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LRIT-RELATED MATTERS

Report on the outcome of the intersessional meetings of the *Ad Hoc* Working Group on Engineering Aspects of Long-Range Identification and Tracking of Ships

Submitted by the Chairman of the *Ad Hoc* Working Group

SUMMARY

Executive summary:	This document reports the outcome of those meetings of the *Ad Hoc* Working Group on Engineering Aspects of Long-Range Identification and Tracking of Ships that took place after MSC 82, and presents an overview of the Group's conclusions and recommendations
Action to be taken:	Paragraph 24
Related documents:	MSC 82/24, paragraphs 8.37, 8.40 and 8.61; MSC.1/Circ.1219; resolution MSC.202(81) and resolution MSC.210(81)

General and Terms of Reference

1 The Committee, after discussion in its eighty-second session, approved MSC.1/Circ.1219 on Interim LRIT Technical Specifications and other matters, including:

.1 technical specifications for the International LRIT Data Exchange;

.2 technical specifications for the International LRIT Data Centre;

.3 technical specifications for communications within the LRIT system network;

.4 protocols for the development testing of the LRIT System and for testing the integration into the system of new LRIT data centres; and

.5 guidance on setting up and maintaining the Data Distribution Plan.

2 Recognizing that the technical specifications and other matters required further expert development by the *Ad Hoc* Working Group on Engineering Aspects of Long-Range Identification and Tracking of Ships the Committee agreed to circulate the technical specifications, as an interim document, by means of MSC.1/Circ.1219 to all Contracting Governments, and to the nominated LRIT Co-ordinator, and instructed the Secretariat accordingly.

3 The Committee, in its eighty-second session, noting that, apart from the agreed need for further work on the deliverables approved in MSC 82/24, paragraph 8.37, there were still other outstanding issues which could only be taken forward intersessionally in order to ensure the timely establishment of the LRIT system, approved the re-establishment of the *Ad Hoc* Engineering Working Group on LRIT with the following revised and expanded terms of reference:

> *The Ad Hoc Working Group on Engineering Aspects of LRIT should, taking into account the provisions of SOLAS regulation V/19-1, resolution MSC.211(81) on Arrangements for the timely establishment of the long-range identification and tracking system, resolution MSC.210(81) on Performance standards and functional requirements for long-range identification and tracking of ships and the decisions and discussions at MSC 82, specifically the comments on the draft technical specifications given in plenary, complete the following tasks and submit a report to MSC 83 for approval*:
>
> *.1 Further develop the draft technical specifications, as given in MSC 82/8/1*.
>
> *.2 Update the required technical documents taking into account MSC 82/8/11*.
>
> *.3 Prepare a technical costing and billing standard within the policy framework as decided by the Committee.*
>
> *.4 Address all items within square brackets within the draft technical specifications.*
>
> *.5 Consider technical issues and develop technical criteria to be taken into account when establishing the International LRIT Data Centre and the International LRIT Data Exchange*.
>
> *.6 Liaise with the IMO Secretariat regarding consistency, security and other aspects of the Data Distribution Plan with the technical specifications.*
>
> *.7 Ensure that the testing documents completely address the performance standards.*

4 The Committee in its eighty-second session also authorized the necessary two to four meetings of the intersessional *Ad Hoc* Working Group on Engineering Aspects of LRIT ("the Group") to produce the final technical specifications in time for the deadline of the submission of the report to the Committee's eighty-third session. The Committee authorized the next meeting of the Group to be held in the week prior to the eleventh session of the Sub-Committee on Radiocommunications and Search and rescue (COMSAR 11) and accepted the generous offer of CIRM to host the meeting.

Third meeting of the *Ad Hoc* Working Group on Engineering Aspects of Long-Range Identification and Tracking of Ships

5 The third meeting of the Group was held in London, United Kingdom from Monday, 12 February until Friday, 16 February 2007 and was hosted by CIRM (Comité International Radio-Maritime). It was chaired by Dr. Sam Ryan of the Canadian Coast Guard and was attended by representatives from Australia, Brazil, Canada, China, Finland, Greece, Iran, (Islamic Republic of), Japan, the Marshall Islands, Panama, the Philippines, Poland, Norway, Romania, Spain, the Russian Federation, Sweden, Turkey, the United Kingdom, the United States and Hong Kong, China, including observers from the European Commission,

IAIN, ICS, IEC, CIRM and IMSO; a total of sixty-four participants. An IMO representative provided Secretariat services for the meeting. When unforeseen circumstances arose, Mr. Andrew Fuller of IMSO was able to offer support to the Chairman for part of this meeting.

6 As the third meeting of the Group followed the approval of the interim draft technical specifications by the Committee, the Group concentrated on further development of those technical specifications and began developing recommendations for a technical costing and billing standard within the policy framework as decided by the Committee.

7 The meeting was able to make considerable progress in refining the interim specifications developed at its earlier meetings. The Group was also able to consider those questions asked by the Committee in its eighty-second session about costing and billing issues, to consider the contributions of the United States and CIRM to COMSAR 11, and to identify a number of different scenarios under which different costs would be incurred at various points within the LRIT system. The Group made an interim report to COMSAR 11.

Fourth meeting of the *Ad Hoc* Working Group on Engineering Aspects of Long-Range Identification and Tracking of Ships, Attard, Malta, 9 to 12 May 2007

8 The fourth meeting, also chaired by Dr. Sam Ryan (Canada) was hosted by the Government of Malta. It was attended by the representatives from Argentina, Australia, Canada, Chile, China, Denmark, Germany, Greece, India, Japan, Malta, the Marshall Islands, Mexico, Norway, Portugal, the Russian Federation, South Africa, Sweden, Turkey, the United Kingdom and the United States, including observers from the European Commission, CIRM and IMSO; a total of thirty-five participants. An IMO representative provided Secretariat services for the meeting, and also provided liaison between the Group and the IMO on matters relating to the Data Distribution Plan.

9 The working pattern of this meeting was similar to that of the third meeting.

10 At this meeting, the Group was able to make substantial progress towards refining and completing all of the required documents. While on costing and billing considerable progress was made, a considerable number of areas were identified where the burden of costs would be affected by ambiguities within the existing policy framework, identifying where additional policy decisions would be needed, and highlighting the consequences of such decisions.

Fifth meeting of the *Ad Hoc* Working Group on Engineering Aspects of Long-Range Identification and Tracking of Ships, Hamburg, Germany, 12 to 14 June 2007

11 The fifth Meeting, also chaired by Dr. Sam Ryan (Canada), was hosted by the Government of Germany. It was attended by representatives from Angola, Argentina, Australia, Canada, Chile, China, Denmark, Finland, Germany, Greece, India, Iran (Islamic Republic of), Japan, Malta, the Marshall Islands, Mexico, Norway, Panama, Qatar, Romania, the Russian Federation, Sweden, Turkey, the United Kingdom and the United States, including observers from the European Commission, CIRM and IMSO; a total of fifty-two participants. An IMO representative provided Secretariat services for the meeting, and provided liaison between the Group and the IMO on matters relating to the Data Distribution Plan.

12 Preliminary discussions were held in Plenary related to all documents. Further drafting work was carried out. All documents were essentially completed, with the Group recognizing that some editorial work remained and that some text could not be finalized awaiting final policy decisions from the Committee.

13 At this meeting, the Group agreed that a final informal Editorial Group meeting was necessary to finalize the afore-mentioned specifications and also that it should be a small group, with limited number of participants, to ensure good progress. The purpose of that meeting would be to review the documents produced by the Group and ensure their clarity of expression and consistency, but not make substantive changes or create new content.

