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DEVELOPMENT OF AN E-NAVIGATION STRATEGY

Long-Range Identification and Tracking (LRIT) Project

Submitted by the Republic of the Marshall Islands

SUMMARY

- Executive summary:** The purpose of this paper is to provide the Sub-Committee and the *Ad Hoc* Working Group on the Engineering Aspects of Long-Range Identification and Tracking of Ships with a status report on the establishment of a Marshall Islands National LRIT Data Centre and Vessel Tracking System (MarVTS) and to present a list of observations and summary recommendations which may be necessary to consider in the continuing development and implementation of LRIT systems
- Action to be taken:** Paragraph 21
- Related documents:** Resolutions MSC.202(81), MSC.210(81), MCS.211(81); MSC 82/8/1; and MSC 82/WP.8/Add.1 and Add.2

Background

1 During the International Maritime Organization's (IMO) Maritime Safety Committee (MSC) meeting in May 2006, Safety of Life at Sea (SOLAS) Convention amendments were adopted that require Long-Range Identification and Tracking of Ships (LRIT) (resolution MSC.202(81)) and associated Performance standards and functional requirements were defined (resolution MSC.210(81)). The MSC also adopted a related resolution MSC.211(81), "Arrangements for the Timely Establishment of the Long-Range Identification and Tracking System", which is the actual subject matter of this Marine Notice.

2 Resolution MSC.210(81) requests Contracting Governments to:

- .1 promptly put in place the necessary arrangements for the smooth integration of the ships entitled to fly their flag into the LRIT system so as to be able to submit to the MSC, at its eighty-second session, their firm intentions in relation to the establishment of National, Regional and Co-operative LRIT Data Centre(s);

- .2 urge ships entitled to fly their flag to participate in trials and testing of the LRIT system;
- .3 take early and appropriate actions to ensure that all necessary infrastructures are in place, timely, for the establishment of the LRIT system; and
- .4 in consultation with the industry, if feasible, to implement the provisions of SOLAS regulation V/19-1 before the dates its provisions are envisaged to become effective,

with a view to ensuring the prompt establishment, testing and confirmation of the functionality of the LRIT system as envisaged in the LRIT architecture.

National LRIT Data Centre

3 To this end, the MI Administration is complying with the urgings of the MSC and has begun to implement a system through a Contract of Agreement with Pole Star Space Applications Limited, an Applications Service Provider (ASP). The Agreement authorizes Pole Star to establish a secure Marshall Islands outsourced National LRIT Data Centre, manage its regulated functional requirements and assume the obligations of an ASP as required under the provisions of the performance standards and functional requirements established in conjunction with SOLAS regulation V/19-1.

National Vessel Monitoring System (VMS)

4 Under the authority granted to the Maritime Administrator in Marshall Islands Maritime Regulation 1.07, Control of the Movement and Operation of Vessels, the MI Administration has availed itself of the privilege provided in regulation V/19-1 through the Performance Standards to use the National LRIT Data Centre as a National VMS. The MI Administration has done so expecting that its National VMS may serve other valuable safety and security functions.

5 Subject to the applicability provisions of SOLAS regulation V/19-1, Marshall Islands Marine Notice 2-011-25 dated August 2006 now requires all ships entitled to fly the flag of the Marshall Islands to participate. The MI Administration is now providing to its National LRIT Data Centre the following information for each of the ships entitled to fly its flag that is required to transmit LRIT information:

- name of ship;
- IMO Ship identification number;
- call sign; and
- Maritime Mobile Service Identity.

6 The following provides the MI Administration's experiences thus far in establishing its National LRIT Data Centre and VMS which may be of interest to the *Ad Hoc* Working Group on the Engineering Aspects of Long-Range Identification and Tracking of Ships.

Outsourced National LRIT Data Centre

7 The following components form the Marshall Islands outsourced National LRIT Data Centre:

- LRIT information transmitting equipment: Inmarsat-C GMDSS
- Communication Service Provider(s): France Telecom/Xantic (Inmarsat)
- Application Service Provider(s): Pole Star (UK)
- LRIT Data Centre(s): MarVTS powered by Purplefinder
- Vessel Monitoring System(s): as per LRIT Data Centre
- LRIT Data Distribution Plan: N/A at this stage
- International LRIT Data Exchange: N/A at this stage.

