respect of straddling stocks, highly migratory species, marine mammals and anadromous and catadromous species as provided for in Articles 63(2) and 64 to 67 respectively. UNCLOS does not provide a legal mechanism for the enforcement of conservation and management measures on the high seas; responsibility rests upon the flag state, as provided for in Article 117. Furthermore, states have a general obligation to cooperate for the conservation and management of living resources in high seas areas. Article 118 further specifies, in this regard, that states that exploit identical living resources or different living resources in the same area have a specific obligation to enter into negotiations so as to take appropriate measures for the conservation of the targeted living resources, and are required, as appropriate, to establish regional or subregional fisheries organizations to this end.

Having claimed EEZs, coastal states were then confronted with the daunting task of exercising their sovereign rights over vast expanses of water. MCS of fishing activities, as well as enforcement of fisheries conservation and management measures, throughout EEZs is a major problem that few nations have been able to cope with properly. For many small island nations, which derive substantial income from rights of access to their fisheries but do not have the adequate assets in personnel or equipment to enforce their fisheries regulations, VMS is a particularly attractive technological innovation, since it has the potential, at an affordable cost, to

improve the effectiveness of MCS schemes and by the same token secure a major sector of their economy.

In accordance with Article 118, states have entered into fisheries arrangements or established regional or subregional fisheries organizations for the purpose of taking measures for the conservation of fish stocks on the high seas. With a view to improving compliance with their conservation and enforcement measures within their jurisdiction, certain of these organizations have introduced or are considering introducing VMS. The contracting parties to the Northwest Atlantic Fisheries Organization (NAFO), for instance, agreed to implement a pilot project for satellite tracking of fishing vessels¹. According to this agreement, the parties undertook to install satellite tracking devices on 35% of their respective vessels fishing in the NAFO Regulatory Area. The North East Atlantic Fisheries Commission (NEAFC), which is responsible for the management of fisheries resources outside areas under national jurisdiction in the northeast Atlantic, has adopted a framework for the implementation of VMS that should be operational no later than 1 January 2000². In the Antarctic Region, the CCAMLR is considering the installation of satellite tracking devices on all vessels of CCAMLR members which fish or plan to fish in the Convention Area from 1 January 1998³ so as to curb the high level of illegal, unregulated and unreported fishing activities which are undermining the effectiveness of the Convention on the Conservation of Antarctic Marine Living Resources signed on 20 May 1980 in Canberra, Australia.

2.1.2 The 1995 Agreement for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (the 1995 Agreement)

In 1992, the United Nations Conference on Environment and Development (UNCED) requested that the United Nations convene a conference aimed at implementing Articles 63 and 64 of UNCLOS relating to straddling and highly migratory fish stocks and with a view to establishing a conservation and management regime for these two types of stocks. On 4 August 1995, the conference adopted the *Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea (10 December 1982) Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks* (the 1995 Agreement). At the time of writing, the Agreement was not yet in force since, in accordance with its Article 40, it will enter into force 30 days after the deposit of the thirtieth instrument of ratification or accession. As of 8 April 1998, 59 countries were signatory and 17 had ratified the Convention. The 1995 Agreement is intended to give practical effect to the provisions of Articles 63 and 64 of UNCLOS, which deals with straddling fish stocks and highly migratory fish stocks. It contains a number of provisions that support the use of VMS.

Article 5 sets out the general principles governing the conservation and management of these two

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1. Decision made by the contracting Parties at their 17th annual meeting in September 1995 (NAFO/FC, Document 95/17). See also Article 1 of Council Regulation (EC) No.3070/95, of 21 December 1995, on the establishment of a pilot project on satellite tracking in the NAFO Regulatory Area, as modified by Council Regulation (EC) No.731/98 of 30 March 1998.
 2. Article 8.1 (a) stipulates that "Each Contracting Party shall require its fishing vessels, fishing in the Regulatory Area, to be equipped with an autonomous system able to automatically transmit messages to a land-based fisheries monitoring centre allowing a continuous tracking of the position of the fishing vessel by the Contracting Party of that fishing vessel in conformity with the specifications and schedule set out in Annex ..."
 3. Proposals from the European Community and Chile. See p.130, Section 1.64, of the *Report of the 16th Meeting of the Commission (CCAMLR-XVI)*

types of stocks and requires coastal states and states fishing on the high seas to take some specific actions, *inter alia*:

- (i) collect and share, in a timely manner, complete and accurate data concerning fishing activities, including vessel position, catch of target and non-target species and fishing effort (Article 5(j));
- (ii) promote and conduct scientific research and develop appropriate technologies in support of fisheries management (Article 5(k)); and
- (iii) implement and enforce conservation and management measures through effective monitoring, control and surveillance (Article 5(l)).

Article 10 provides that, in fulfilling their obligation to cooperate through regional or subregional fisheries management organizations or arrangements, states are required, *inter alia*:

- (i) to agree on standards for collection, reporting, verification and exchange of data on fisheries (Article 10(e));
- (ii) compile and disseminate accurate and complete statistical data, to ensure that the best evidence is available, while maintaining confidentiality where appropriate (Article 10(f)); and (iii) establish appropriate cooperative mechanisms for effective monitoring, control, surveillance and enforcement (Article 10(h)).

Article 14 stipulates that it is the duty of the flag states to ensure that vessels flying its flag provide necessary information. To this end, states are required to:

- (i) collect and exchange scientific, technical and statistical data with respect to the two fish stocks considered (Article 14.1(a));
- (ii) ensure that data are collected in sufficient detail to facilitate effective stock assessment and are provided in timely manner to fulfil the requirements of subregional and regional fisheries management organizations or arrangements (Article 14.1(b)); and
- (iii) take appropriate measures to verify the accuracy of such data (Article 14.1(c)).

It also indicates that states must agree on the specification of data and the format in which they are to be provided to subregional or regional fisheries management organizations or arrangements (Article 14.2(a)).

In accordance with Article 117 of UNCLOS, Article 18 of the 1995 Agreement specifies that a flag state shall ensure that fishing vessels operating on the high seas and flying its flag comply with subregional and regional management measures and that vessels do not engage in any activity which undermines the effectiveness of such measures. Consequently, a flag state shall authorize vessels flying its flag to fish on the high seas only if it is able to effectively exercise its responsibilities over them. In addition, a flag state is expected to take a set of measures as part of its duties that include, *inter alia*:

- (i) requirements for recording and timely reporting of vessel position, catch of target and non-target species, fishing effort and other relevant fisheries data in accordance with subregional, regional and global standards for collection of such data (Article 18.3(e)); and
- (ii) MCS of such vessels, their fishing operations and related activities by, *inter alia*: the development and implementation of VMS, including as appropriate, satellite transmitter systems, in accordance with any national programmes and subregional, regional or global programmes that may have been agreed to (Article 18.3(g)(iii)).

Article 25, dealing with the forms of cooperation with developing states, indicates that assistance to developing states shall be specifically directed towards:

- (i) improving conservation and management of straddling and highly migratory fish stocks through collection, reporting, verification, exchange and analysis of fisheries data and related information (Article 25.3(a)); and
- (ii) MCS, compliance and enforcement, including training and capacity-building at the local level, development and funding of national and regional observer programmes and access to technology and equipment (Article 25.3(b)).

Annex I of the 1995 Agreement defines the standard requirements for the collection and sharing of data.

Article 1.1 indicates that the timely collection, compilation and analysis are fundamental to the effective conservation and management of straddling fish stocks and highly migratory fish stocks and that such data must be verified to ensure accuracy. It also specifies that confidentiality of non-aggregated data shall be maintained.

Article 2 requires that states devise appropriate system of verification of fishery data and communicate such data in a timely manner to the relevant subregional or regional fisheries management organizations or arrangements. It also stresses the need for states to agree, within the framework of the above mentioned organizations or arrangements, on the specification of data and the format in which they are to be provided.

It is the responsibility of flag states to ensure that vessels flying their flag transmit to their national fisheries agency and, where applicable, to the relevant subregional or regional fisheries management organization or arrangement, logbook data on catch effort at sufficiently frequent intervals to meet national requirements and regional and international obligations. It specifies that such data shall be transmitted, among other means, by satellite (Article 5).

With a view to ensuring sound fisheries management measures, states are also required to establish mechanisms for verifying fishery data, such as position verification through VMS (Article 6).

As is clear from the foregoing, the 1995 Agreement provides ample support for the use of VMS. In particular, Article 18, on duties of flag states, explicitly requires flag states to implement VMS as a means of controlling fishing vessels flying their flag. When developing VMS at national level, states must ensure its compatibility with subregional, regional or globally agreed VMS programmes.

The 1995 Agreement stresses the vital importance of timely collection and exchange of data for both fisheries management and enforcement purposes, and also emphasizes the need to design systems of data verification. VMS is a suitable vehicle for the collection of catch data, particularly in terms of timely collection and as a means of verifying catch location. With regard to its technical features and its availability at an affordable cost, it can certainly be argued that VMS is the primary instrument for achieving the state's obligation to ensure the effectiveness of its MCS scheme. It also underscores the necessity to make technology and equipment available to developing countries through international cooperation, in particular those that may enhance MCS, compliance and enforcement capabilities.