Criteria for the location of the International Data Centre and International Data Exchange

14 MSC 82 directed the Group to develop technical criteria to be taken into account when establishing the International LRIT Data Centre (IDC) and the International LRIT Data Exchange (IDE). The Group has developed these criteria and believes these could also apply to the LRIT Data Distribution Plan (DDP). All three of these LRIT entities could be co-located but need not be. The Group believes that these criteria could also apply as a guideline for the establishment of any LRIT Data Centre.

15 The Group considered the requirements for the physical location of the IDC. The Group felt that there should be redundancy in IDC and IDE equipment and that a disaster recovery site would be appropriate. The site must be accessible every day of the year 24 hours a day. It must be accessible to the LRIT Co-ordinator in accordance with the Performance Standards. The IDC and IDE must also have physical security including protection from vandalism, the environment (e.g., natural disasters) and fire.

16 Network requirements will be of paramount importance in the IDC and IDE. Communication links will be needed between the Application Service Provider (ASP) and Communications Service Provider (CSP) and the IDC, between the IDC and the IDE, between the IDC and the DDP, and between the DDP and the IDE. Additionally, the LRIT Co-ordinator should have remote access to the IDC, the IDE, and the DDP. Because it is not yet known how much the LRIT system will be used, communications links must have adequate and scaleable data bandwidth. Multiple internet service providers (ISP) should be accommodated in the IDC and IDE. The ISP links should likely be fiber optic with satellite communications for back up. Terrestrial microwave communications may also serve in a back up capacity. Data integrity is a key feature of the IDC and IDE and should require redundant firewalls. The communications links with the IDC and IDE will likely be internet but may also be leased lines, but in no case should broadcast connections be considered for any links within the LRIT system.

17 Redundancy and quality of service will impact the power and server requirements for the IDC and IDE. Power considerations should include underground power supply, uninterruptible power supply, and a source of emergency power (e.g., emergency diesel) sufficient to meet the availability requirements specified below. The IDC and IDE should include local backup servers with seamless switch-over between servers locally. Remote backup servers should have close to seamless switch-over. The IDC and IDE should operate 24 hours a day 7 days a week with an availability of 99.9% over the year and 95% over any day. To meet these availabilities, maintainability of the IDC and IDE will necessitate availability and access to spare parts.

Informal Drafting Group of the *Ad Hoc* Working Group on Engineering Aspects of Long-Range Identification and Tracking of Ships, IMO Headquarters, London, United Kingdom, 2 to 3 July 2007

18 This informal Drafting Group meeting, again chaired by Dr. Sam Ryan (Canada) was attended by representatives from Canada and the United Kingdom, and observers from CIRM; a total of seven participants. An IMO representative provided Secretariat services for the meeting, as well as providing liaison with IMO on matters relating to the Data Distribution Plan.

19 The outcome of the meeting was final revised texts of the following:

.1 draft technical specifications for the International LRIT Data Exchange;

.2 draft technical specifications for the International LRIT Data Centre;

.3 draft technical specifications for communications within the LRIT system network;

.4 draft LRIT Technical Costing and Billing standard;

.5 draft protocols for the development testing of the LRIT System and for testing the integration into the system of new LRIT data centres;

.6 draft Guidance on establishing and maintaining the Data Distribution Plan; and

.7 a document outlining the key outstanding issues and policy decisions for consideration by the Committee.

Conclusions and recommendations

20 Intensive efforts were made by the Group to provide a comprehensive LRIT system functional specification and architectural design; the resulting draft technical specifications, along with the additional draft protocols for the developmental testing; and draft Guidance on setting up and maintaining the Data Distribution Plan. The documents are sufficiently mature to support the request for the submission of proposals for the IDE and the IDC; and the development and commissioning of the entire LRIT system.

21 However, it was agreed that further policy work and decisions are necessary for the successful implementation and sustainability of the LRIT system. Therefore the Group submitted the draft LRIT Technical Costing and Billing standard and the document outlining the key outstanding issues and policy decision to the Intersessional meeting of MSC Working Group, in the hopes that the ISWG could advance the policy related issues.

22 It was the opinion of the Group that this consolidated document should form the foundation of the international LRIT system, and as such the Group recommends that the Committee forward the document in its entirety to Contracting Governments, to the LRIT Co-ordinator, and to other appropriate persons or parties, including Observers, interested in further development of the system.

Action requested of the Committee

23 The Committee is invited to:

.1 consider and approve the:

.1 draft technical specification for the International Data Exchange (annex 1);

.2 draft technical specification for the International Data Centre (annex 2);

.3 draft technical specification for communications within the LRIT system network (annex 3);

.4 draft Technical Costing and Billing standard (annex 4);

.5 draft protocols for the development testing of the LRIT system and for testing the integration into the system of new LRIT data centres (annex 5);

.6 draft guidance on setting up and maintaining the Data Distribution Plan (annex 6); and

.7 document outlining the key outstanding issues and policy decisions for consideration by the Committee (annex 7);

.2 endorse the advice of the Group regarding the location of the IDC and IDE (paragraphs 15 to 18 inclusive);

.3 note and endorse the opinion of the Group (paragraph 23) that the report be forwarded in its entirety to Contracting Governments, to the LRIT Co-ordinator and to other appropriate persons or parties, including Observers, interested in further developing the system, and to instruct the Secretariat accordingly; and

.4 approve this report in general.

***

ANNEX 1

Draft Technical Specifications for the International LRIT Data Exchange

Prepared by: *Ad Hoc* Engineering Working Group
Date of Issue of this Draft: July 3, 2007

Table of Contents

REVISED DRAFT TECHNICAL SPECIFICATION FOR THE INTERNATIONAL LRIT DATA EXCHANGE

1 General Provisions

1.1 Scope and Background

1.1.1 Scope

1.1.1.1 The intent of this document is to outline the technical specifications for the International LRIT Data Exchange within the international Long-Range Identification and Tracking (LRIT) system as stated in the terms of reference of resolution MSC.211(81).

1.1.1.2 This document has been prepared by the *Ad Hoc* Working Group on Engineering Aspects of Long-Range Identification and Tracking of Ships.

1.1.1.3 In preparing the document, the *Ad Hoc* Working Group has taken into account the provisions of SOLAS regulation V/19-1 and resolution MSC.210(81), "Performance Standards and Functional Requirements for the Long Range Identification and Tracking of Ships."

1.1.2 Background

1.1.2.1 The Maritime Safety Committee, at its eighty-first session in May 2006, adopted amendments to chapter V of the SOLAS convention in relation of LRIT. These amendments will enter into force on 1 January 2008 provided that acceptance criteria have been fulfilled by 1 July 2007.

1.1.2.2 The LRIT system provides for the global identification and tracking of ships.

1.1.2.3 In operating the LRIT system, recognition shall be given to international conventions, agreements, rules or standards that provide for the protection of navigational information.

1.1.2.4 The specifications for the International LRIT Data Exchange within the international LRIT system will detail the routing of LRIT positional data, LRIT request messages and system messages between LRIT Data Centres.

1.1.2.5 The specifications for data security throughout the network and protocols required for transporting data from one network point to another are described in the document entitled "Draft Technical Specifications for Communications within the LRIT System Network."

1.1.2.6 The draft specifications for the International LRIT Data Exchange for the international LRIT system as outlined in this document will be established and recognised by the Committee.

1.2 General Description of the System and Definitions

1.2.1 LRIT System Description

1.2.1.1 As described in resolution MSC.210(81), sub-section 1.2, the LRIT system consists of the following components:

.1 the shipborne LRIT information transmitting equipment;

.2 the Communication Service Provider(s);

.3 the Application Service Provider(s);

.4 the LRIT Data Centre(s), including any related Vessel Monitoring System(s);

.5 the LRIT Data Distribution Plan;

.6 the International LRIT Data Exchange, and

.7 LRIT Data Users.

1.2.1.2 As described in resolution MSC.210(81), sub-section 1.2, certain aspects of the performance of the LRIT system are reviewed or audited by an LRIT Co-ordinator acting on behalf of all Contracting Governments.