Commissioning Phase

8 In all cases, a comprehensive Inmarsat-C commissioning process, i.e. DNID lifecycle management, was followed consisting of 16 separate attempts over a two-week period – so allowing for ships in port with terminals switched-off and/or logged-off. Inmarsat, France Telecom and Xantic were actively engaged and provided advisory feedback during this phase and into the operational phase. The essential parameters are defined below:

- Commissioning Start-date: 01-Aug-06
- Commissioning End-date: 15-Aug-06
- Vessels: 903 required to comply
- LESOs used: France Telecom (50%) and Xantic (50%)

Operational Phase

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- | | |
|---------------------------|------------------|
| Start Date: | 16 August 2006 |
| Current Date: | 20 December 2006 |
| Account code: | Marshall Islands |
| Ship compliant count: | 746 |
| Ship problem count: | 120 |
| Ship never tracked count: | 37 |

Summary:

Status	Status	Number of Vessels
ONLINE	OK	746
ONLINE	SNR	98
ONLINE	MLO	30
ONLINE	MNIOR	24
ONLINE	UM	5

10 Of the total Marshall Islands applicable fleet of 903 ships, 746 (83%) were commissioned successfully and remain functional and consistent in their reporting (OK status), 120 (13%) provide inconsistent position reporting, and a total of 37 (4%) have never reported at all.

11 Of the 120 inconsistent ships, four types of problems were encountered:

- System Not Responding (SNR), the most serious problem, as these units cannot be identified by the Inmarsat LESO.
- Mobile Logged Off (MLO), less serious, as they can be identified by the Inmarsat LESO but have been manually logged off by the Master.
- Mobile Not In Ocean Region (MNIOR), a transient error which normally evolves to an OK, SNR, or MLO status.
- Unknown Mobile (UM), the Inmarsat Mobile Number (IMN) is not recognized by the Inmarsat LESO.

Observations

12 *Control Sample 1 – Inconsistent Ship Monitoring*

- Group – 52 ships that had reported since start of commissioning but had as of 19 October stopped reporting for over four days were observed for a period of two weeks.
- Observation – 3 (6%) had reported during the period then stopped reporting again, whilst 15 (29%) had started and remained reporting.
- Summary – this demonstrates the transient nature of Sat-C reporting and difficulties in identifying which units are compliant or non-compliant. In some cases the Master regularly switches off and/or logs out of the Sat-C terminals in port resulting in loss of tracking, and switches on and/or logs on when underway with a return to tracking. There does not appear to be a solution to this problem unless it is mandated that Sat-C terminals be left logged on and/or switched on at all times, especially in port. Other possibilities that should be considered are:
 - The vessels heading is such that the Inmarsat-C antenna is temporarily obscured from the satellite, e.g. due to ship superstructure blockage.
 - The equipment has been unintentionally powered off.
 - A failure of ships power has occurred.
 - To a limited degree, ships transiting Inmarsat Ocean Regions also cause this effect.

13 *Control Sample 2 – Secondary Sat-C Utilization*

- Group – 37 ships that had never reported since start of commissioning were re-activated using the secondary Sat-C (refer to SOLAS IV-15 Maintenance requirements).
- Observation – 26 (68%) were successfully activated and 12 (32%) unsuccessfully.
- Summary – Using the secondary Sat-C is an attractive option. In some cases the secondary Sat-C will be a newer terminal than the primary Sat-C and consequently better conditioned to position report. Furthermore, the secondary Sat-C, if used as the duplicate system, generally does not have to handle the same volume of communications/e-mail traffic as the primary system and consequently better conditioned to uninterrupted position reporting.

14 *Control Sample 3 – SSAS Utilization*

- Group – 13 ships were re-activated using the Mini-C-type SSAS.
- Observation – 11 (85%) were successfully activated and 2 (15%) unsuccessfully.
- Summary – Using Mini-C SSAS is an attractive option. Of the 11 successful activations, all have remained active, i.e. they have not been logged off or switched off in port. It is worth noting that the 2 unsuccessful SSAS terminals are non-compliant to SOLAS XI-2/6. The Administration is investigating these terminals.

15 *Control Sample 4 – ‘Poll Only’ Terminals*

Group – 110 ships are of a ‘poll-only’ type (15% of the 746 that have been commissioned successfully and remain functional and consistent in their reporting). That is to say, the LRIT Data Centre must poll the terminal to obtain a position report, i.e. the terminal will not automatically position report. In addition, the vast majority of the ‘poll-only’ terminals are of a specific make and model that cannot be programmed to automatically report.

- Observation – An automatic position report can be emulated using this procedure, but the commercial impact is that the procedure incurs twice the cost per position report.
- Summary – While this procedure may be acceptable for a Flag in order to obtain the baseline tracking, i.e. 4 position reports per day, the procedure is not compatible with the performance standard and functional requirement to allow the position report interval to be modified, e.g. to each hour.