With a view to facilitating the exchange of fisheries data, the need to develop international standards for the collection and reporting of such data, as well as the format in which they are to be provided, is recognized. In addition, confidentiality of data, including those collected via VMS, must be ensured.

2.1.3 The FAO Compliance Agreement

The *Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas* (the Compliance Agreement) was approved, through resolution 15/93, by the FAO Conference at its Twenty-seventh Session (November 1993). In accordance with Article XI.1, the Compliance Agreement shall enter into force as from the date of receipt by the Director-General of FAO of the twenty-fifth instrument of acceptance. As of 27 April 1998, 10 countries had deposited their instrument of acceptance. It should be noted that the Compliance Agreement constitutes and integral part of the *International Code of Conduct for Responsible Fisheries*.

The Compliance Agreement, which was primarily directed at curbing re-flagging of fishing vessels, does not refer specifically to VMS, but does contain relevant provisions.

It stresses the responsibility of the Flag State, which is required to take all necessary measures to ensure that fishing vessels entitled to fly its flag do not engage in any activity that undermines the effectiveness of international conservation and management. To this end, no State shall authorize any vessel entitled to fly its flag to be used for fishing on the high seas unless that State is able to exercise effectively its responsibility. Vessels operating on the high seas are required to provide the Flag State with information on their fishing activities, including those pertaining to the area of their fishing operations (Article III).

Provisions of Article V require parties to the Compliance Agreement to exchange information, including evidentiary material relating to the activities of fishing vessels, in order to assist the Flag State identifying those vessels flying its flag and reported to have engaged in activities undermining international conservation and management measures.

In the absence of an enforcement mechanism on the high seas, the Compliance Agreement, like the 1995 Agreement, requires Flag States to exercise responsibilities for the activities of fishing vessels flying their flags. This extends to the providing of information on vessel operations, including those relating to areas of fishing. As already indicated, VMS may constitute the most reliable method of collecting such information.

States must cooperate in particular in exchanging information that may help identify vessels conducting illegal fishing operations on the high seas. VMS may prove a very useful tool in providing evidentiary material, since it can identify a vessel that is fishing in a particular area of the high seas or inside an EEZ.

2.2 MULTILATERAL AND BILATERAL FISHING AGREEMENTS

The adoption of UNCLOS had a profound impact on the traditional way of conducting fishing on the seas and oceans. Indeed, by enabling coastal states to claim 200-nautical-mile EEZs, UNCLOS allowed most of the traditional high seas fishing grounds to be included within national jurisdiction, thus altering the traditional freedom of high seas fishing. As a result, traditional high seas fishing fleets were denied access to fishing grounds that, in some cases, they had fished for centuries, and compelled them to enter into bilateral or multilateral access fishing agreements with coastal states to pursue their operations.

Even though VMS is not yet a common feature of fishing agreements, it can be argued that this is just a matter of time, as some of these agreements already contain VMS provisions. For instance, the Morocco/European Community four-year fishing agreement (expiring 30 November 1999) provides (Chapter VII of Annex II) that prior to the establishment of a Moroccan vessel tracking system, Community vessels authorized to operate within the framework of the agreement are required to carry a vessel tracking unit. It should be noted, however, that, as of the time of writing, this pilot project had not been implemented. Another example can be found in the bilateral subsidiary fishing agreement concluded between Australia and Japan, where it is a condition of the fishing licence that Japanese vessels carry VMS when operating within Australian waters.

In the region served by the South Pacific Forum Fisheries Agency¹ (FFA), another example is found in the multilateral treaty between the US and certain Pacific Island States² (Multilateral Treaty). The Multilateral Treaty stipulates that where a region-wide vessel tracking system applicable to all vessels licensed to fish in the Treaty Area is established, US vessels licensed to fish under the Multilateral Treaty “shall participate in the system and shall install and operate a transponder of a type and in such a manner as may be agreed by the Parties.”³

2.3 NATIONAL LAW

In order to implement their own VMS, or to translate into national legislation their international obligations on this matter, states may need to modify their principal legislation on marine fisheries before devising specific VMS regulations. It should be noted that recent fisheries legislation usually contemplates the implementation of a VMS or provides for electronic reporting of fisheries information (satellite-based communications system), whereas fisheries legislation enacted prior to the early 1990s does not have such provisions. In Namibia, for instance, law-makers clearly foresaw the development of new technology, such as VMS, for the purpose of fisheries MCS and enforcement, since the Sea Fisheries Act, Act 29 of 1992, in Government Gazette No.493, 1 October 1992, provides that the Minister may make regulations in relation to the installation and maintenance of communication, safety or surveillance equipment on fishing or factory vessels. Likewise, the recently enacted Fisheries Act, 1997, of Argentina (Decreto 6 de enero 1997 promulgando la ley nacional de pesca no.24922) incorporates specific language on VMS stipulating that the Secretary of Fisheries could decide on the installation of vessel tracking systems on board fishing vessels. Another example is the New Zealand Fisheries Act, 1996, which contains a specific provision on electronic transmission. It stipulates (Section 296) that “for the purpose of this Act, the chief executive may approve the transmission of accounts, records, returns, transactions, information, notices, objections, requests, applications or other documents provided for under this Act by means of electronic transmission”. Common Law countries may not have to amend their principal fisheries legislation since they, typically, contain a section devoted to “regulations” or “power to make regulations” that may confer sufficient power to the specified authority to implement a VMS. Such modification, however, is more likely to be required in civil law countries, where such type of broad provision is not commonly found. In New Zealand, for

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1. FFA, a primarily consultative and advisory body, was established in 1979 by the member states of the South Pacific Forum to increase regional cooperation among its members in fisheries matters. The member states of the South Pacific Forum are Australia, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.
 2. Treaty on Fisheries between the Governments of Certain Pacific Island States and the Government of the United States of America.
 3. *Ibid.*, Part 8 of Annex I.

example, the Fisheries (Satellite Vessel Monitoring) Regulations, 1993, were established on the basis of Section 89, entitled “Regulations”, of the Sea Fisheries Act, 1983 (Act No.14), which stipulates that the Governor General may make regulations for the purpose of generally regulating fishing in New Zealand and New Zealand fisheries waters (Section 89(a)), *inter alia*: prescribing the accounts, records, returns and information that any person or class of person may be required to keep or furnish (Section 89(ka)). In contrast, in Morocco, where the installation of a VMS is under way, the Sea Fisheries Act, 1973¹, needed to be amended in order to both provide legal basis for the implementation of such a system and determine specific offences and penalties for the breach of VMS regulations.

3. LEGAL ISSUES

While the use of VMS is undoubtedly expanding, the number of countries having implemented or in the process of implementing a VMS, insofar as the author has been able to determine, is still limited. Argentina, Australia, Canada, Chile, EU, Japan, NAFO, NEAFC, New Zealand, Norway, South Africa and USA are the principal countries or entities currently using or requiring the use of such a system within their area of jurisdiction. Despite differences in their state of implementation, most VMS programmes are still in an early stage of development. Whereas it is well established as a MCS tool in Australia and New Zealand, it is still in a trial phase in the European Union and only used in a few regions of the USA. FFA has just brought into operation (1 April 1998) its region-wide VMS. Other countries, such as Morocco, are in the process of installing a VMS. Meanwhile, CCAMLR seriously envisages the use of a VMS to enhance the effectiveness of the MCS and enforcement scheme within its area of jurisdiction.

This chapter attempts – through the study of various VMS regulations – to identify the legal issues arising from the implementation of a VMS.

3.1 CONFIDENTIALITY OF VMS INFORMATION

Typically, the principal fisheries legislation enables the governmental agency responsible for fisheries management to collect information, including VMS data, which is relevant and necessary for the conservation and management of fisheries. The corollary being that the authorized agency is required to ensure confidentiality of the collected information.

Confidentiality of VMS data is a major issue for the fishing industry. It is not restricted to the non-disclosure of such information, but also entails other aspects relating to the access and use of VMS data. What is examined in this section is the extent of protection that the administration is required to provide. In this regard, it is important to note that an administration's responsibility starts when data are received by the monitoring agency. Protection of VMS data prior to this point, i.e., during the transmission, do not is not the responsibility of the monitoring agency but rather that of the manufacturer, since they relate to the technical reliability of the system. John Fitzgerald, in a manuscript on VMS prepared for FAO, raises the issue of security of data, including concepts such as integrity and authenticity, which relate to the technical reliability of the system and which are defined as follows: *_integrity_* as “whether or not data has been

1. Dahir portant loi no. 1-73-255 du 27 charoual 1393 (23 novembre 1973) formant reglement sur la peche maritime (Bulletin Officiel no. 3187)

altered or the function of a process is as intended” and authenticity as “whether or not a source of data can be positively identified and accepted as valid.”