1.2.2 LRIT System Operation

1.2.2.1 Sub-sections 1.2.2.1 to 1.2.2.11 provide a high-level overview of the LRIT system architecture. The LRIT system Performance standards, resolution MSC.210(81), provide further details on the functions associated with each component of the system.

1.2.2.2 Tracking of any applicable ship begins with LRIT positional data being transmitted from the shipborne equipment. The LRIT information transmitted includes the ship's GNSS position (based on the WGS 84 datum), time and identification, as described in resolution MSC.210(81), Table 1.

1.2.2.3 The Communication Service Provider (CSP) provides the communication infrastructure and services that are necessary for establishing a communication path between the ship and the Application Service Provider (ASP). The LRIT information transmitted from the ship will travel across the communication path set up by the CSP to the ASP.

1.2.2.4 The ASP, after receiving the LRIT information from the ship, will add additional information to the LRIT message and pass along the expanded message to its associated LRIT Data Centre. Functionality required for the programming and communicating of commands to the shipborne equipment is provided by the ASP.

1.2.2.5 The LRIT data, along with all the parameters added by the various LRIT components, is described in the messaging section of the document entitled "Draft Technical Specifications for Communication within the LRIT System."

1.2.2.6 LRIT Data Centres will store all incoming LRIT information from ships instructed by their Administrations to transmit LRIT information to that Data Centre. LRIT Data Centres will disseminate LRIT information to LRIT Data Users according to the Data Distribution Plan (DDP).

1.2.2.7 The LRIT DDP will contain the information required by the Data Centres for determining how LRIT information will be distributed to the various Contracting Governments. The DDP will contain information such as standing orders from Contracting Governments and geographical polygons relating to Contracting Governments' coastal waters and ports and port facilities.

1.2.2.8 LRIT Data Centres will process all LRIT messages to and from the International LRIT Data Exchange (IDE). The IDE will process all LRIT messages between LRIT Data Centres. The IDE will route the message to the appropriate Data Centre based upon the address in the message and the IP addresses in the DDP. The IDE will neither process nor store the positional data contained within LRIT messages.

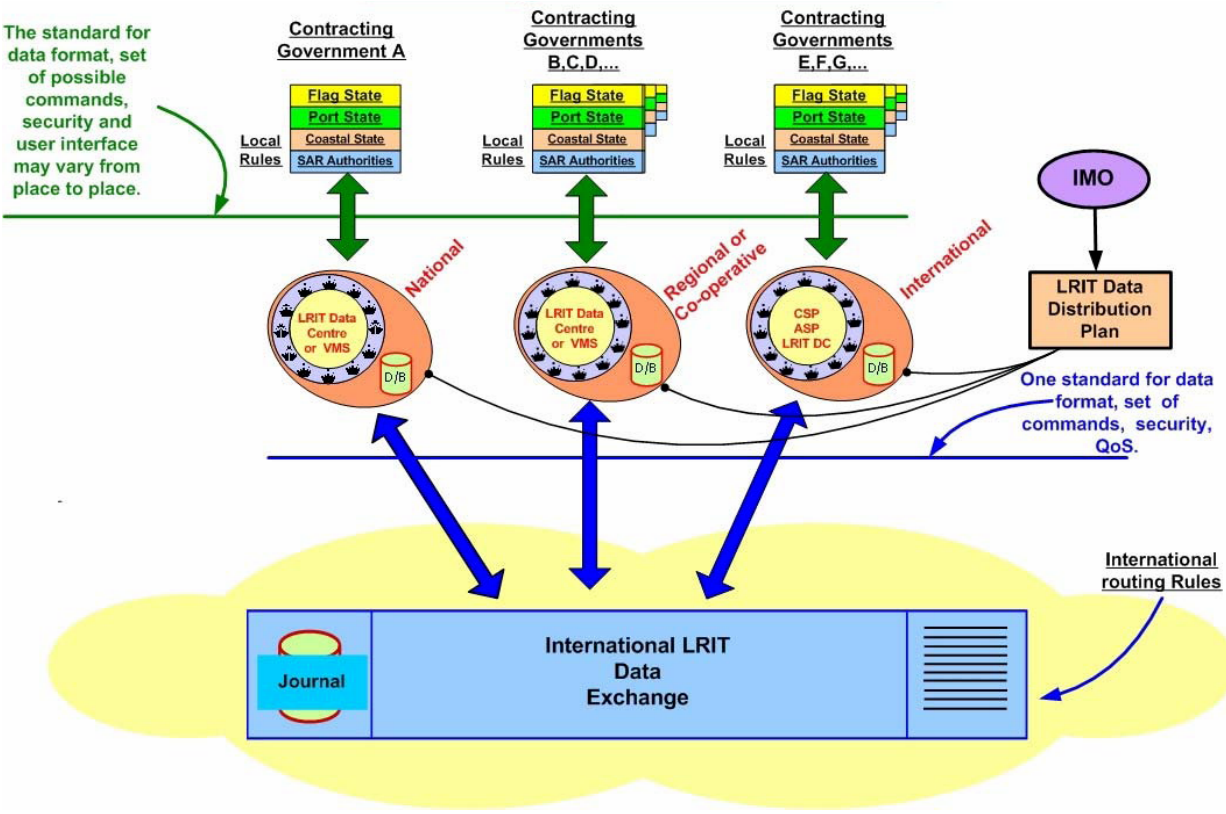
1.2.2.9 LRIT Data Users may be entitled to receive or request LRIT information in their capacity as a flag State, port State, coastal State or Search and Rescue (SAR) service.

1.2.2.10 The LRIT Co-ordinator will assist in the establishment of the international components of the LRIT system, perform administrative functions, and review and audit certain components of the LRIT system.

1.2.2.11 Figure 1 provides a high-level illustration of the basic LRIT system architecture.

FIGURE 1

TYPICAL LRIT SYSTEM ARCHITECTURE



1.2.3 Definitions

1.2.3.1 Unless expressly provided otherwise:

.1 *Convention* means the International Convention for the Safety of Life at Sea, 1974, as amended.

.2 *Regulation* means a regulation of the Convention.

.3 *Chapter* means a chapter of the Convention.

.4 *LRIT Data User* means a Contracting Government or a Search and rescue service that opts to receive the LRIT information it is entitled to.

.5 *Committee* means the Maritime Safety Committee.

.6 *High-speed craft* means a craft as defined in regulation X/1.3.

.7 *Mobile offshore drilling unit* means a mobile offshore drilling unit as defined in regulation XI-2/1.1.5.

.8 *Organization* means the International Maritime Organization.

.9 *Vessel Monitoring System* means a system established by a Contracting Government or a group of Contracting Governments to monitor the movements of the ships entitled to fly its or their flag. A Vessel Monitoring System may also collect from the ships information specified by the Contracting Government(s) that has established it.

.10 LRIT information means the information specified in SOLAS regulation V/19-1.5.

.11 *IDC operator* means the individual responsible for the daily operation and maintenance of the International LRIT Data Centre.

1.2.3.2 The term "*ship*," when used in the present Performance standards and functional requirements for long-range identification and tracking of ships, includes mobile offshore drilling units and high-speed craft as specified in SOLAS regulation V/19-1.4.1 and means a ship that is required to transmit LRIT information.

