

# **SRT Marine Systems plc**

## **INFORMATION PAPER**

### **VMS-100S**

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## 1. CONTEXT

This document provides information relative to the accreditation of the MTU/ALC VMS-100S from SRT Marine Systems.

### **About SRT Marine Systems:**

SRT is a UK based company founded in 1987 as a specialist radio communications technology development house. During its 30 year history the company has been at the leading edge of radio communication development and innovation across many areas, including satellite and terrestrial. The company has pioneered new technologies and developed and provided radio communication technology for companies such as Motorola, Nokia, Saab, Marconi, Transas, JRC, Koden, Raymarine and many others. Technologies have included satellite transceivers, cellular, maritime VHF and PMR. This has included notable industry enabling technology innovations such as linearisation which has been fundamental to the evolution of faster cellular communication. Today these unique capabilities have been focused on maritime domain awareness and embedded within our sophisticated integrated maritime surveillance and management systems, which are being adopted around the world to provide high resolution, high functioning reliable MDA at significantly reduced and thus viable cost. SRT has manufactured and deployed over 300,000 marine AIS based transceivers.

### **About VMS-100S:**

The VMS-100S was developed specifically for professional fisheries monitoring and management. It integrates SRT's most advanced technologies and know-how to deliver a robust, reliable and cost-effective electronic fisheries reporting transceiver.

The VMS-100s is a fully tested and certified (EU and USA) AIS transceiver. It uses AIS as its primary communication channel due to AIS's simultaneous multi-mode capability that delivers significantly enhanced fisheries surveillance and management functionality and reliability. This enables continuous tracking globally with a minimum of 4 status report updates per hour as well as localised real time direct tracking by patrol and enforcement vessels and aircraft, and vessel to vessel emergency communication in the event of an SOS.

AIS a number of other subtle by operationally significant advantages:

- 1) One communications protocol which enables reliable monitoring of all vessel's types and sizes – whole fleet management is both practical and viable without functionality compromise.
- 2) Significantly improved vessel tracking and reporting rates.
- 3) Multiple satellite service providers ensure competitive data marketplace and thus low airtime charges – typically +50% lower than traditional 'locked' systems.
- 4) Optional encryption for privacy.
- 5) Intelligent transmission payload coding enables extensive electronic reporting capabilities.

The VMS-100S incorporates a range of additional functionality which provides significant benefits:

- 1) Anti-spoofing
- 2) Electronic and physical anti-tamper.
- 3) Integrated backup battery
- 4) Secure internal 90 day VDR to enable onboard inspector and observer auditing
- 5) Ability to support multiple ERS devices – wirelessly or wired
- 6) VMS-100S has a built in capability to support alternative satellite only communication protocol such as Iridium to accommodate territories where existing legislation demands the use of this specific system. With dynamic switching between AIS and Iridium.

**WCPFC Accreditation Background:**

The Philippines has an ambitious program to digitise its fisheries monitoring and management across the entire Philippine fisheries fleet, ultimately creating the largest and most sophisticated fisheries management system. This is the IMEMS project which is now in its second Phase with the construction of a national monitoring system network and installation of monitoring transceivers on 5,000 of the largest vessels. This will progress to smaller and much larger numbers of vessels in the near term. IMEMS will enable robust, mass scale active management of all Philippines fisheries.

The achievement of this goal relies upon the intelligent integration of advanced technologies to deliver the required high level of functionality and performance whilst also delivering this at a economically viable cost point. The use of AIS and thus the VMS-100S is an integral component to IMEMS as it allows the low operating costs which make the IMEMS project economically viable on the scale envisaged.

As approximately 400 of the Philippines total fishing fleet of +200,000 vessels operate in WCPFC regulated areas, it is desirable for the standard VMS-100S to be certified by WCPFC.

## 2. VMS-100S TRIAL

### 2.1 TRIAL VESSEL DETAILS

In order to accredit the VMS-100S by the WCPFC, an extensive trial has been conducted and successfully completed under WCPFC Secretariat supervision. The timeline for this is described below.