3.1.1 VMS information

Requiring installation of VMS equipment on board fishing vessels may be felt as too intrusive by some fishermen, and may therefore face strong resistance from the fishing industry. Experience has shown that making vessel operators aware of the benefits they can derive from certain VMS applications, in particular those concerning their safety at sea and their way of conducting business, combined with assurances regarding the confidentiality of VMS information, is essential in gaining their support for the installation of a VMS. The first step in order to assure confidentiality of VMS information is to determine what categories of information would qualify as warranting confidentiality. Most commonly, the range of information that is transmitted electronically includes, but is not limited to, catch data, vessel position, vessel identifier, notification of intentions (EEZ entry/exit, port entry, etc.), owner identification, speed and course. In the recommendations made by the Second VMS Legal Workshop, organized by FFA in Nadi, Fiji, 16-18 February 1998 (hereinafter referred as the 2nd FFA VMS Legal Workshop), VMS information categories were defined as including, non-exhaustively: “sighting reports; self-reported positions; catch reports; notifications (EEZ entry/exit, port entry, etc.); automatic location communicator (ALC) position reports; and VMS analyses.” Note that, up till now, fisheries legislation does not contain specific provisions on the confidentiality of electronically transmitted data and that only a few countries have addressed confidentiality of fisheries data in general in their fisheries legislation. In the USA, for example, the Magnuson Fishery Conservation and Management Act, 1976, provides for the confidentiality of statistics, which are defined (Section 1853(a)(5)) as

“including, but not limited to, information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, number of hauls, and the estimated processing capacity of, and the actual processing capacity utilized by, United States fish processors.”

It was further specified in the Federal Register (50 C.F.R., Section 600.405 (1996)) that statistics covered all data “required to be submitted to the Secretary with respect to any fisheries management plan (FMP).” Therefore, statistics are all data that are used for management purposes, irrespective of the nature and the means of transmission of such data. VMS information, even though they are not specifically mentioned as such, clearly fall into the broad category of “statistics” and will therefore be protected accordingly. In Australia, there is a regulation on confidentiality of logbook data, but none on VMS. However, it is envisaged to extend it to electronic transmission of data in order to cover catch data provided by VMS (Dr A. Bergin, ADFA, Canberra, *pers. comm.*). The approach adopted in Australia differs from that of the USA. Whereas in the USA confidentiality applies to all data that are necessary for the design of a FMP, confidentiality in Australia applies to specified categories of data which are defined on the basis of their means of transmission.

3.1.2 Disclosure

Ensuring confidentiality of VMS information, especially concerning location of successful fishing grounds (fishing positions) and catch data, is a particularly sensitive issue for the fishing industry, since such data can be highly valuable commercial information the disclosure of which may put a vessel's owner at a commercial disadvantage. It can be argued that such types of information, by reason of their commercial nature, may require a higher level of protection. In this respect, it was specified in the USA Federal Register that

“the disclosure of data indicating individual vessel positions will be treated in accordance with the provisions of the Freedom of Information Act and the Trade Secrets Act. This means that if data is requested, it will not be divulged if the vessel owner can show that the disclosure would cause substantial harm to the owner’s competitive position.”¹

The intent of USA law-makers was not to provide special protection for commercial information *per se* but to ensure that disclosure of such information would not unfairly affect the competitive position of the vessel owner. The burden of proof rests upon the vessel's owner, who must show substantial harm so as to preclude certain information from being disclosed. It can be inferred from this reasoning that provisions of both the Freedom of Information Act and the Trade Secrets Act are likely to also be applicable to information other than individual vessel positions if the vessel owner can show that disclosure of such information may cause substantial harm to their competitive position. As the USA example shows, provisions ensuring confidentiality of VMS information are not only found within fisheries legislation and regulations but also in legislation dealing with the safeguarding of privacy, the use of computerized personal data, or concerning unfair competition as well. Such legislation directed at safeguarding privacy and the use of computerized personal data has been enacted in most developed countries.

In addition, a number of countries have enacted Acts addressing Privacy, directed at striking a balance between the government's legitimate need for certain information and the individual's right of informational privacy in the context of computerized record-keeping systems. The USA and Australian Privacy Acts, for example, also apply to the disclosure of VMS data. One of the underlying principles of the USA Privacy Act of 1974 is the “limitation of disclosure principle,” which sets limits on the external disclosures of information a record-keeping entity may make about an individual.

Confidentiality may also be ensured by requiring the release of data in an aggregated form, i.e., as data containing no identifying particulars. In this regard, Article 1 of Annex I of the 1995 Agreement specifies that “confidentiality of non-aggregated data shall be maintained.” Likewise, in the USA, the Magnuson Fisheries Conservation and Management Act of 1976 stipulates that “any statistics ... shall be confidential and shall not be disclosed” and that “the Secretary shall, by regulation, prescribe such procedures as may be necessary to preserve such confidentiality, except that the Secretary may release or make public any such statistics in any aggregate or summary form which does not directly or indirectly disclose the identity or business of any person who submits such statistics.”

Another safeguard preventing unwanted disclosure of data is the incorporation of provisions within fisheries legislation specifying that all persons having access to confidential data will be held responsible for the unauthorized disclosure of any such data. In Australia, persons employed by the Australian Fisheries Management Authority are required to sign a form relating to the disclosure of information gained in confidence. In the USA, the fisheries legislation (50

1. Federal Register, Vol. 59, No. 219, 15 November 1994, Rules and Regulations, p. 58 790

C.F.R., Section 600.420(3)(b) (1996) established a control system requiring that all persons having access to statistics be informed of the confidentiality of the statistics and sign a statement acknowledging their having been so informed and their being familiar with the procedures to protect confidential statistics. In addition, these persons are explicitly prohibited from unauthorized disclosure of data and subject to sanctions for doing so.

3.1.3 Access

Access to confidential information, including VMS information, is generally restricted to specified categories of persons. In the USA, for instance, specific provisions regulating access to confidential fisheries data have been devised (50 C.F.R., Section 600.415). They lay out the general criteria that are applied when determining whether to grant access to confidential data: (i) specific types of data required; (ii) relevance of data to conservation and management issues; (iii) duration of time access; and (iv) explanation of why the available aggregate or non-confidential data would not suffice (50 C.F.R., Section 600.415(a)). They also spell out the various categories of federal employees that have access to “statistics submitted as a requirement of FMP” (50 C.F.R., Section 600.415(b)). Conversely, other categories of federal employees which are not specifically mentioned in the regulations do not have access to statistics. In order to have access to the statistics, state employees must demonstrate a need for such information for use in fishery conservation and management (50 C.F.R., Section 600.415(c)). Likewise, statistics are accessible to council employees who are responsible for FMP development and monitoring. A council member may also have access to such information for use by the Council for conservation and management purposes, provided that such member might not gain personal or competitive advantage from access to the data and that suppliers of data would not be placed at a competitive disadvantage by public disclosure of such data at Council meetings or hearings (50 C.F.R., Section 600.415(d)). Under USA law, the granting of access to confidential data is a two-step process whereby the requesting person must demonstrate a need for such data and establish that such data will be used for conservation and management purposes.

3.1.4 Use

The general principle governing the use of VMS information is that they can only be used for fisheries management purposes, which may include fisheries research¹ and enforcement of fisheries regulations, since the monitoring agency cannot employ them for any other purposes than those for which they have been required by law. The issue of use of VMS information has recently been examined by a working group within the framework of the 2nd FFA VMS Legal Workshop. Recommendations made by the working group established a distinction between primary and secondary uses of VMS information. The former are restricted to fisheries management purposes, whereas the latter aim at other purposes, such as general law enforcement, search and rescue and international obligations. It recognizes the fact that VMS information may be used for purposes beyond the scope of the monitoring agency's authority and that consequently the use of VMS information for secondary purposes would need to be based on enabling legislation. This would also require the modification of the fisheries regulations in order to include language allowing the disclosure of certain VMS information for specific purposes to specified agencies. One of the most obvious examples, which relates to the enhancement of safety at sea, is the disclosure of vessel positions to the authority responsible for search and rescue

1. In the USA, the National Marine Fisheries Service (NMFS) continues to examine the issue of whether VMS information should be used for research purposes. Currently, NMFS scientists do not have access to such data

3.2 INTELLECTUAL PROPERTY

Issues relating to intellectual property, and more specifically to that of copyright and database protection, are only briefly touched on here. This is a complex issue that would justify a separate study. In fact, the 1st FFA VMS Legal Workshop recommended: (1) that the FFA seek technical assistance from the World Intellectual Property Organization (WIPO) to study these emerging issues; and (2) the organization of a separate workshop to address intellectual property issues relevant to VMS.

The central issue is to determine whether the VMS database kept by the competent authority would be granted copyright protection. This is certainly questionable since, in the copyright legislation of most countries, intellectual creativity as a distinctive human intervention is still the basic requirement for the granting of copyright protection. Also, issues to be addressed include: definitions of database/compilation; nature of VMS data (raw data, processed data, analysed information); notion of originality (not a copy of an existing work/degree of creativity/novel nature compared with existing work); and the development of *sui generis* protection in Europe¹.