1.2.3.3 Terms not otherwise defined should have the same meaning as the meaning attributed to them in the Convention.

1.2.4 Acronyms Used Within This Document

1.2.4.1 The acronyms that appear within this document shall have the meanings assigned to them in this Article:

.1	ASP	Application Service Provider
.2	CSP	Communication Service Provider
.3	DC	Data Centre
.4	DDP	Data Distribution Plan
.5	IDC	International Data Centre
.6	IDE	International LRIT Data Exchange
.7	LES	Land Earth Station
.8	MMSI	Maritime Mobile Service Identity
.9	NDC	National Data Centre
.10	R/CDC	Regional/Co-operative Data Centre
.11	RFP	Request for Proposal
.12	SAR	Search and Rescue
.13	SAR SURPIC	Search and Rescue Surface Picture
.14	SOLAS	International Convention for the Safety of Life at Sea
.15	SSL	Secure Sockets Layer
.16	VPN	Virtual Private Network
.17	VMS	Vessel Monitoring System

2 Role of the International LRIT Data Exchange

2.1 Overview

2.1.1 International LRIT Data Exchange

2.1.1.1 The International LRIT Data Exchange (IDE) is a message handling service that facilitates the exchange of LRIT data amongst LRIT Data Centres to enable LRIT Data Users to obtain that LRIT ship positional data that they are entitled to receive. The IDE routes information between LRIT Data Centres.

2.1.1.2 The IDE, at a minimum, shall be accessible to DCs via standard Internet communication paths

2.1.1.3 The IDE shall store and archive message information in a Journal(s) that will be used for audit, billing and statistical analysis.

2.1.1.4 The IDE does not:

.1 read the LRIT positional data contained in LRIT messages; and

.2 store or archive any LRIT positional data.

2.1.1.5 The application of standing orders and other information contained within the DDP is a function of individual LRIT Data Centres. The IDE shall only read the message header content. The IDE shall not perform any filtering function on the LRIT positional data.

2.1.1.6 The message header as stated in resolution MSC.210(81), “Performance Standards and Functional Requirements for the Long Range Identification and Tracking of Ships.” refers to all parameters with the exception of the parameters provided by the LRIT shipborne equipment.

2.1.1.7 The IDE shall use the LRIT ID contained in either the destination parameter, LRIT Data User Requestor parameter or LRIT Data User Provider parameter included in the messages to determine where to route the message. The IDE maps the LRIT ID to the Internet Protocol (IP) address of the Data Centre holding the information using the mapping information contained in the DDP.

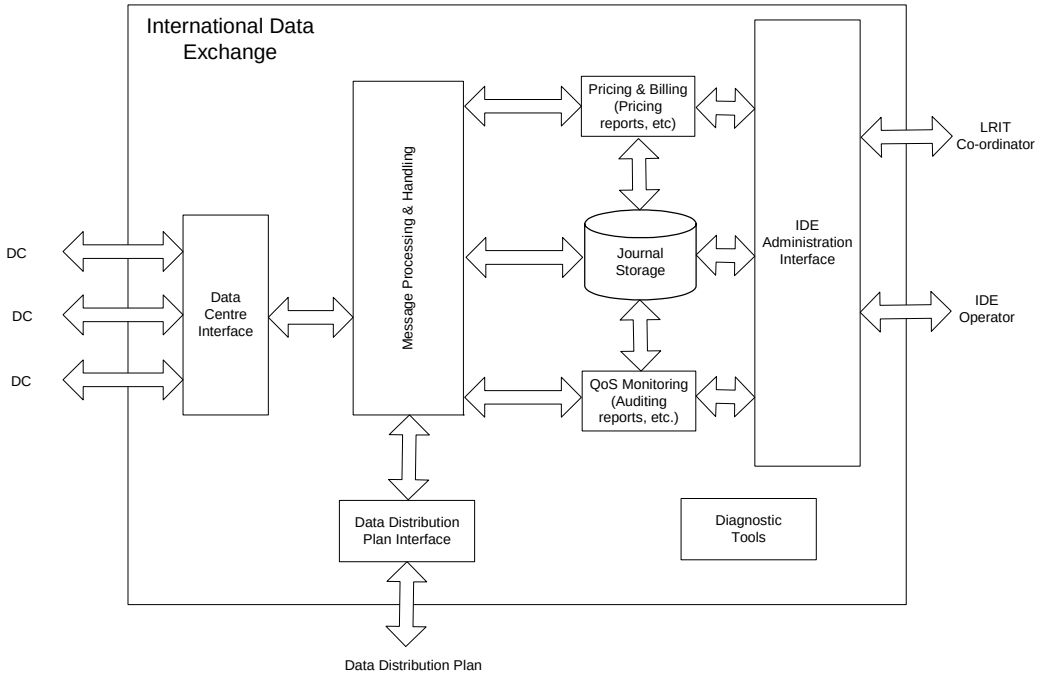
3 System Architecture/High Level Design of the IDE

3.1 High Level Overview of System Architecture

3.1.1 General Composition of the IDE

3.1.1.1 The general composition (top level block diagram) of the IDE is illustrated in Figure 2.

FIGURE 2



TOP LEVEL BLOCK DIAGRAM OF IDE DATA FLOW

3.1.1.2 The various blocks illustrated in the IDE block diagram represent functional modules or sub systems of the larger system being the IDE itself.

3.1.1.3 Implementation of the IDE, for example, could consist of a high-speed computer running IDE specific application software. The IDE application software would consist of various software modules such as a Data Centre interface module, message processing module, billing module, QoS monitoring module, etc.

3.2 Data Centre Interface

3.2.1 Functional Overview

3.2.1.1 The Data Centre Interface of the IDE shall:

.1 receive LRIT messages from all LRIT Data Centres participating in the international LRIT system;

.2 transmit LRIT messages to the appropriate LRIT Data Centres based upon message processing performed by the IDE;

.3 maintain a secure communication connection to all participating LRIT Data Centres based upon the communication and data security protocols outlined in the "Draft Technical Specifications for Communication in the LRIT System"; and

.4 communicate, through an IP based network, with all Data Centres.

3.2.1.2 [*This article may be included depending on a policy decision of the Committee:* The Data Centre interface of the IDE shall have the functional capability of barring a Data Centre from connecting to the IDE. The ability to enable or disable this function shall be accessible from the IDE administration interface. SAR requests will always go through and data requests to the barred DC will always go through.]

3.3 Message Processing & Handling

3.3.1 Message Summary

3.3.1.1 Table 1 provides a summary of all LRIT messages (Messages 1-15) and indicates whether the message is routed between Data Centres or broadcast to all Data Centres.

TABLE 1
SUMMARY OF LRIT MESSAGES

Message Type	Message Name	Message Description/Purpose	TX(1)	RX(1)	Broadcast
LRIT positional data (position report) messages					
1	Periodic Position Report	Regular periodic ship position reports.	DC2 IDE	IDE DC1	No
2	Polled Position Report	Ship position report as a result of a poll request.	DC2 IDE	IDE DC1	No
3	SAR Position Report	Ship's position report; for a special purpose (SAR); reported by Data Centres with ships in the area.	DCx IDE	IDE DC1	No
LRIT request messages					
4	Ship Position Request	To enable a LRIT Data Centre to request LRIT positional data for ships being monitored by another LRIT Data Centre.	DC1 IDE	IDE DC2	No
5	SAR Poll Request	To enable a LRIT Data Centre to request LRIT positional data, as a SAR user, for ships being monitored by another LRIT Data Centre.	DC1 IDE	IDE DC2	No
6	SAR SURPIC Request	Area poll; routed to all Data Centres.	DC1 IDE	IDE DCx	Yes
Other messages					
7	Receipt message	To enable a Providing LRIT Data Centre to confirm the receipt and processing status of a Request Message from a Requesting LRIT Data Centre.	DC2 IDE	IDE DC1	No
8	DDP Notification	Notification that an updated version of the DDP file is available.	DDP IDE	IDE DCx	Yes
9	DDP request	Request for current copy of the DDP or incremental copy.	DCx IDE	DDP	No
10	DDP Update	This is a routine update of the DDP by the DDP server to the IDE.	DDP	DCx IDE	Does not get routed by the IDE
11	System Status message	To enable the IDE to communicate a status message every 30 minutes to each Data Centre advising that the system is "healthy" and receive status messages from the DCs.	IDE DCx	DCx IDE	Yes