- **September 2019**, SRT Marine Systems engaged with M. Albert CARLOT, WCPFC VMS Manager, and agreed on a test plan compliant to the WCPFC MTU/ACL accreditation rules.
- **October 2019**, a VMS-100S was installed on board reefer vessel 'F/V ISHI' operating in the WCPFC Convention Area and two months of continuous testing was undertaken, commencing from 17<sup>th</sup> October 2019 and ending on 17<sup>th</sup> December 2019.



#### Vessel Details

<b>Owner Name:</b>	EUTHYNNUS VENTURE CORPORATION
<b>Owner Address:</b>	PUROK BAGING SILANG, MAKAR, LABANGAL, GENERAL SANTOS CITY, PHILIPPINES
<b>Master Name:</b>	MARIO HEMELGO
<b>Master Nationality:</b>	Philippines
<b>Reg Port:</b>	General Santos
<b>Built in Country:</b>	Japan
<b>Built in Year:</b>	

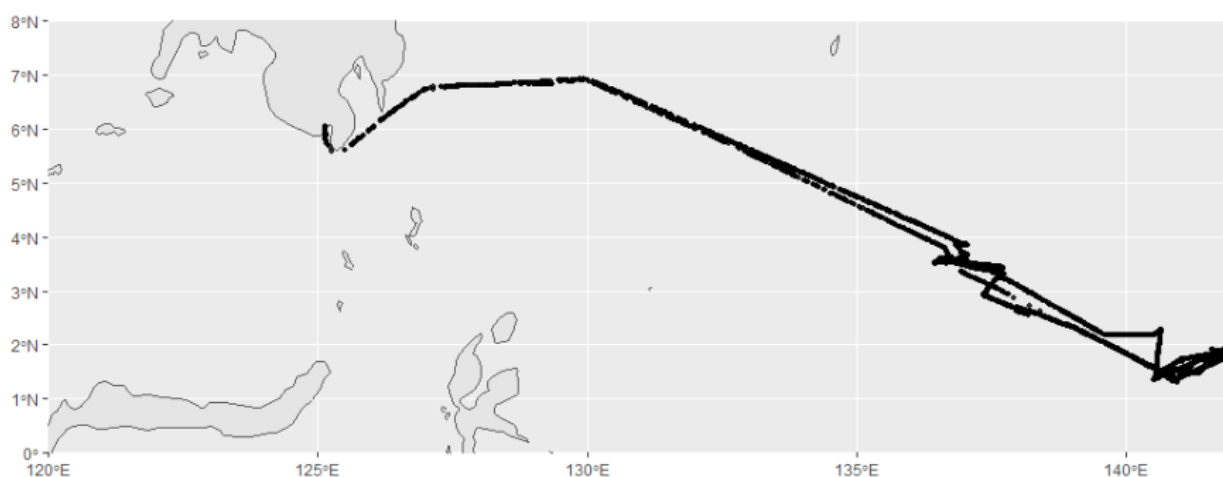
<b>1975</b>	<b>Crew:</b>	7
<b>Length:</b>		39.56m
<b>Moulded Depth:</b>		3.60 m
<b>Beam:</b>		6.30 m
<b>Tonnage:</b>		214.22 GT
<b>Engine Power:</b>		447 KW
<b>Freezer Types:</b>		ICE
<b>Fish Hold Capacity:</b>		180 MT

<b>Flag:</b>	Philippines
<b>Registration Number:</b>	12-0002340
<b>IRCS:</b>	DUG-6329
<b>Vessel Type:</b>	FISH CARRIER
<b>WIN:</b>	DUG-6329
<b>IMO-LR:</b>	7513707

## 2.2 TRIAL RESULTS

PARAMETER	RESULT	NOTES
TEST PERIOD	17 <sup>th</sup> October 2019 to 17 <sup>th</sup> December 2019	
TEST DURATION	62 days	
TOTAL STATUS REPORTS RECEIVED	19,354	WCPFC requirement is minimum of 1,440
STATUS REPORTS PER DAY	312	WCPFC requirement is minimum of 24
REPORTING RATE	6 minutes 12 seconds	WCPFC requirement is 60 minutes
NUMBER REPORTS WITH LATENCY +90mins	0 (0.00%)	WCPFC requirement is maximum latency of 90 minutes