3.3 EVIDENCE

With regard to evidentiary matters, the central issue is to determine whether a VMS, by itself, provides evidence of a standard likely to satisfy most criminal courts² of an offence that involved fishing activity. Consequently, what needs to be established is whether the level of trustworthiness and credibility of VMS information, in particular that relating to a vessel position, is of a sufficient standard to warrant a conviction. In this respect, it shall be noted that position reporting is automatic and independent of the vessel operator and that position reports generally provide for identification of the vessel, date and time of the position fix, the latitude and longitude of the fix, and the speed and course of the vessel at the time of the position fix. Based on these information, the monitoring agency is able to plot the tracks of the vessels and monitor their entry into and exit from waters placed under national jurisdictions and their compliance with the bounds of fishing exclusive zones. From the vessel position and speed provided in a number of consecutive reports, it is possible for the monitoring agency to draw conclusions about the activities of a vessel. The speed of a vessel is an indicator of its possible activity (steaming, longlining or trawling). Likewise, a pattern of positions may also indicate possible fishing activity. It is clear that, at this stage of development, VMS, which merely indicates probable activity of a vessel, fails to furnish evidence of a sufficient calibre to warrant, on its own value, a conviction.

In criminal prosecutions the standard of proof is higher than in civil proceedings (beyond

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1. cf. Directive 96/9/EC of the European Parliament and of the Council, of 11 March 1996, on the legal protection of databases. This Directive offers two alternatives: copyright protection and a new *sui generis* right to prevent unfair extraction or re-utilization of the contents of a database.
 2. "Reasonable doubt," as defined in Black's legal dictionary, is "the standard used to determine the guilt or innocence of a person criminally charged. The accused's guilt must be established _beyond a reasonable doubt,_ which means that facts must, by virtue of their probative force, establish guilt"

reasonable doubt vs preponderance of the evidence¹). The USA, for example, applies the system of civil and administrative penalties to fisheries offences. This approach presents the advantages of permitting hearings which do not necessarily follow strict rules of evidence, expedited proceedings, lower standard of proof and negotiated settlements. As a result, while VMS information is not, by itself, evidence of sufficient stature to warrant a conviction, it may, however, be of assistance in establishing the preponderance of evidence, in combination with information provided by other means.

In many countries, it is a requirement for fishery control officers to establish “probable cause”² prior to conducting certain types of investigations such as search, seizure and arrest. VMS may provide reasonably trustworthy information to lead a fishery control officer to believe that an illegal act has occurred³. To establish probable cause, it is not necessary that a fishery control officer possess knowledge of facts sufficient to establish guilt, but more than suspicion is required. Therefore, what needs to be ascertained is whether VMS information provides evidence of a standard higher than mere suspicion. In this respect, it is important to note that the high level of accuracy of GPS⁴, which is the most widely used position fixing method in the context of fisheries, has not been challenged to date. This seems to indicate that GPS accuracy is widely recognized and may even be regarded as universally established by common notoriety. In spite of its accuracy, a vessel position, even though it may indicate a clear violation of the limits of a fishing prohibited area, does not provide adequate information to determine the nature of the suspicious activity. It shall be noted that VMS and the information it provides will be integrated with other surveillance and enforcement functions. Effective monitoring of fishing vessel location and activity and confirmation of the accuracy and integrity of vessel positions will be achieved by the comparison of VMS positions with sighting reports, primarily from aerial surveillance, scientific observer records and reports (if applicable), vessel records and returns, and in-port vessel inspections. Computer systems will be used to compare vessel activity and location from these sighting reports with relevant VMS positions transmitted to the monitoring agency⁵. Any discrepancies, outside acceptable tolerances, will be identified for further analysis and investigation. This shows that VMS information will not suffice, by itself, to determine whether or not the activity of a vessel need to be further investigated, but that its use as corroborating evidence in relation to other information provided by other means will be of assistance in allowing a fishery control officer to determine with reasonable certainty that a violation has occurred.

During the 2nd FFA VMS Legal Workshop, a working group was created to identify and

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1. The concept of “preponderance of the evidence” as defined in Black’s legal dictionary is “evidence which is of a greater weight or more convincing than the evidence which is offered in opposition to it; that is, evidence which as a whole shows that the fact sought to be proved is more probable than not”
 2. The concept of “probable cause” as defined in Black’s legal dictionary is “a reasonable ground for belief in certain alleged facts. A set of probabilities grounded in the factual and practical considerations which govern the decisions of reasonable and prudent persons and is more than mere suspicion but less than the quantum of evidence required for conviction”
 3. The phrase “reasonable grounds to believe”, which means substantial probable cause, is the standard commonly used in fisheries legislation to allow a fishery control officer to carry out arrest, search and seizure.
 4. Industry standards for GPS are generally accepted to provide an accuracy of less than 100 m from uncorrected GPS readings
 5. In this regard it is interesting to note that Article 19(1) of Council Regulation (EEC) No.2847/93 of 12 October 1993, establishing a control system applicable to the common fisheries policy, provides that “each Member States shall establish a validation system comprising in particular cross-checks and verification of data”, including VMS information, and that Article 3(2) of Commission Regulation No.1489/97 of 29 July 1997, laying down detailed rules for the application of Council Regulation No.2847/93, stipulates that ‘each flag Member States shall take all the necessary measures to check the accuracy of the data referred to in paragraph 1” which includes the position of fishing vessels

review evidentiary issues. In its findings, the working group emphasized the fact that the presentation of VMS information may not be admissible as evidence in court because of the hearsay rule. Hearsay evidence, as defined in the United States Federal Rules of Evidence, “is testimony in court of a statement made out of court, the statement being offered as an assertion to show the truth of matters asserted therein, and thus resting for its value upon the credibility of the out-of-court asserted.” It noted that exceptions to the hearsay rule were based upon the level of reliability and trustworthiness of VMS information and set out the exceptions that can be found in most jurisdictions of FFA member countries. These include: business records, public records, evidence by certificate, rebuttable presumption, and judicial notice. Of particular interest are the comments made on both rebuttable presumption and judicial notice. With regard to rebuttable presumption, which means that a fact is assumed to be true unless the contrary is proved, the working group indicated that the fisheries legislation of the Federated States of Micronesia (Code of the Federated States of Micronesia, Title 24, Section 515) provided that “Where, in any legal proceedings instituted under this title or any regulations issued under this title, the place in which an event is alleged to have taken place is in issue, the place stated and copy of the relevant entry in the logbook or other official record of an enforcement vessel or aircraft as being the place in which the event took place shall be presumed to be the place in which the event took place, unless the contrary is proved.” Considering the level of accuracy of GPS, law-makers might well consider modifying such types of provisions so as to make vessel positioning provided by VMS a rebuttal presumption. In respect of judicial notice¹, the working group noted that “judicial notice may be taken of the fact that certain machines are notoriously accurate, i.e., their accuracy comes to be accepted over a period of time through usage, and their data therefore are accepted as accurate as well”, indicating, thus, that GPS may satisfy this requirement, since its accuracy remains unchallenged.

In conclusion, it appears that, currently, the primary role of VMS information is to trigger further investigation into suspicious fishing activities.

3.4 MARITIME BOUNDARIES

Many countries have not yet formalized their maritime boundaries in accordance with the requirements of Articles 15 and 74 of UNCLOS. Uncertainty regarding boundaries of maritime zones may destroy a case, whether civil or criminal, and provoke tension between the countries involved (e.g., in the China Sea). Though formal delimitation of maritime boundaries throughout the world is certainly highly desirable and would, *inter alia*, facilitate the implementation of VMS projects, it must be recognized that this is an extremely delicate matter, involving national sovereignty, and that it can only be achieved through negotiations or other peaceful means of dispute settlement. Regional organizations², including regional fisheries organizations, may provide forums where progress can be made on this issue. Meanwhile, caution should be exercised in the implementation of VMS projects in areas where maritime boundaries are contested between two or more countries or where a case involves a position fix in the direct vicinity of a maritime

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1. Judicial notice, as defined in Black's legal dictionary, means “the act by which a court, in conducting a trial, or framing its decision, will, without the production of evidence, recognize the existence and truth of certain facts”
 2. In this regard, it can be noted that Article 4.2 of Commission Regulation (EC) No.1489/97 of 29 July 1997, laying down detailed rules for the application of Council Regulation (EC) No.2847/93 as regards satellite-based vessel monitoring systems, stipulates that “Each Member State shall transmit to the other Member States, before 31 December 1997, a comprehensive list of latitude and longitude coordinates which delimit its exclusive economic zone or exclusive fishery zone,” and that the 2nd FFA VMS Legal Workshop strongly recommended that “FFA Member Countries ascertain and formalize their maritime boundaries as soon as possible”

boundary.

4. VMS REGULATIONS

This chapter will identify, through comparative study what are the current main features of VMS regulations.