Message Type	Message Name	Message Description/Purpose	TX(1)	RX(1)	Broadcast
[12	R/CDC or IDC issued Billing & Transaction	Routine monthly message from a R/CDC or the IDC to the IDE indicating transaction and Billing report.	R/CD C1 or IDC)	IDE	No*]
[13	Pricing Notification	Notification that a new pricing list for between DC charges is in place	IDE	DC	YES
14	Pricing Request	Request for updated pricing list	DC	IDE	No
15	Pricing Update	Updated pricing list full	DC IDE	IDE DC	No**]

Note:

(1) DC1 = requesting DC; DC2 = providing DC; DCx = all DCs; R/CDC1 = Regional or Co-operative Data Centre

*Awaiting policy decision

** Awaiting policy decision related to set published price list in the IDE

3.3.2 General Message Processing Functions

3.3.2.1 The IDE shall have the functional capability to validate the DDP version # contained in all received LRIT messages against the version number of the DDP it is using. If the IDE detects a mismatch in DDP version numbers, it will archive the received message and transmit a receipt message to the originating Data Centre. It shall not route the LRIT message (unless it is a SAR message) that contained the invalid DDP version #. The ability to enable or disable this function shall be accessible from the IDE administration interface.

3.3.2.2 The DDP version number checking function shall have a time delay feature that automatically disables the DDP version # checking for a period of time after the IDE has updated its internal DDP. The period of time in which this function is disabled shall be programmable through the IDE administration interface.

3.3.2.3 SAR requests, regardless of the DDP version used, should always be routed.

3.3.3 Generic Message Handling

3.3.3.1 Annex A contains message handling and processing diagrams for received LRIT messages.

3.3.3.2 The following generic process shall be followed for all LRIT messages (Messages 1-15) received by the IDE:

.1 Perform a DDP version # check, if the function is enabled, by looking at the DDP version # parameter contained in the message and comparing against the IDE's DDP version #.

.2 LRIT messages that fail the check (mismatch of DDP version #'s) shall be archived in the journal and a receipt message with a receipt code of "9" shall be sent to the Data Centre which transmitted the message.

.3 LRIT messages that pass the check (DDP version #s match) shall be further processed by looking at the message type parameter in order to identify the particular type of LRIT message and handling the message type as detailed in the subsequent sub-sections.

3.3.4 Message Handling For Message Types 1-7

3.3.4.1 The IDE shall process LRIT messages with Message types 1-7 by:

.1 Identifying the message destination (LRIT Data User, DC) by looking at the LRIT Data User Requestor parameter for message types 1-3, the LRIT Data User Provider parameter for message types 4-6 or the Destination parameter for message type 7;

.2 mapping the LRIT ID associated with the message destination to the Internet address of the appropriate Data Centre using the mapping information from the DDP;

.3 routing the LRIT message to the appropriate Data Centre or to all connected Data Centres in the case of broadcast messages (i.e. SAR SURPIC request message);

.4 building a receipt message with a receipt code of 3 and route the receipt message to the DC associated with the originating LRIT message if the IDE determines that the DC intended to receive the message is not available (not on line); and

.5 archiving everything in the messages except for the LRIT shipborne equipment parameters of messages 1, 2 and 3 as defined in Table 2 of the "Draft Technical Specifications for Communication within the LRIT System."

3.3.5 Message Handling for DDP Messages (Message 8-10)

3.3.5.1 The IDE shall process the DDP messages by:

.1 receiving update notifications for the DDP through the DDP notification message (Message 8) automatically;

.2 building and transmitting a DDP request message (Message 9) for an incremental update of the DDP plan;

.3 receiving updated incremental DDP files through the DDP update message (Message 10);

.4 updating the map of Internet addresses for all Data Centres accordingly; and

.5 archiving all messages in the Journal(s).

3.3.6 Message Handling for System Status Message (Message 11)

3.3.6.1 The IDE shall:

.1 send out a status message (Message 11) every 30 minutes to each Data Centre advising them on the health of the IDE, and archive the transmitted message in the Journal(s); and

.2 on receipt of a System Status Message from the Data Centres, process all System Status Messages by updating the system status (i.e. if no message from a Data Centre or the DDP, generate a warning to the operator), archiving everything in the messages in the Journal(s).

3.3.7 [Message Handling For R/CDC or IDC issued Billing and Transaction Message (Message Type 12)

3.3.7.1 *This article may be included depending on a policy decision of the Committee:* The IDE shall:

.1 Receive and process LRIT Billing and Transaction messages from all R/CDCs and the IDC; and

.2 Archive all of the contents of the R/CDC or IDC issued Billing & Transaction messages in the Journal.]

3.3.8 [Message Handling for Pricing Messages (Message 13 - 15)

3.3.8.1 *This article may be included depending on a policy decision of the Committee*: The IDE shall process the pricing messages by:

.1 receiving pricing update messages (Message 15) from the Data Centres;

.2 on receipt of Message 15, sending updated pricing notifications to all connected Data Centres by means of the Pricing notification message (Message 13) automatically.

.3 receiving pricing request messages (Message 14) from Data Centres;

.4 on receipt of Message 14, building and transmitting pricing files through the pricing update message (Message 15) to the requesting DC(s); and

.5 archiving all messages in the Journal(s).]

3.4 DDP Interface

3.4.1 General

3.4.1.1 The IDE shall maintain a secure communication connection to the DDP server based upon the communication and data security protocols outlined in the "Draft Technical Specifications for Communication in the LRIT System."

3.5 Quality of Service Monitoring

3.5.1 Quality Reporting

3.5.1.1 The IDE shall monitor the communication connections to all Data Centres and:

.1 respond to quality-related requests from the IDE operator and the LRIT Co-ordinator;

.2 provide, to the LRIT Co-ordinator, the necessary level of access in order for the LRIT Co-ordinator to perform an audit of the IDE performance; and

.3 provide sufficient information to an IDE operator for daily operation at required levels of reliability, maintenance and availability.

3.5.1.2 The archived LRIT information should provide a complete record of the activities of the IDE between two consecutive annual audits of its performance.

3.5.1.3 The IDE shall be able to measure Quality of Service as defined in resolution MSC.210(81).

3.6 IDE Administration Interface

3.6.1 General

3.6.1.1 The functionality associated with the IDE administration interface shall provide external users with the ability to connect to the IDE and perform simple administrative tasks.

3.6.1.2 The LRIT Co-ordinator shall be responsible for establishing valid external users of the IDE administration interface, granting limited access to the IDE administrative functions based on (but not limited to) the following requirements:

.1 IDE operator contracted to operate the IDE.

.2 Integration and Testing of a new Data Centre.

.3 Trouble shooting a connection problem with a Data Centre.

3.6.1.3 The communication method used by the external users to connect to the IDE administration interface shall be a secure Internet-based point to point communication link as described in the document "Draft Technical Specifications for Communication within the LRIT System."

3.6.2 Administrative Capabilities

3.6.2.1 The IDE shall have the capability to allow external users to connect to the IDE system and perform the following tasks:

.1 Query the Journal for specific LRIT messages.

.2 Query the IDE for billing or audit reports.

.3 Query the IDE for a list of all Data Centres (and their IP addresses) connected to the IDE.

.4 Query the IDE for network statistics (data rate, dropped packets, etc) on specific or all communication links.

.5 Configure and manage the LRIT network through the use of standard network management practises. This shall include the capability of allowing the user to set the priority of LRIT messages (quality of service).

.6 Query the IDE for quality of service information.

.7 Query the IDE for a list of errors or anomalies that the IDE has detected over a given period of time.

.8 Query the IDE for the results of a diagnostic test.