16 *Control Sample 5 – Uncontrolled Ship Position Reporting*

- Group – Upon commissioning, a small number of terminals immediately entered into a state of uncontrolled position reporting, i.e. one position report per hour in the worst case.
- Observation – Generally this situation is caused through either an historic programming feature which in some fashion becomes immediately enabled on commissioning, or through manual intervention on the ship.
- Summary – The commercial impact is that the procedure incurs a significant multiple of the cost per ship. Reprogramming or replacement may be necessary to ensure compliance.

17 *Obsolete MES equipment*

- Observation – Some old obsolete MES Inmarsat-C equipment is still likely to be in service. This includes the Trimble Galaxy, very old Thrane & Thrane units, SNEC, Toshiba, Hughes, etc. These units cannot be upgraded as they are no longer supported and may not even support some functions at all.
- Summary – Any users with very old equipment, particularly if it is older than 10 years, are likely to experience difficulties. There does not appear at present to be an acceptable solution to this problem other than requiring a refit to newer type approved hardware and the latest applicable type approved software.

18 *DNID Registry*

- Observation – A short form of addressing is employed called “closed network addressing.” A Data Reporting and Polling Closed Network Identity (DNID) is allocated to the Sat-C that will be reporting to a particular Applications Service Provider (ASP). Depending on the age, make and model of the Sat-C terminal, it is possible that the DNID registry is full which will result in a failure to initiate and maintain tracking, i.e. a System Not Responding (SNR) failure status.
- Summary – Manual procedures can be put in place for the Master to establish the state of the DNID registry and implement corrective action through a structured deletion of unused DNIDs involving the originating LES. However, in the case of very old, obsolete or unsupported terminals, this procedure may be technically too complex and administratively too time consuming to make it an effective solution. Again, the only acceptable solution to this problem may be to require a refit to newer type approved hardware and the latest applicable type approved software.

19 *Terminal Activation Process – Incoming Ship*

- Observation – During the process of ship transfer, the Marshall Islands Flag Administration (MIF) would in some cases immediately attempt to activate the tracking of a ship. At this stage the Point of Service Activation (PSA) agent acting on behalf of the MIF would have already legitimately registered the Sat-C terminal with Inmarsat under a MIF Inmarsat Mobile Number – prefix “538”. Given that it can take up to 12 hours for this information to propagate out from Inmarsat to some LESOs, i.e. greater than the 6 hour minimum regulatory reporting interval, when the MIF attempted to activate the Sat-C terminal, the system would not recognize the “new” Inmarsat Mobile Number and would return an “Unknown Mobile (UM)” status and resultant non-compliant ship.
- Summary – The solution to this problem would appear to be to allow some form of temporary holding area with regulatory exemption and to build a delay into the commissioning process for incoming ships so that enough time is allowed for propagation to take place.

20 *Terminal De-activation Process – Outgoing Ship*

- Observation – The Marshall Islands Flag (MIF) would not always be aware that it was releasing a ship to another Flag. At this stage, the PSA agent acting on behalf of the incoming Flag would have already legitimately registered the Sat-C terminal with Inmarsat under an alternative Inmarsat Mobile Number. Consequently, when the MIF attempted to de-activate the Sat-C terminal, the system would not recognize the “old” Inmarsat Mobile Number and would return a “UM” status. The LESO at this point would no longer be able to de-activate the Sat-C terminal, and consequently the ship would continue to track and transmit position reports to the MIF relating to which it has no regulatory remit nor interest, and furthermore continues to incur cost on the part of the MIF.
- Summary – Again, the solution to this problem would appear to be to allow some form of temporary holding area with regulatory exemption, and to build a delay into the commissioning process for incoming ships to allow de-activation to take place. It might be recalled that the COMSAR LRIT Correspondence Group in Task 10, LRIT Data Centre list of ships, anticipated that the LRIT-FS De-commissioning and

Commissioning Reports would be received by an LRIT Data Centre in close duration to each other. In the event that either one of the reports was received in isolation of the other, the applicable report would need to be placed in a 'temporary holding area' to await receipt of, and cross reference with, the associated report. A time threshold would have to be placed on the duration of this holding period, and the action to be taken determined in the event that an associated report is not received within a reasonable period of time.

The Next Step

21 If possible, and once the basic technical difficulties are resolved, the MI Administration will attempt to simulate an LRIT Data Exchange and initiate vessel tracking with another volunteering Contracting Government.

Action requested of the Sub-Committee

22 The *Ad Hoc* Working Group on the Engineering Aspects of Long-Range Identification and Tracking of Ships is requested to take the above technical experiences into consideration in the continuing development of the specifications for LRIT Data Centres and the LRIT Data Exchange and the effects they may have on the ability of shipboard units to comply with the regulation, performance standards and functional requirements of the LRIT system.