4.1 AS A CONDITION OF FISHING LICENCES

As a preliminary remark, equipment required to be installed on board fishing vessels will be referred to as a vessel tracking unit (VTU) hereinafter in this paper. Although installation of a certified VTU on board fishing vessels required to carry such type of equipment may not be specifically mentioned as a condition of a fishing licence, it is clear that vessels falling into this category will not be authorized to conduct fishing operations unless they comply with such a requirement. In Australia, installation of a VTU is a condition of the fishing permit in respect of Australian vessels. With regard to foreign fishing, obligation to carry a VTU is negotiated on a case by case basis in the framework of bilateral fishing agreements. For instance, it is a provision of the bilateral subsidiary agreement with Japan and a condition of the licence that Japanese vessels carry a VTU. New Zealand has adopted a different approach, since it has formulated a blanket provision requiring all foreign fishing vessels authorized to operate within its EEZ to carry a VTU¹. In the New England (USA) fisheries, owners of fishing vessels required to install a VTU on board their vessels must provide documentation to the Regional Director at the time of application for a fishing permit that the vessel is equipped with an operational VTU that meets the specified minimum performance criteria. It is further specified that if a vessel has already been issued a fishing permit without providing the required documentation, the Regional Director shall allow at least a 30-day period for the owner to comply with their obligations.

In the region served by FFA, the member states of FFA have agreed to include in the fishing licences of foreign vessels fishing within their zones, conditions that require these vessels to install and carry automatic location communicators². This requirement is considered to be the first step in the implementation of the FFA VMS pending amendments to existing laws and regulations or the promulgation of new VMS regulations by FFA member states.

4.2 SCOPE

Since there has been little understanding of VMS as a fisheries management tool and considerable distrust of it within the fishing industry, most countries have adopted an evolutionary approach to implementing VMS. This led fisheries managers to decide to implement VMS on a fishery by fishery basis. In a first phase, trials were generally conducted on one or two fisheries for a period of one or several years, following which decisions to pursue the experiment and extend VMS requirement to other fisheries were made. As of writing, VMS has become a common feature in

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1. The Fisheries (Satellite Vessel Monitoring) Regulations 1993, Article 3(1)(a)
 2. The agreement to include conditions in fishing licences for installation of automatic location communicators on foreign fishing vessels was facilitated through amendments to the Harmonised Minimum Terms and Conditions for fishing access (HMTCs). The governing body of FFA, the Forum Fisheries Committee (FFC), approved the HMTCs amendments at FFC 34 (24-28 November 1998).

several countries, including Australia, Japan and New Zealand, whereas it is in what can be described as an intermediary stage in EU, USA and NAFO, i.e., beyond the trial stage but still requiring some time for the installation of VTU on board fishing vessels to be completed, and remains in a trial phase in Norway and South Africa.

In 1993, New Zealand, which is the country that has developed the most comprehensive set of VMS regulations to date, enacted the Fisheries (Satellite Vessel Monitoring) Regulations 1993, whereby it was required that by 1 April 1994 an automatic location communicator should be carried on board the following classes of vessels: (i) foreign, licensed fishing vessels; (ii) foreign, chartered fishing vessels capable of engaging in trawling for fish; and (iii) New Zealand fishing vessels exceeding 43 m in overall length and capable of engaging in trawling for fish. The Director-General was empowered to specify, by notice in the Gazette and after consultation with the New Zealand Fishing Industry Board, fishing vessels of any class, being New Zealand fishing vessels or foreign, chartered fishing vessels, in respect of which such regulations should apply. In 1994, the Director-General issued a notice¹ providing that by 1 October 1994 the requirement to carry an automatic location communicator be extended to the following classes of vessels: (i) all foreign, chartered vessels not specified in the 1993 regulations, excepting those used for jigging for arrow squid or used for longlining for tuna; and (ii) all New Zealand fishing vessels exceeding 28 m in overall length, not specified in the 1993 regulations, which are used for jigging for squid or used for longlining for tuna. It further specified that by 1 April 1994 all New Zealand fishing vessels of 28 m or less in overall length which are used at any time during a fishing year for fishing for orange roughy or scampi be subject to the obligation of carrying and operating such devices as well. In order to determine the scope of VMS regulations, New Zealand fisheries managers rely on a combination of four distinct criteria: nationality of the vessel (national or foreign), the type of fishery the vessel is involved in, fishing gear used and length of the vessel.

Furthermore, Regulation 10 of the Fisheries (Satellite Vessel Monitoring) Regulations 1993 provides for the Director-General to authorize a person or vessel to operate without complying with all or any of the requirement of these regulations. The dispensation can be allowed “to the extent that compliance with the regulations is unreasonable or impracticable in the case of that person or vessel.” The New Zealand Ministry of Agriculture and Fisheries (MAF) does not intend to monitor the location of vessels where there is no need to do so, and the dispensation provisions of the regulations will be utilized in cases in which fishing is not affected by location, such as for a vessel not subject to any area restrictions or one fishing species not subject to quota, or when a vessel’s location is not relevant to fishing, e.g., a vessel undergoing lengthy refit and not fishing for a few months.

In the EU, VMS regulations were devised on the basis of the findings derived from VMS pilot projects carried out by Member States on the basis of Article 3(2) of Council Regulation (EEC) No.2847/93 of 12 October 1993, establishing a control system applicable to the common fisheries policy. The categories of vessels to which VMS applies is defined by

Article 3(1) of Council Regulation No.2847/93, as amended by Council Regulation (EC) No.

1. The Fisheries (Fishing Vessels Subject to Satellite Vessel Monitoring) Notice 1994 (No.5325)

686/97¹ which contains provisional measures stipulating that

“the VMS shall apply no later than 30 June 1998 to all Community fishing vessels exceeding 20 m between perpendiculars or 24 m overall length belonging to any one of the following categories:

- ∓ vessels operating on the high seas, except in the Mediterranean Sea²;
- ∓ vessels operating in the waters of third countries, provided that provisions have been made in Agreements with the relevant third country or countries for the application of a VMS to the vessels of such country or countries operating in the waters of the community;
- ∓ vessels catching fish for reduction to meal and oil.”

Article 3(2) further specifies that “the VMS shall apply no later than 1 January 2000 to all Community fishing vessels exceeding 20 m between perpendiculars or 24 m overall length wherever they operate. However, only in the situation where a third country or countries have accepted the obligation to apply a VMS to their vessels operating in the waters of the Community, shall Community fishing vessels operating in the waters of such third country or countries be subject to the application of VMS.”

With regard to foreign fishing vessels, the approach adopted by the EU, which is based on the reciprocity principle, differs from that of New Zealand. Decision to apply a VMS to the fishing vessels of a third country wishing to operate within Community waters will depend on whether or not such a third country imposes a VMS on EU fishing vessels operating within its EEZ. Negotiations between the two countries will therefore be necessary to solve the issue. Criteria utilized by the EU to determine which vessels fall within the scope of its VMS regulations rest primarily on the size of the vessel, regardless of the fishing gears used or the fishery in which the vessel is involved. In this regard, it should be noted that the size criterion is only applicable to EU vessels.

Unlike New Zealand VMS regulations, which authorize the Director General to exempt, on a case by case basis, a person or vessel from complying with these regulations, EU VMS regulations specifically mention the categories of fishing vessels to which the VMS requirement does not apply. They concern “vessels operating exclusively within 12 nautical miles of the baseline of the flag Member State; or vessels which never spend more than 24 hours at sea, taken from the time of departure to the return to port.”³ This regulation is directed at small fishing vessels for which the obligation to carry and operate a VTU was thought to constitute a disproportionate burden in relation to their fishing capacity.

In the USA, VMS regulations have been adopted in the New England fisheries. A VTU is required to be installed on board New England multispecies vessels issued an individual day-at-sea or combination permit, and scallops vessels issued a full-time or part-time limited access scallop permit⁴. While scallop vessels had to have complied with the VMS requirement by 15 May

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1. Council Regulation (EC) No.686/97 of 14 April 1997, amending Council Regulation (EEC) No.2847/93 establishing a control system applicable to the common fisheries policy, contains VMS provisions that replace Article 3 of Council Regulation (EEC) No.2847/93
 2. No EEZs have yet been established by EU Member Countries in the Mediterranean Sea
 3. Article 3(3) of Council Regulation (EEC) No.2847/93 of 12 October 1993, establishing a control system applicable to the common fisheries policy, as amended by Council Regulation (EC) No.686/97 of 14 April 1997
 4. 50 C.F.R., Section 648.10 (1996)

1998, the multispecies fleet was allowed a one-year delay by the National Marine Fisheries Service (NMFS) to comply.

FFA launched the research, design and implementation of a region-wide satellite based VMS in 1995. After extensive testing, the FFA VMS became technically operational on 1 April 1998¹. Currently, the agreement of FFA member states to include as a condition of licence, the requirement to install automatic location communicators, applies to foreign fishing vessels that are licensed to fish in the FFA region.

By the end of 1998, Morocco was expecting to have implemented an experimental monitoring programme covering all vessels², including foreign fishing vessels authorized to participate in the squid fishery. The experimental phase was to run for approximately one year, after which the entire programme was to be assessed and a decision taken by the Ministry of Marine Fisheries as to whether or not to extend VMS to other fisheries.

The above examples show that states do not use uniform criteria to determine the scope of their VMS regulations. Indeed, fisheries management agencies rely on various sets of criteria established in relation to the specificities of their fisheries and with regard to the goals of their vessel monitoring programme, as defined in fisheries management plans.