.9 Query the IDE for information pertaining to the software operating on the IDE (i.e. version number, etc).

.10 Query the IDE for the version of the DDP plan being used.

.11 [Enable or disable the barring function of the Data Centre interface. This will block particular Data Centres from connecting to the IDE and exchanging LRIT messages with other Data Centres.]

.12 Enable or disable the DDP version # validity checking function for LRIT messages from all LRIT Data Centres.

.13 Configure the time delay feature of the DDP version # checking function.

3.6.3 Confidentiality/Security of IDE Data

3.6.3.1 The IDE shall only provide access to the database or Journal(s) information within the guidelines provided by the LRIT Co-ordinator. Any access or release of information shall include an audit trail of access to and modifications made.

3.7 LRIT Journal(s)

3.7.1 General

3.7.1.1 As per resolution MSC.210(81), sub-section 10.3.4, the IDE should automatically maintain Journal(s) containing message header information only, meaning that the LRIT shipborne equipment parameters of messages 1, 2 and 3 as defined in Table 2 of the "Draft Technical Specifications for Communication within the LRIT System," shall not be stored.

3.7.1.2 The purpose of the Journal(s) is to enable the IDE to trace, record and archive the identification of all messages routed through the IDE to support:

.1 auditing;

.2 message handling/distribution;

.3 the necessary information required to aid in the resolution of billing disputes; and

.4 usage and performance statistics.

3.7.1.3 Data from the Journal(s) may be requested through the LRIT Co-ordinator by: LRIT Data Users, LRIT Data Centres, approved ASPs and CSPs and any sub-contracted billing entity(ies).

3.7.1.4 It should be noted that the LRIT Co-ordinator should provide an access framework describing the appropriate authorisation levels.

3.7.2 Journal Contents

3.7.2.1 The IDE will log all messages relating to the request for LRIT ship positional data in a manner that facilitates the ready identification of individual transactions and provides an audit trail to identify:

.1 each Request Message received from individual LRIT Data Centres;

.2 the communications with other LRIT Data Centres; and

.3 the subsequent delivery of the Response Message to the Requesting LRIT Data Centre.

3.7.2.2 In particular, the Journal(s) should include:

.1 Time Stamp of receiving a message;

.2 Time Stamp of transmitting a message; and

.3 The complete message contents except for the LRIT shipborne equipment parameters of messages 1, 2 and 3 as defined in Table 2 of the "Draft Technical Specifications for Communication within the LRIT System."

3.7.2.3 The format for the Journal is outlined in Table 2.

TABLE 2

FORMAT FOR JOURNAL

Parameters	Data Field
Rx [2] time stamp	Time [1] of receiving a message. Not available for messages only transmitted by the IDE and not routed.
Tx [3] time stamp	Time [1] of transmitting the message (routing to the appropriate DC). Not available for messages only received by the IDE and not routed.
Message contents	Complete message contents except for the LRIT shipborne equipment parameters of Messages 1, 2 and 3.

Notes: [1] All times should be indicated as Universal Co-ordinated Time (UTC).
[2] Receiving.
[3] Transmitting.

3.7.3 Archiving

3.7.3.1 The IDE shall maintain an archive journal that can accommodate the ready retrieval of Journal(s) data for at least one year or until such time as the Committee reviews and accepts the LRIT Co-ordinator's annual report of the audit of its performance.

3.7.3.2 The archived Journal(s) should provide a complete record of the activities of the IDE between two consecutive annual audits of its performance.

3.7.3.3 Key requirements for archiving include:

.1 redundancy – should include hot swapping and the capability to move to an off-site centre within 1 hour;

.2 resiliency – communications shall have more than one physical path;

.3 query – the data can be retrieved; and

.4 integrity – the data is preserved in its original state.

3.8 Diagnostic Tools

3.8.1 General

3.8.1.1 Diagnostic tools shall be available from the administrator interface of the IDE in order to allow the testing of the various modules or sub components that make up the IDE.

3.8.2 Diagnostic Tool List

3.8.2.1 Network Interface check: This test when executed shall perform a check on all network interface connections to verify proper operation. This would include all DC connections, the IDE administrator interface connection and the DDP connection.

3.8.2.2 Journal Storage check: This test shall check the read and write function of the storage space used to hold the Journal.

3.8.2.3 Message Handling check: This test shall check the Message Handling function's ability to properly process different types of messages.

3.8.2.4 General Health Check: This test shall check the general health of IDE sub components that are not checked by other tests.

3.8.2.5 Generate LRIT Message Check: This test shall provide the administrative user with the ability to generate any of the LRIT messages (with the test parameter set to "1") with any valid parameter value and transmit the message to a connected DC.

3.9 Pricing Functionality

3.9.1 General

3.9.1.1 [*This article may be included depending on a policy decision of the Committee*: The IDE shall have the capability of:

.1 receiving pricing files by means of the Pricing Update Message from all DCs;

.2 compiling a table of all prices and routing to all DCs; and

.3 archiving to the Journal.]

4 IDE System Performance

4.1 Overview of IDE System Performance

4.1.1 General

4.1.1.1 The IDE shall process and handle any input within 30 seconds of the receipt of the input and shall give the appropriate output.

4.1.1.2 The IDE shall be capable of receiving and processing at least 100 reports per second.

4.1.2 Availability and Reliability

4.1.2.1 The IDE shall provide data to the LRIT system 24 hours per day 7 days per week with better than 99.9% availability measured over a year and better than 95% availability per day.

4.1.3 Maintainability and Upgradeability

4.1.3.1 IDE equipment shall be so designed that the main units can be replaced readily, without elaborate re-calibration or readjustment.

4.1.3.2 IDE equipment shall be so constructed and installed that it is readily accessible for inspection and maintenance purposes.

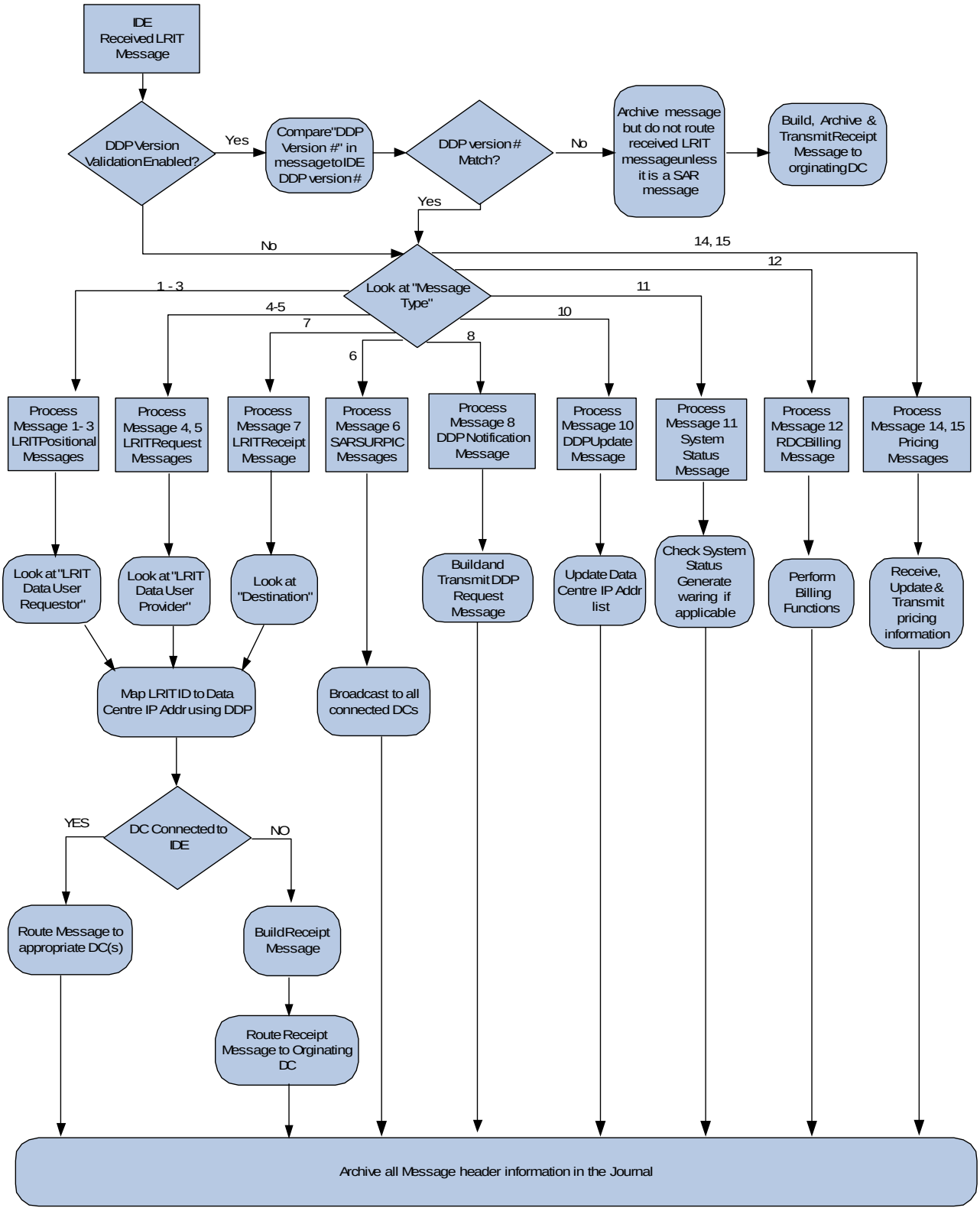
4.1.3.3 IDE software shall be capable of being easily upgraded through a standard secure internet based communication link.