### Vessel Track During Period:



### 3. VMS-100S

#### 3.1 TECHNICAL DESCRIPTION

The VMS-100 is an innovative vessel tracking, monitoring and reporting transceiver specifically designed for large scale fisheries monitoring. It uses multiple communication technologies that enable dual satellite and terrestrial operation and built in intelligence to enable a high level of continuous and reliable reporting with ultra-low long-term operating costs.



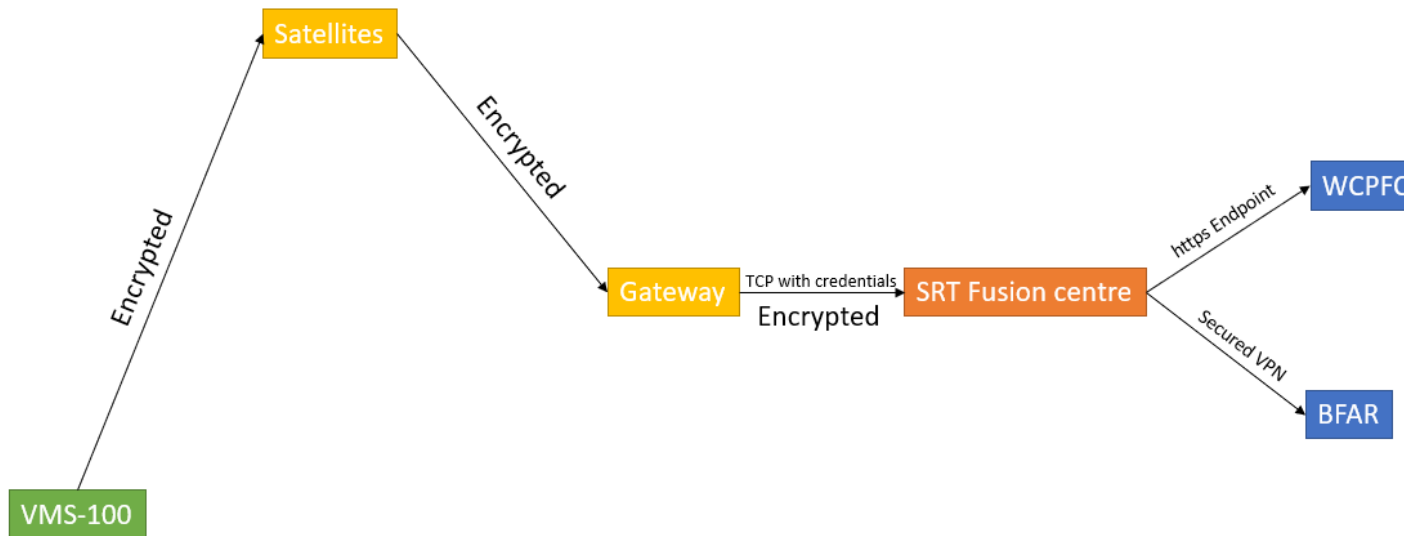
The VMS-100S key functionalities are:

- Fully encrypted 128 AES message allowing a secured and unreadable transmission of all messages over AIS to the Fisheries monitoring centre.
- Configurable transmit rate. By default:
  - Anchored or moored: 3mins
  - SOG >1 knots: 10 secs
- Anti-tampering:
  - VMS-100 is mounted on an anti-tamper mounting plate
  - Different type of seals
  - Power on/off alert
  - Antenna removal alert
- Voyage data recording: 90 days of full activity logs recorded on both VMS-100S and CONNECT-FISH (Electronic Catch Book)

SAT-Trak next generation technology optimises AIS transmissions from AIS transceivers for satellite reception, dramatically increasing the number of transmissions received by satellite and therefore more position reports per vessel.