4.3 STANDARDS AND REQUIREMENTS RELATING TO VTUs

4.3.1 VTU minimum performance standards

Quite commonly, only VTUs that have been certified can be used on board fishing vessels required to carry such equipment. In order to be approved, a VTU must meet the minimum performance standards specified in fisheries regulations. Based on the findings derived from a thorough analysis of relevant EU, New Zealand and USA regulations, it appears that the basic features required in a VTU are:

Tamper-proof New England fisheries regulations require that the VTU be tamper-proof and specify that it shall not permit the input of false positions. Furthermore, it indicates (50 C.F.R., Section 648.9(b)(1) (1996)) that when using satellites to determine position, “satellite selection should be automatic to provide an optimal fix and should not be capable of being manually overridden by any person aboard a fishing vessel or by the owner.” It is worth noting that whereas the USA and the EU have devised general specifications applicable to all types of VTUs, New Zealand has developed specific requirements in relation to particular types of equipment³, namely Argos⁴ and Inmarsat-C⁵ ALCs. In order to secure positioning information, both sets of regulations contain similar language stipulating that “the user interface shall not allow user access to functions that can alter or disable any functions relating to position reporting.” EU regulations do not contain specific language with regard to this issue, but require that a VTU ensures automatic transmission of requisite data, including positioning information, to the relevant FMC, thus denying any manual

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1. See the FFA website <http://www.ffa.int/> for more information on the FFA VMS.
 2. Initially, an estimated 400 vessels comprising 300 Moroccan vessels and 100 EU vessels were to be required to install a VTU
 3. Regulation 4(2) of the Fisheries (Satellite Vessel Monitoring) Regulations 1993 provides that “different standards and requirements may be so specified in respect of automatic location communicators.”
 4. Ministry of Agriculture and Fisheries, Vessel Monitoring Systems, Circular Two on Certification Requirements for Argos Automatic Location Communicators (December 1993)
 5. Ministry of Agriculture and Fisheries, Vessel Monitoring Systems, Circular One on Certification Requirements for Inmarsat-C Automatic Location Communicators (December 1993)

input.

Operational at all times While USA regulations require that a VTU be operational at all times, regardless of weather and environmental conditions, without providing further details, New Zealand regulations specify that the automatic location communicator “shall be able to function at specified accuracy between -10°Celsius and +40°Celsius.” Furthermore, requirements relating to the mounting of the transceiver box¹ and antenna are designed to ensure continuous reliable operation of the automatic location communicator.

Position accuracy and velocity VTUs installed on board fishing vessels operating in the New England region must provide positional accuracy to within 400 m. While NMFS acknowledges that position accuracy must be determined on the basis of industry standards, it also recognizes that only systems using GPS can obtain accuracy of less than 100 m. Therefore, in order not to exclude other systems from consideration, NMFS requires VMS to meet industry standards while maintaining a minimum accuracy of 400 m. Based on similar reasoning, EU regulations require position accuracy within 500 m, with a confidence of 99%². With regard to systems using GPS, New Zealand regulations require that position error with selective availability turned on must be within 100 m, and 25 m with selective availability turned off, and velocity error with selective availability turned on must be less than 1.5 knots, and less than 1.0 knot with selective availability turned off. It is interesting to note that both EU and USA regulations are silent on the issue of velocity accuracy. Lack of velocity standards may have legal implications, notably, where a monitoring agency tries to establish probable cause by determining whether a vessel is fishing on the basis of its reported speed.

Frequency of position reports and polling In the USA, all mandatory VTUs must transmit a signal indicating the vessel’s accurate position at least every hour, 24 hours a day, throughout the year (50 C.F.R., Section 648.9(c) (1996)). In addition, the VTU must allow polling of individual vessels or any set of vessels at any time and receive position reports in real time. “Real time” refers to “data that reflect a delay of 15 minutes or less between the displayed information and the vessel’s actual position.” This feature is particularly important in that it allows the monitoring agency to act swiftly by directing an aircraft out to photograph the suspected violator, and then wait for it to return to port for a dockside investigation. EU regulations provide that requisite VMS information, including positioning report, be transmitted to the FMC at least every two hours unless otherwise specified. In this respect, Annex 1 of Commission Regulation (EC) No.1489/97 sets out various maximum intervals of time between receipt of position reports in relation to the location of the vessel: (i) when in port, the vessel is required to communicate its position at least once every 24 hours over a 48-hour period. However, if the vessel remains in port for more than 48 hours, the VTU may be switched off; (ii) when operating in the Mediterranean Sea outside Community waters, or in the NAFO area, vessels must communicate their position at least every 12 hours; and (iii) when operating in areas other than the Mediterranean Sea outside Community waters and in International Council for the Exploration of the Sea (ICES) area north of 62°N outside Community waters (except ICES division IIIId), vessels are required to transmit their position at least every 24 or 6 hours respectively. Polling of individual vessels is recommended but does not constitute a mandatory requirement. In case a VTU does not offer the possibility of polling the actual position of a fishing vessel, the Member State concerned is, however, required to

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1. Section 4.2.1 of the Circular stipulates that “fixings used shall be capable of securing the device [the transceiver box] to prevent movement when exposed to the vibration and shaking typically experienced aboard a deep-sea going vessel so as to ensure continuous reliable operation of the ALC as a part of the VMS”
 2. Article 3.1 of Commission Regulation (EC) 1489/97 of 29 July 1997, laying down detailed rules for the application of Council Regulation (EEC) No.2847/93 as regards satellite-based vessel monitoring systems

take all necessary measures to ensure that the FMC receives the position of the vessel every hour¹. New Zealand regulations as regards systems using GPS provide that the VTU must be capable of supplying position information at preset intervals using unreserved or reserved access over the data reporting channel, and specify that the minimum range of reporting intervals must be between 15 minutes and 24 hours². Such system are also required to supply information on demand (polling) using unreserved access over the data reporting channel. Finally, it is important to keep in mind that frequency of position reports may vary, within the range of reporting intervals set in the regulations, in relation to the type of fishing gears used (longlining, trawling, seining, etc.) or according to the target species (e.g., species subject to quotas).

Data to be transmitted As indicated earlier in this paper, VMS, hitherto, has primarily been used for the purpose of monitoring the movement of fishing vessels, notably in order to monitor compliance with prohibited fishing areas (e.g., marine sanctuaries, closed areas, spawning grounds) or adherence with days-at-sea programmes (e.g., New England multispecies and scallop fisheries). As a result, emphasis has generally been put on the transmission of data relating to the position of the vessels. In the EU, required VMS information encompasses: (i) vessel identification; (ii) the most recent geographical position of the vessel expressed in degrees and minutes of latitude and longitude; and (iii) the date and time of the fixing of the position of the vessel³. In addition, EU regulations require that those data be transmitted simultaneously to both the FMC of the coastal Member State in the waters of which the fishing vessel operates and to the FMC of the flag Member State. At the same time, one should be aware that standard GPS reports also contain owner identification and speed and course information. Likewise, current USA regulations only require the transmission of information relating to the position of the vessel. In New Zealand, however, VMS information required extends to the transmission of catch data for selected species, while Japan and Australia require that vessels flying their flags operating in specific fisheries transmit catch data. Unlike other type of information communicated through VMS – which are transmitted automatically – input of catch data requires human intervention and thus may not be as reliable. In addition, VMS is used to notify port of call⁴.

Format It is important that VMS regulations specify formats to be used when preparing and sending the requisite information. In this respect, New Zealand's fisheries regulations state that VMS reports, including catch reporting, notice of port call and test report, be sent in binary format. In addition, it also defines formats for polling commands for remote programming. It should be emphasized that the main issue in this is the fact that as of yet, neither a universal standard for the purpose of exchanging VMS data between national monitoring agencies nor a standard communications system or communications protocol for delivering the data have been agreed. This matter is covered by John Fitzgerald in his draft manuscript for FAO, where he reviews existing international standards, analyses various formats that could be used in relation to position report, catch reporting and polling, and stresses the necessity to agree on a universal standard format for the purpose of exchanging VMS data between national monitoring agencies.

Two-way communications systems Most fisheries management agencies require

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1. Article 3.3 of Commission Regulation (EC) 1489/97 of 29 July 1997, laying down detailed rules for the application of Council Regulation (EEC) No.2847/93 as regards satellite-based vessel monitoring systems
 2. Section 2.1.2.1, Ministry of Agriculture and Fisheries, Vessel Monitoring Systems, Circular One on Certification Requirements for Inmarsat-C Automatic Location Communicators (December 1993)
 3. Article 3.1 of Commission Regulation (EC) 1489/97 of 29 July 1997, laying down detailed rules for the application of Council Regulation (EEC) No.2847/93 as regards satellite-based vessel monitoring systems
 4. Section 2, [New Zealand] Ministry of Agriculture and Fisheries, Vessel Monitoring Systems, Circular Four on Port of Call and Catch Reporting (February 1994)

systems that provide two-way communications¹ capable of operating in both send and receive modes.