4.1.3.4 The IDE shall be designed such that it has the capability to add future features or functions via software upgrade (example: billing reports managed similar to Internet banking).

5 Annex A – IDE Message Handling & Processing Diagram

FIGURE 4

IDE MESSAGE HANDLING & PROCESSING FOR RECEIVED LRIT MESSAGES



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ANNEX 2

Draft Technical Specifications for the International LRIT Data Centre

Prepared by: *Ad Hoc* Working Group on Engineering Aspects of LRIT
Date of Issue of this draft: July 3, 2007

Table of Contents

DRAFT TECHNICAL SPECIFICATIONS FOR THE INTERNATIONAL LRIT DATA CENTRE (IDC)

1 General Provisions

1.1 Scope and Background

1.1.1 Scope

1.1.1.1 The intent of this document is to outline the technical specifications for the International LRIT Data Centre within the international Long-Range Identification and Tracking (LRIT) system as stated in the terms of reference of resolution MSC.211(81).

1.1.1.2 This document has been prepared by the *Ad Hoc* Working Group on Engineering Aspects of LRIT.

1.1.1.3 In preparing the document, the *Ad Hoc* Working Group has taken into account the provisions of SOLAS regulation V/19-1 and resolution MSC.210(81), "Performance Standards and Functional Requirements for the Long Range Identification and Tracking of Ships."

1.1.2 Background

1.1.2.1 The Maritime Safety Committee, at its eighty-first session in May 2006, adopted amendments to chapter V of the SOLAS convention in relation of LRIT. These amendments will enter into force on 1 January 2008 provided that acceptance criteria have been fulfilled by 1 July 2007.

1.1.2.2 The LRIT system provides for the global identification and tracking of ships.

1.1.2.3 In operating the LRIT system, recognition shall be given to international conventions, agreements, rules or standards that provide for the protection of navigational information.

1.1.2.4 The International LRIT Data Centre is an element of the International LRIT System that receives, stores and disseminates LRIT information on behalf of Governments. In the context of the LRIT system architecture, this document addresses the functional specifications for the International LRIT Data Centre.

1.1.2.5 The International LRIT Data Centre shall be established and recognized by the Committee.

1.1.2.6 The International LRIT Data Centre shall be capable of receiving and processing LRIT information from all ships, other than those that are required to transmit LRIT information to a National, Regional or Co-operative LRIT Data Centre.

1.1.2.7 The International LRIT Data Centre shall accommodate any LRIT Data User not participating in a national, Regional or Co-operative LRIT Data Centre.

1.2 General Description of the System and Definitions

1.2.1 LRIT System Description

1.2.1.1 As described in resolution MSC.210(81), sub-section 1.2, the LRIT system consists of the following components:

.1 the shipborne LRIT information transmitting equipment;

.2 the Communication Service Provider(s);

.3 the Application Service Provider(s);

.4 the LRIT Data Centre(s), including any related Vessel Monitoring System(s);

.5 the LRIT Data Distribution Plan;

.6 the International LRIT Data Exchange; and

.7 LRIT Data Users.

1.2.1.2 As described in resolution MSC.210(81), sub-section 1.2, certain aspects of the performance of the LRIT system are reviewed or audited by an LRIT Co-ordinator acting on behalf of all Contracting Governments.

1.2.2 LRIT System Operation

1.2.2.1 Articles 1.2.2.1 to 1.2.2.11 provide a high-level overview of the LRIT system architecture. The LRIT system Performance standards, resolution MSC.210(81), provide further details on the functions associated with each component of the system.

1.2.2.2 Tracking of any applicable ship begins with LRIT positional data being transmitted from the shipborne equipment. The LRIT information transmitted includes the ship's GNSS position (based on the WGS84 datum), time and ship borne equipment identifier, as described in resolution MSC.210(81), Table 1.

1.2.2.3 The Communication Service Provider (CSP) provides the communication infrastructure and services that are necessary for establishing a communication path between the ship and the Application Service Provider (ASP). The LRIT information transmitted from the ship will travel across the communication path set up by the CSP to the ASP.

1.2.2.4 The ASP, after receiving the LRIT information from the ship, will add additional information to the LRIT message and pass along the expanded message to its associated LRIT Data Centre. Functionality required for the programming and communicating of commands to the shipborne equipment is provided by the ASP.

1.2.2.5 The LRIT data, along with all the parameters added by the various LRIT components, is described in the messaging section of the "Draft Technical Specifications for Communication within the LRIT System."

1.2.2.6 LRIT Data Centres will store all incoming LRIT information from ships instructed by their Administrations to transmit LRIT information to that Data Centre. LRIT Data Centres will disseminate LRIT information to LRIT Data Users according to the Data Distribution Plan (DDP).

1.2.2.7 The LRIT DDP will contain the information required by the Data Centres for determining how LRIT information will be distributed to the various Contracting Governments. The DDP will contain information such as standing orders from Contracting Governments and geographical polygons relating to Contracting Governments' coastal waters and ports and port facilities.

1.2.2.8 The Data Centres will process all LRIT messages to and from the International LRIT Data Exchange (IDE). The IDE will process all LRIT messages between LRIT Data Centres. The IDE will route the message to the appropriate Data Centre based upon the information contained within the DDP. The IDE will neither process nor store the positional data contained within LRIT messages.