### 3.2 MESSAGE TRANSMISSION

Data integrity and security is an important part of a VMS system and therefore SRT Marine Systems a full secured solution to transport the position information to the right user



- From VMS-100S to SRT Fusion Centre, the message is fully encrypted with a 128 AES encryption automatically changed each month
- From SRT Fusion Centre to WCPFC VMS provider (Trackwell), data is transferred via a secured endpoint (https) provided by WCPFC provider
- From SRT Fusion Centre to BFAR, data is transferred via a dedicated and secured VPN to the National Fisheries Data Centre



## 4. WCPFC COMPLIANCE

<p style="text-align: center;"><b>CMM 2014-02 – Annex 1</b></p> <p style="text-align: center;"><b>Draft Minimum Standards for Automatic Location Communicators (ALCs) used in the Commission Vessel Monitoring System</b></p>	<p style="text-align: center;"><b>VMS-100S features</b></p>
<p><i>The ALC shall automatically and independently of any intervention on the vessel communicate the following data:</i></p> <p><i>(i) ALC static unique identifier;</i></p> <p><i>(ii) the current geographical position (latitude and longitude) of the vessel; and (iii) the date and time (expressed in Universal Time Constant [UTC]) of the fixing of the position of the vessel in para 1 (ii) above.</i></p>	<p>Each VMS-100S is identified by a MMSI number which is unique and allocated by both BFAR and the National Telecommunication agency of Philippines as part of the licensing process.</p> <p>Each message is sent with:</p> <ul style="list-style-type: none"> <li>• ALC Unique Identifier</li> <li>• the current geographical position</li> <li>• a date and time (hours:minutes:seconds) in UTC</li> </ul>
<p><i>The data referred to in paras 1 (ii) and 1 (iii) shall be obtained from a satellite-based positioning system</i></p>	<p>VMS-100S is compatible with GPS, GLONASS and GALILEO positioning networks</p>
<p><i>ALCs fitted to fishing vessels must be capable of transmitting data referred to in para 1, hourly</i></p>	<p>For trial purpose, the VMS-100S was reporting at the highest reporting rate possible. This delivered a reporting rate of 6min 12s. this reporting rate can be adjusted</p>
<p><i>The data referred to para 1 shall be received by the Commission within 90 minutes of being generated by the ALC, under normal operating conditions</i></p>	<p>All data are transmitted with no greater latency than 90min as requested</p>
<p><i>ALCs fitted to fishing vessels must be protected so as to preserve the security and integrity of data referred to in para 1.</i></p>	<p>All accesses are password protected, all data are encrypted, and password protected</p>
<p><i>Storage of information within the ALC must be safe, secure and integrated under normal operating conditions</i></p>	<p>All data are continuously stored in the internal memory of the VMS-100S, encrypted and password protected.</p>