4.3.2 Approval

Approval is the procedure by which the competent authority certifies that a VTU complies with the requirements and specifications established by fisheries regulations. In Australia, choice of VTU is limited to a list of equipment which has been approved by the Australian Fisheries Management Authority (AFMA). AFMA also approves commercial installers and maintainers of the equipment. In the USA, the Regional-Director annually approves a list of VTUs that meet the minimum performance standards. The list of approved VTUs is published in the Federal Register upon addition or deletion of a VTU from the list. In this regard it is worth noting that, as of writing, only one vendor has been certified (Boatrac Inc.) by the New England Regional-Director, and therefore only Boatrac equipment can be used in this area, although NMFS indicated in its Federal Register notice that it was continuing testing equipment from another supplier (SeaConnect), which, like Boatrac, had participated in the VTS experiment. Pursuant to the publication of the White Paper on Fisheries Policy, formally recognizing the use of VMS as a fisheries monitoring and control tool, South African authorities have been testing various VMS systems² and should soon be in a position to devise certification requirements for VMS, with an approval procedure for the equipment deployed. Regulation 5 of the New Zealand Fisheries (Satellite Vessel Monitoring) Regulations 1993 provides that “any person may apply to the Director-General for a type approval in respect of any automatic location communicator” and establishes two levels of type approvals: a full type approval and a provisional type approval³. The former is granted where the VTU submitted for approval fully complies with the appropriate standards and requirements. If it complies in some respects, but not fully, then a provisional type approval may be granted. A provisional type approval is valid for a specified period of time which may, at any time, be increased or reduced by the Director-General. When granting a provisional type approval, the Director-General may specify the reasons for granting that kind of approval and indicate the period within which the device must comply with the appropriate standards and requirements. Circulars One and Two specifying standards and requirements in respect of, respectively, Inmarsat-C and Argos ALCs set out procedures to test these devices for type approval. Such procedures mainly consist of off-line and on-line tests. It is worth noting that if there is more than one supplier for exactly the same equipment and that such equipment has been approved, then each supplier does not have to apply for type approval. Lastly, VMS regulations

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1. The Argos system, currently used in New Zealand, operates in send mode only. Receive mode, however, should be integrated by 2000.
 2. According to: *Report on the Introduction of Vessel Monitoring Systems (VMS) in South Africa with Specific Application to the Deployment of Satellite Tracking Units on Toothfish-Directed Vessels Operating from South Africa*, submitted by the Delegation of South Africa to CCLAMR (Document CCLAMR-XVII/BG/18). Systems tested were: Seawatch (using Inmarsat-C/GPS and a Trimble maritime transceiver); Sailor/Capsat (using Inmarsat-C/GPS and a Thrane & Thrane maritime transceiver); Argos (using the Argos satellite communications network linked to GPS); and Inmarsat-A.
 3. In respect of Inmarsat-C ALCs, Section 6.1 of Circular One stipulates that “ALC Approval” shall be granted if: (1) “the unit is highly integrated so that the link between the Inmarsat-C transceiver and the GPS module may not be accessed in any unauthorized manner that could result in a compromise to the integrity of GPS position reports; and (2) all other requirements outlined in this document [Circular One] are met”; and that “Provisional ALC Approval” shall be accorded if: (1) “it does not qualify for ALC Approval; and (2) the unit is secured using a form of technology acceptable to MAF that will provide a level of security against wilful attempts to compromise the integrity of GPS position reports; and (3) all other requirements in this document [Circular One] are met.

identify the Ministry of Commerce as the approved organization to test VTUs¹.

4.3.3 Registration

Insofar as the author has been able to determine, it appears that only New Zealand currently requires the registration of VTUs. Regulation 6 of the Fisheries (Satellite Vessel Monitoring) Regulations 1993 provides that the Director-General shall register a VTU if (s)he is satisfied that the device under consideration is of the same type as a type approved in accordance with the appropriate standards and requirements set out in Regulation 5 of these regulations. It further specifies that the Director-General may make the registration of a VTU subject to such reasonable conditions as they may indicate in writing to the applicant. They are also empowered to cancel at any time the registration of a VTU if satisfied that it no longer complies with the appropriate standards and requirements. The registration certificate issued by the Ministry of Agriculture and Fisheries must be kept on board the fishing vessel to which it relates and maintained in a legible condition and produced immediately on the request of a Scientific Observer². The registration expires when the vessel to which the VTU is registered is no longer authorized to operate within New Zealand waters or at such earlier date if cancelled by the Director-General.

Of particular interest are the recommendations made by the 1st FFA VMS Legal Workshop, which provide for the modification of the minimum terms and conditions of access by requiring the registration of VTUs and for the establishment of a separate FFA VMS register. It was also recommended that registration should be an annual requirement and should remain valid only until 31 August each year.

These recommendations have been adopted and became operational in November 1997³.

4.3.4 Procedures in case of VTU failure

Law-makers have generally designed specific procedures to apply in the event a VTU fails to transmit the required information. In the event of technical failure or non-functioning of the VTU fitted on board a fishing vessel, EU regulations require that the master or the owner of the vessel or their representative communicate at least every 24 hours, starting from the time that this event is detected, the requisite data by alternative means of communication, namely telex, fax, telephone message or radio (via a radio station approved under EU legislation for the reception of such reports) (Commission Regulation (EC) No.1489/97 of 29 July 1997, Article 6(1)). Interestingly, identical provisions apply in the event of technical failure or non-functioning of the VMS of the flag Member State. The applicable procedure is uniform regardless the cause for malfunction of the device, whether it is the result of an intentional action (tampering) or a technical failure. Clearly, what matters is the continuous functioning of the VMS. As to whether the failure or non-functioning of the VTU can be linked to an intentional act will be determined at a later stage. It is further specified that the owner of the fishing vessel or their representative has the duty to have the

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1. Ministry of Agriculture and Fisheries, Vessel Monitoring Systems, Circular Three on Approved Organization for the testing of Automatic Location Communicators (1994)
 2. Section 3.2 of Ministry of Agriculture and Fisheries, Vessel Monitoring Systems, Circular Five on Registration of Automatic Location Communicators
 3. FFC34 (24-28 November 1997). In addition to the requirement for registration of VTUs, the HMTCs sets out the procedures for registration, criteria for withdrawal of or suspension of registration, reinstatement of registration, (Annex 4), a guide for application for registration (Annex 5), application for registration form (Annex 6) and the registration form (Annex 7).

VTU repaired or replaced within one month. Once that period has elapsed, the master is not authorized to commence a fishing trip with a defective VTU. The only exception to this rule concerns a vessel embarked on a fishing trip exceeding one month, in which case, the repair or replacement of a defective VTU must take place as soon as the vessel enters a port. As a corollary to the fact that most VTUs are fully automatic (transmission of catch data is not currently required under EU regulations) and that failure or non-functioning of a VTU may therefore not be easily detected by the operator of the vessel, Member States are required to ensure that the master or the owner of the vessel or their representative is informed of any defective or non-functioning VTU (Commission Regulation (EC) No.1489/97 of 29 July 1997, Article 6(3)).

The 1st FFA VMS Legal Workshop addressed the issue of VTU failure and recommended that, upon notification by the member country that the vessel's VTU has failed to report, the licence holder be required to ensure communication, at intervals of 8 hours, or less if so specified, of reports containing the vessel's name, call sign, position and date and time of reports, commencing from the time of notification of VTU failure. Emphasis is put on the obligation to continue communication of the required information, but no mention is made of which alternative means of communication may be used. Call-in notification is not subject to any time frame and therefore must continue until such time as the delegated authority directs the vessel to return to a port designated by the licensing country or until communication of any further position reports becomes impossible. In these circumstances, the master of the vessel must: (a) immediately stow the fishing gear and take the vessel to a port; and (b) as soon as possible, report to the delegated authority that the vessel has been taken to port with gear stowed due to failure of the vessel's VTU. This recommendation appears to be incomplete and imprecise since it does not include any allowance for the repair or replacement of the defective VTU and does not explicitly mention whether such fishing vessel may commence a new fishing trip before having undertaken all necessary repair.

New Zealand fisheries regulations do not provide any specific procedure in the event of a VTU failure but require that the Fisheries Communication Centre be notified if a VTU on board a fishing vessel fails to work properly¹.

4.4 RESPONSIBILITIES OF PERMIT HOLDER AND MASTER

As a general rule, masters of vessels to which VMS applies must ensure that VTUs are fully operational and that the required VMS information is regularly transmitted. In New Zealand, Regulation 7 of the Fisheries (Satellite Vessel Monitoring) Regulations, 1993, also specifies that the permit holder and master must ensure that the VTU carried on board the vessel operates continuously and is properly registered. USA regulations applicable in the Western Pacific region provide that the holder of a Hawaii longline limited access permit and the master of the vessel operating under the permit must: (1) provide opportunity for the competent authority to install and make operational a VTU; (2) carry the VTU on board whenever the vessel is at sea; and (3) not remove or relocate the VTU without prior approval from the competent authority². As indicated in Section 4.3.4 above, in New Zealand and the EU, masters of fishing vessels have the duty to notify any failure or malfunction of the VTU installed on board.

