



IMO

E

SUB-COMMITTEE ON
RADIOCOMMUNICATIONS AND
SEARCH AND RESCUE
11th session
Agenda item 14

COMSAR 11/14/6
17 January 2007
Original: ENGLISH

DEVELOPMENT OF AN E-NAVIGATION STRATEGY

Long-Range Identification and Tracking of Ships (LRIT)

Submitted by the United States

SUMMARY

<i>Executive summary:</i>	The United States proposes that, pursuant to SOLAS chapter V/19-1 (MSC.202(81)), the associated performance standards and functional requirements (MSC.210(81)), and the decision of the Maritime Safety Committee that IMSO is the selected LRIT Co-ordinator, the United States is willing to build and operate an international LRIT data centre and international data exchange until such time as another centre/exchange is available
<i>Action to be taken:</i>	Paragraph 8
<i>Related documents:</i>	MSC.202(81); MSC.210(81); MSC.211(81); MSC 82/WP.8/Add.2; and COMSAR 8/13/5

Introduction

1 This document is submitted in accordance with the Guidelines on the organization and method of work of the MSC and its subsidiary bodies (MSC-MEPC.1/Circ.1) and comments on COMSAR 11/2/2, paragraph 8.55. This document is submitted in accordance with the extended deadline for comments (19 January 2007) noted in COMSAR 11/2/2, paragraph 8.62.

2 In resolution MSC.211(81), the Committee invited Contracting Governments to submit proposals on the issues which need to be addressed in relation to establishment of the International LRIT Data Centre (IDC) and International LRIT Data Exchange (IDE) or other issues relating to the LRIT system. In MSC 82/8/5, the United States offered to host, build, and operate the IDC and IDE until there is another viable alternative which the Organization wishes to pursue. As noted in paragraph 8.55 of COMSAR 11/2/2, MSC was unable to decide upon the location of the IDC and IDE. To assist COMSAR and MSC, this document provides further details on the United States offer.

For reasons of economy, this document is printed in a limited number. Delegates are kindly asked to bring their copies to meetings and not to request additional copies.

Offer to build and operate the International LRIT Data Centre and Data Exchange

3 Should IMO accept the United States offer to host, build, and operate the IDC and IDE on an interim basis, the United States would meet all obligations of such facilities. In particular, the design and operation of the IDC and IDE will be in accordance with MSC.202(81), MSC.210(81), and MSC.211(81). The United States operation will follow the precepts of SOLAS regulation V/19-1. Specifically, Contracting Governments will have access only to that LRIT information to which they are entitled under SOLAS regulation V/19-1/8.1. LRIT data in the IDC and IDE would not be accessed by the United States persons or agencies of the United States Government outside the scope of SOLAS regulation V/19-1.

4 Recognizing that IDC/IDE start-up costs were not part of the obligations of Contracting Governments in the Performance Standards, the United States' offer is to build and fund the IDC and IDE on a non-reimbursable and interim basis. It is envisaged that the IDC and IDE would be located at the United States Coast Guard's Operations Systems Center (OSC) in Kearneysville, West Virginia, where the Amver system is also located. This location provides economies of scale as well as the requisite levels of security and support in operating a 24/7 LRIT system. The OSC would also host a United States National LRIT Data Centre. Since the Operations Systems Center would, in effect, be the Application Service Provider (ASP) for the IDC, the United States submits OSC for consideration and recognition by the Committee in accordance with MSC.210(81).

5 In COMSAR 8/13/5, the United States made a similar offer to be built upon or modelled after Amver to support LRIT and SAR. The United States has conducted an analysis of vessel tracking capabilities and no longer believes the Amver model would best satisfy the LRIT design. The Amver technologies do not allow the required bi-directional, dynamic content-based routing and secure messaging that IMO specifications require. Developing the LRIT code, database, and fundamental architecture would be less complex and avoid risk by utilizing the United States Coast Guard Enterprise Architecture. This approach also preserves the single mission SAR focus of the Amver system. Thus, Amver would continue to operate as it has in the past.

6 A proposed high level LRIT implementation architecture is provided at the annex.

Action requested of the Sub-Committee

7 The Sub-Committee is invited to consider the United States' offer to build and operate an International LRIT Data Centre and International LRIT Data Exchange until other suitable arrangements are in place to perform these functions, and decide, as appropriate, to advise MSC 83.

ANNEX

HIGH LEVEL LRIT ARCHITECTURE – DISTRIBUTED, SERVICE-ORIENTED

The following diagram depicts a conceptual high-level model of a service-oriented solution to implementing long range identification and tracking of ships. This architectural model fully complies with the United States Federal Enterprise Architecture Framework and the USCG enterprise architectures. This model can readily serve whether building an IMO-compliant system is implemented in isolation, or extending an IMO solution to serve the needs for voluntary vessel tracking as well.

A brief explanation of the primary facets behind this architectural approach follows the diagram. Note: The “USCG Voluntary Tracking System” in the lower left corner grey box refers to a possible voluntary LRIT system, not Amver.