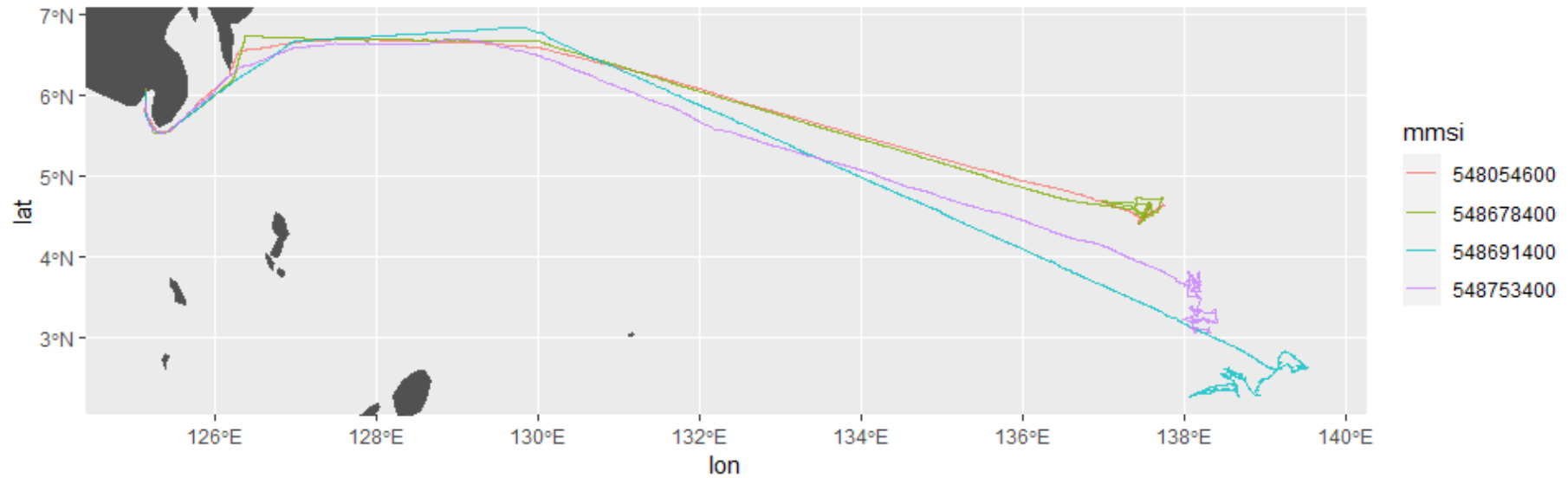
<p><i>It must not be reasonably possible for anyone other than the monitoring authority to alter any of that authority's data stored in the ALC, including the frequency of position reporting to that authority</i></p>	<p>All actions are logged by the VMS-100S and can be audited by Fisheries inspectors locally and are sent back to Fisheries National Datacentre regularly.</p>
<p><i>Any features built into the ALC or terminal software to assist with servicing shall not allow unauthorized access to any areas of the ALC that could potentially compromise the operation of the VMS</i></p>	<p>All accesses are password protected, all data are encrypted, and password protected</p>
<p><i>ALCs shall be installed on vessels in accordance with their manufacturer's specifications and applicable standards</i></p>	<p>Only trained and certified installers can install a VMS-100S. A strict process is followed and endorsed by BFAR to instal the VMS-100S</p>
<p><i>Under normal satellite navigation operating conditions, positions derived from the data forwarded must be accurate to within 100 square metres Distance Root Mean Squared (DRMS), (i.e. 98% of the positions must be within this range).</i></p>	<p>VMS-100S GPS accuracy is certified by a TÜV test and is compliant with WCPFC minimum requirements.</p>
<p><i>The ALC and/or forwarding service provider must be able to support the ability for data to be sent to multiple independent destinations</i></p>	<p>SRT Fusion Centre is operating 24/7 redundant servers disseminating in different format data to required providers.</p>
<p><i>The satellite navigation decoder and transmitter shall be fully integrated and housed in the same tamper-proof physical enclosure</i></p>	<p>All hardware and software are built inside the VMS-100S and are tamper-proofed by different physical and software seals.</p>

## 5. ADDITIONAL REFERENCES

The originally installed vessel for WCPFC accreditation testing has continued to be monitored. The total lapsed time period is now 11 months since installation and performance has been consistent with the original WCPFC testing and is stated below for clarity.

At the time of this report over 200 vessels have been equipped with VMS-100S devices and have been actively monitored. Data is available for all of these vessels to further co-borate the formal WCPFC testing program. Here is a sample of the tracks and stats of 4 vessels equipped with a VMS-100S in the WCPFC area between 25th September 2020 to 15th October 2020.

MMSI/ID	Vessel Name	Nb of msgs	Avg time between msgs (min)	Max (min)
<b>548691400</b>	FB RRCS 15	5317	3.146182	44.23333
<b>548054600</b>	FB MASTER RUSTIN 4	2087	3.208481	29.93333
<b>548753400</b>	FB LORNA-10	5125	3.213167	46.20000
<b>548678400</b>	FB LADY EVELYN 38	4355	3.361110	45.45000



*Figure 1: Tracks of 4 VMS-100S Equipped Vessels*