1. Regulation 7(e)(ii), The Fisheries (Satellite Vessel Monitoring) Regulations, 1993

2. 50 C.F.R., Section 660.25(d) (1996)

4.5 OFFENCES AND PENALTIES

First assessments of VMS programmes in Australia, New Zealand and USA clearly indicate that implementation of a VMS has significantly reduced the number of violations; notably in relation to incursions into prohibited fishing areas. Since VMS appears to act as a deterrent, its effectiveness will certainly be enhanced if supported by a sound legal framework providing for adequate types of offences and dissuasive penalties. In New Zealand, Regulation 8 of the Fisheries (Satellite Vessel Monitoring) Regulations, 1993, defines the different categories of offences relating to VMS. These include:

- (i) the removal of a VTU from a fishing vessel without prior approval of the Director-General;
- (ii) interference with a VTU to an extent that such device no longer complies with the type approval granted in respect of the device, or no longer operates in accordance with the manufacturer's specifications;
- (iii) failure to notify the Director-General of any matter required by or under these regulations; and
- (iv) communication of false or misleading information.

In addition, it contains a blanket provision stipulating that any person commits an offence when failing to comply with any other provision of these regulations. In accordance with Article 73(3) of UNCLOS, which states

“Coastal States penalties for violations of fisheries laws and regulations in the exclusive economic zone may not include imprisonment, in the absence of agreements to the contrary by the States concerned, or any other form of corporal punishment”

Regulation 8 does not provide for an imprisonment term, but stipulates that “every person who commits an offence against these regulations is liable on summary conviction to a fine not exceeding \$ 10 000.” By including language stating that any continuing offence would be punished by a further fine not exceeding \$ 500 for each day during which the offence is continued, law-makers made clear their intention to compel the violator to act promptly to correct the wrongdoing. Finally, New Zealand Regulation 9 specifies that the defendant may defeat the charges held against him or her if he or she can prove that:

- (i) the offence occurred as a result of an accident or a mechanical or technical failure, but it explicitly rules out mechanical or technical failure due to the negligence of the defendant, such as inadequate maintenance of the equipment; and
- (ii) he or she acted reasonably in the circumstances.

USA regulations applicable to the Western Pacific region contain a comprehensive set of prohibitions in relation to VMS. In addition to the above mentioned offences, it stipulates that it is unlawful for any person to:

- (i) possess on board a vessel without a VTU Pacific pelagic management unit species harvested with longline gear after NMFS has installed the VTU on the vessel;
- (ii) interfere with, impede, delay or prevent the installation, maintenance, repair, inspection or removal of VTU;
- (iii) interfere with, impede, delay or prevent access to a VTU by a NMFS observer; and
- (iv) connect, or leave additional equipment attached, to a VTU without the prior approval of

the competent authority.

5. ELEMENTS REQUIRED IN VMS REGULATIONS

This chapter aims to summarize briefly, in light of the above study, what the required elements are that need to be incorporated in VMS regulations.

Generally, VMS regulations should clearly establish the VMS if this is not done in principal legislation on marine fisheries or identify the VMS to be implemented and create obligations for compliance with its requirements.

5.1 DEFINITIONS

As a general rule, incorporation of definitions of key terms is necessary in order to avoid interpretation problems arising when implementing the piece of legislation or regulations. Even though the extent of the definitions to be included in VMS regulations will vary from one country to another in relation to their fisheries legislation or other relevant laws, it would certainly be useful in any case to define precisely what constitutes a “VMS” and what is a “VTU”.

5.2 SCOPE

Determining the scope of VMS regulations is an important issue that will be decided by fisheries managers based both on the priorities set out in the fishery policy and on the capability of the local administration to carry out its task. In view of the evolutionary approach (on a fishery-by-fishery basis) adopted by most fisheries managers the world over, the scope of most VMS regulations is likely to change in the years to come as the VMS requirement may be extended to other already-existing fisheries, or be a condition for the exploitation of new fisheries. As indicated earlier, criteria to be applied to define the scope of VMS regulations will vary in accordance with the specificities of each country’s fisheries. The most commonly used criteria are: vessel length; vessel nationality; the type of fisheries in which the vessels are involved; gears used; and area of operation.

5.3 FISHERIES MONITORING AGENCY

VMS regulations must specify the authority responsible for the implementation of a VMS programme and ensure that the said authority is properly staffed and equipped to carry out its task.

With regard to the issue of telecommunications terminal and satellite earth station equipment, it is interesting to note that the EU has recently adopted Directive 98/13/EC of the European Parliament and of the Council of 12 February 1998, relating to telecommunications terminal equipment and satellite earth station equipment, including the mutual recognition of their conformity.

5.4 MINIMUM PERFORMANCE STANDARDS

In order to ensure the effectiveness of a VMS programme, it is necessary to verify if vessels to which VMS applies are equipped with the proper type of equipment, i.e., equipment capable of accurately and securely transmitting the required information. Typically, minimum performance standards relate to: incorruptibility; position accuracy; transmission speed; reliability for operation in extreme weather or climatic conditions; capability to transmit adequate information; frequency of position reporting; polling; and format standards.

5.5 APPROVAL

A detailed approval process, as has been established in New Zealand, is highly desirable in order to ensure that the equipment to be used complies with the minimum performance standards and to ensure the proper functioning of the VTU. Such a process should encompass provisions relating, notably, to: application (procedure, documents to be provided); testing (off-line and on-line); designation of organizations approved for carrying out testing; and installation (fitting requirements, approved organization or suppliers).

5.6 REGISTRATION

Currently, it appears that only New Zealand requires the registration of VTUs on a register to be kept by the responsible agency (Ministry of Fisheries and Agriculture). Inclusion of such provisions does not seem essential at this stage of development of VMS and thus countries may elect not to establish a VTU register at this point. However, creation of such a register may prove useful as VMS requirements extend in order to monitor vessels required to carry a VTU on board and to prevent illegal removals or transfers of VTUs.

5.7 PROCEDURE TO BE APPLIED IN CASE OF VTU FAILURE OR MALFUNCTION

The effectiveness of VMS as a fisheries management tool is based on its ability to continuously monitor the movements of fishing vessels. It is therefore crucial to assure the continuity and permanency of the reporting of fishing vessel positions. To this end, a detailed procedure to be applied in the event of VTU failure or malfunction must be incorporated in VMS regulations. Such a procedure should include at least the following elements: notification of VTU failure or malfunction (the onus should be on both the master of the vessel and the monitoring agency); transmission of required VMS information through alternative systems of communication (call-in systems); and the specified period within which the repair or replacement of defective VTUs must take place.

5.8 OFFENCES AND PENALTIES

Offences must be defined in such a manner as to cover every imaginable interference with the proper functioning of VMS. The various types of interference which may occur include, inter alia, blocking of antenna, disruption of power supply, physical removal of VTU, duplication of VTU, or transmission of false position.

Penalties must be sufficiently high to deter any person from committing any subsequent violation. In this regard, higher penalties could be provided for any subsequent violation (e.g., higher fines and fishing licence suspension).

6. CONCLUSIONS

Experiments conducted in various fisheries the world over have confirmed that VMS, when properly implemented, is a potent fisheries management tool that can significantly improve the effectiveness of MCS and enforcement schemes. Reports from Australia, New Zealand and USA unanimously indicate a sharp decrease in reported violations in areas where VMS applies, especially where used to monitor adherence to prohibited fishing areas. As a result of these experiences, more countries – including developing countries – are considering the development of VMS systems for their fisheries, either at national level or – in collaboration with neighbouring states – at a regional level.

However, successful implementation of VMS programmes will depend, to a large extent, on the ability of each national government to devise an appropriate legal regime. Equally, given the mobility of both fish stocks that swim across maritime boundaries and distant water fishing fleets that target them, the need for an international approach to VMS is required.

It must be borne in mind that, to be successful, a VMS programme must be supported by:

- (i) a comprehensive set of VMS legislation and regulations, including dissuasive sanctions; and
- (ii) a sound general legal framework.

Beyond the need to design specific regulations for VMS, a central theme of this discussion has been the need to conceive an appropriate legal regime for the protection of VMS data. Therefore, a careful review may be needed of all legislation relating to the safeguarding of privacy, the use of computerized personal data, unfair competition, and legal protection of databases. This will be necessary in each country that intends to implement a VMS programme in order to ascertain whether or not VMS data are adequately protected. Where insufficiently developed or absent, appropriate legislation will need to be drafted. Without this, the inability of the fisheries administration to guarantee adequate legal protection of VMS data is likely to be a major problem in a large number of countries, and especially in some developing countries, where legal concepts such as protection of privacy, freedom of information or unfair competition are still foreign. The lack of such protection of VMS data may antagonize the fishery industry and as a consequence compromise the viability of VMS programmes.

It is widely recognized that proper management of fish stocks can only be achieved through international cooperation. Therefore, to be effective, implementation of VMS will require a high level of international cooperation in order to:

- (i) harmonize VMS regulations;
- (ii) agree on standard communications systems for delivering data; and

- (ii) agree on uniform formats to facilitate the exchange of fisheries information between national monitoring agencies.

In this context, it is noted that developing countries, particularly those with large EEZs, may have problems in individually establishing and maintaining MCS programs including VMS for their EEZs. The FFA experience and achievement in VMS so far show that a regional or subregional approach on VMS could help ease the lack of capacity or the technical and financial resource constraints in developing countries that may otherwise be obstacles to the establishment of VMS in fisheries MCS.