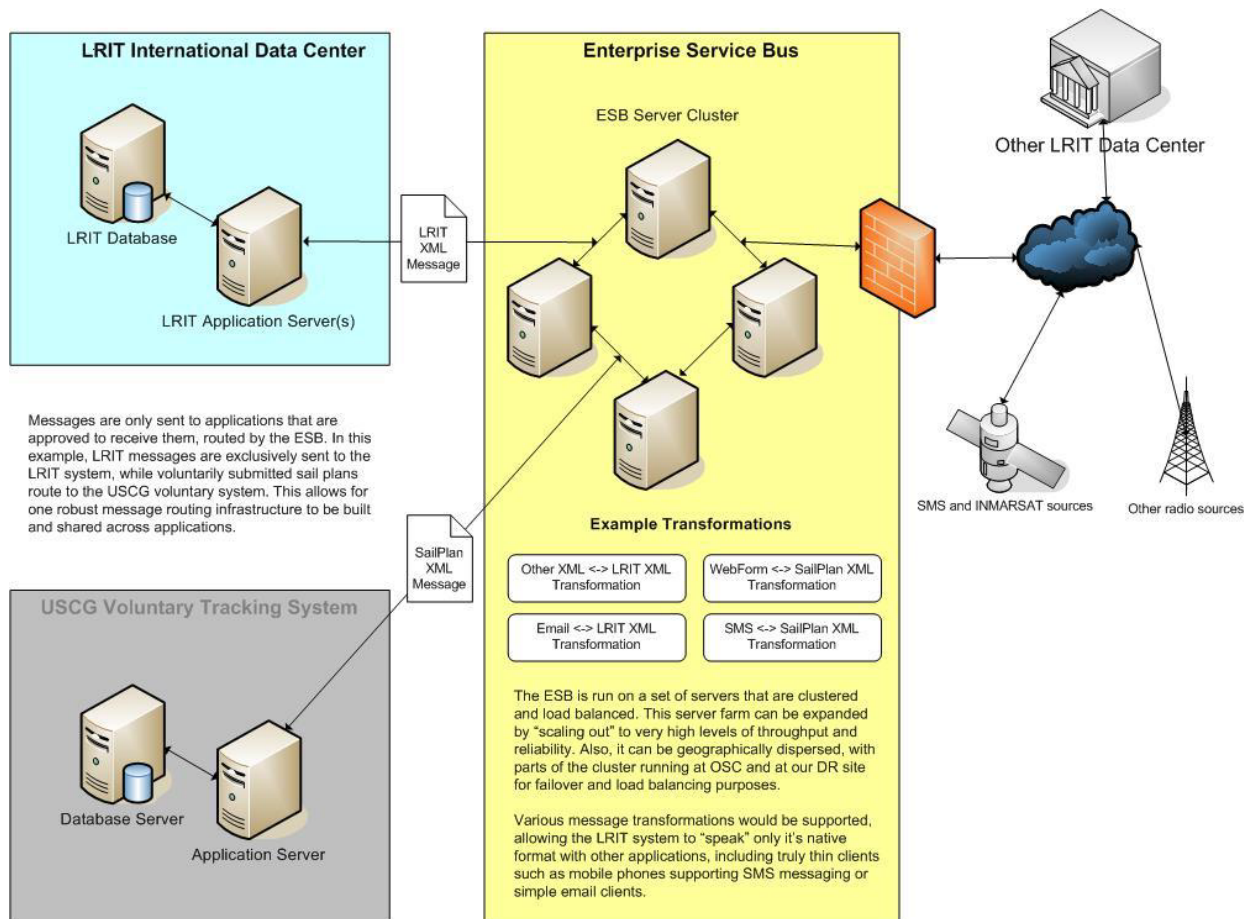


Figure 1 – High Level IMO-compliant LRIT Architecture

The architecture proposed for the LRIT solution decouples the various business services needed to perform the tasks outlined in the IMO requirements from the infrastructure over which messages are sent and routed. This decoupling method provides several advantages over a more tightly integrated design, such as a traditional n-tier application.

Because service-oriented architecture (SOA) leverages standard data formats so heavily – all the business services and applications use common representations of data in XML – it is very important to carefully design and develop the XML schemes to be used. Once they are deployed and many different systems and services start using them, changes are relatively high impact and cost. This means that a very thorough analysis of the business and technical requirements needs to be made in the early stages of an SOA project as much of the development is data driven. This is worth noting because in most application development more thought is given to the program design than the data design in the early stages, however such an approach is not helpful when dealing with SOA. It is the data interchange formats that are most critical – not the internal data models for relational or other forms of data storage.

Publish and Subscribe

One of the major issues that will be faced by any LRIT system is how to efficiently send messages to many recipients. By using an Enterprise Service Bus (ESB), a publish/subscribe mechanism can be leveraged to provide this functionality in a generic and powerful way.

Content-Based Routing

The routing of messages can be built into the bus and the rules for routing can be enforced across many applications. Also, because routing can be content-based it can be highly dynamic, if a new recipient requires all messages that meet a new set of business criteria this can be added into the architecture without modifying existing applications to accommodate it. In concert with dynamic routing security can be implemented upstream from the attached business services, ensuring messages are only delivered to the appropriate recipients.

Distribution

Because an ESB is a powerful tool for providing routing services and publication, a distributed model can be introduced to the LRIT project from the beginning. Such a model allows the data to potentially be distributed to servers near the users, improving performance and making better use of network resources. Distribution also allows for nearly linear scale-out capacity by allowing new “nodes” on the ESB to be stood up as-needed.

Broadly Leveraged Data Transformation

In an SOA, the business services “speak” in a standard XML format and adapters or transformers are built for non-standard formats. This way all the services on the bus can leverage any new input or output mechanisms or services as appropriate.