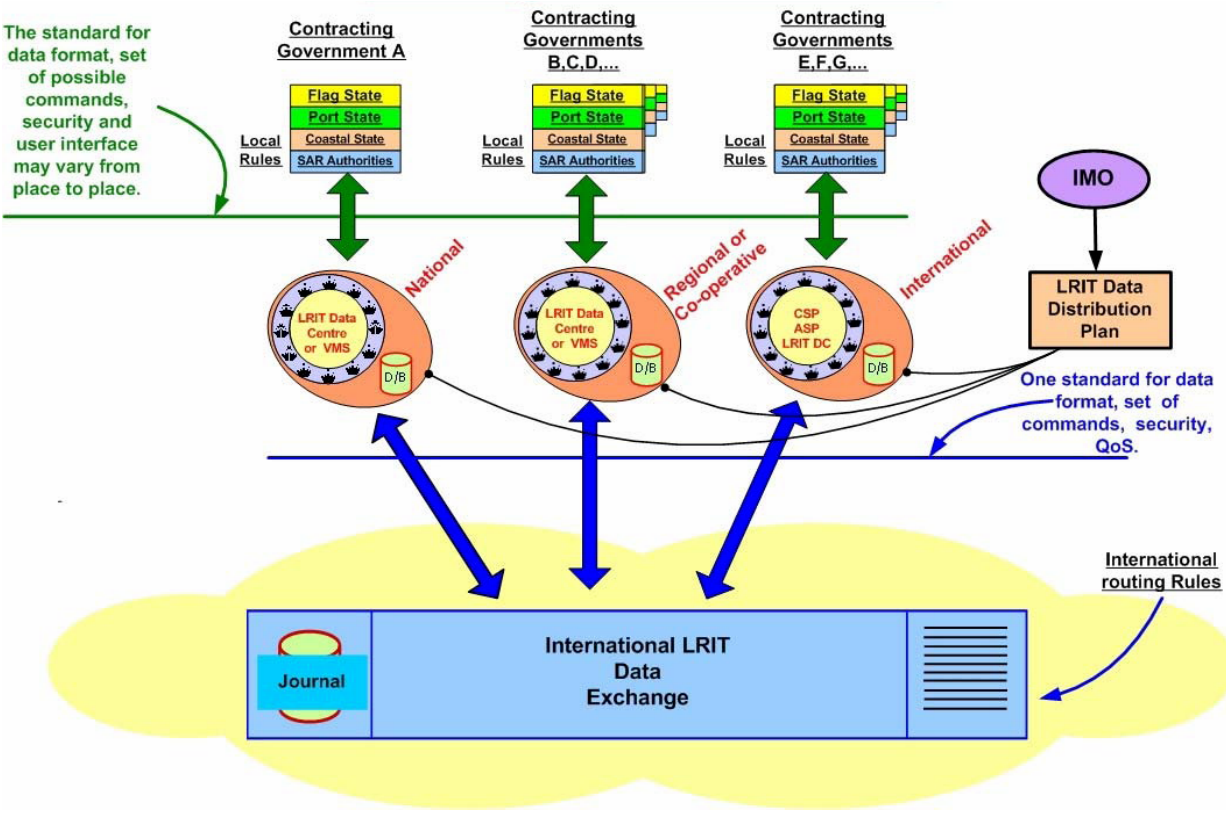
1.2.2.9 LRIT Data Users may be entitled to receive or request LRIT information in their capacity as a Flag State, Port State, Coastal State or Search and rescue (SAR) service.

1.2.2.10 The LRIT Co-ordinator assists in the establishment of the international components of the LRIT system, performs administrative functions, and reviews and audits certain components of the LRIT system.

1.2.2.11 Figure 1 provides a high-level illustration of the basic LRIT system architecture.

FIGURE 1

TYPICAL LRIT SYSTEM ARCHITECTURE



1.2.3 Definitions

1.2.3.1 Unless expressly provided otherwise:

.1 *Convention* means the International Convention for the Safety of Life at Sea, 1974, as amended.

.2 *Regulation* means a regulation of the Convention.

.3 *Chapter* means a chapter of the Convention.

.4 *LRIT Data User* means a Contracting Government or a Search and rescue service that opts to receive the LRIT information it is entitled to.

.5 *Committee* means the Maritime Safety Committee.

.6 *High-speed craft* means a craft as defined in regulation X/1.3.

.7 *Mobile offshore drilling unit* means a mobile offshore drilling unit as defined in regulation XI-2/1.1.5.

.8 *Organization* means the International Maritime Organization.

.9 *Vessel Monitoring System* means a system established by a Contracting Government or a group of Contracting Governments to monitor the movements of the ships entitled to fly its or their flag. A Vessel Monitoring System may also collect from the ships information specified by the Contracting Government(s) that has established it.

.10 *LRIT information* means the information specified in SOLAS regulation V/19-1.5.

.11 *IDC operator* means the individual responsible for the daily operation and maintenance of the International LRIT Data Centre.

1.2.3.2 The term *"ship,"* when used in the present Performance standards and functional requirements for long-range identification and tracking of ships includes mobile offshore drilling units and high-speed craft as specified in SOLAS regulation V/19-1.4.1 and means a ship that is required to transmit LRIT information.

1.2.3.3 Terms not otherwise defined should have the same meaning as the meaning attributed to them in the Convention.

1.2.4 Acronyms Used Within This Document

1.2.4.1 The acronyms that appear within this document shall have the meanings assigned to them in this Article:

.1 ASP Application Service Provider
.2 CSP Communication Service Provider
.3 DC LRIT Data Centre
.4 DDP LRIT Data Distribution Plan
.5 IDC International LRIT Data Centre
.6 IDE International LRIT Data Exchange
.7 LES Land Earth Station
.8 MMSI Maritime Mobile Service Identity
.9 RFP Request for Proposal
.10 SAR Search and Rescue
.11 SAR SURPIC Search and Rescue Surface Picture
.12 SOLAS International Convention for the Safety of Life at Sea
.13 SSL Secure Sockets Layer
.14 VPN Virtual Private Network
.15 VMS Vessel Monitoring System

2 Description of the International LRIT Data Centre (IDC)

2.1 LRIT Data Centre Description

2.1.1 System Functions

2.1.1.1 The general functionality of the International LRIT Data Centre is addressed in resolution MSC.210(81).

2.2 LRIT Information Reporting

2.2.1 Data Requirements

2.2.1.1 Shipborne equipment shall:

.1 transmit position, identification and time, and
.2 be capable of automatically and without human intervention on board the ship transmitting the ship's LRIT information at 6-hour intervals to an LRIT Data Centre.

2.2.1.2 In addition to the provisions specified in paragraph 4.1 of MSC.210(81), shipborne equipment shall provide the functionality specified in table 1 of this document.

2.2.2 System Capacity

2.2.2.1 The International LRIT Data Centre shall be capable of processing data from 50,000 SOLAS Class ships. Based on the requirement for ships to transmit LRIT information four times per day, this results in 50,000 x 4 reports per day = 200,000 reports per day.

2.2.2.2 System capacity shall be sufficient to perform archival and retrieval of LRIT information as specified in resolution MSC.210(81), paragraph 7.1, for a period of at least one year.

TABLE 1

DATA TO BE TRANSMITTED FROM THE SHIPBORNE EQUIPMENT

Parameter	Comments
Shipborne equipment Identifier	The identifier used by the shipborne equipment.
Positional data	The GNSS position (latitude and longitude) of the ship (based on the WGS 84 datum). *Position:* The equipment should be capable of transmitting the GNSS position (latitude and longitude) of the ship (based on WGS 84 datum) as prescribed by SOLAS regulation V/19-1, without human interaction on board the ship. *On-demand* (1) *position reports:* The equipment should be capable of responding to a request to transmit LRIT information on demand without human interaction onboard the ship, irrespective of where the ship is located. *Pre-scheduled* (2) *position reports:* The equipment should be capable of being remotely configured to transmit LRIT information at intervals ranging from a minimum of 15 minutes to periods of 6 hours to the LRIT Data Centre, irrespective of where the ship is located and without human interaction on board the ship.
Time Stamp 1	The date and time (3) associated with the GNSS position. The equipment should be capable of transmitting the time (3) associated with the GNSS position with each transmission of LRIT information.

Notes:

(1) *On-demand position reports* means transmission of LRIT information as a result of either receipt of polling command or of remote configuration of the equipment so as to transmit at intervals other than the preset ones.

(2) *Pre-scheduled position reports* means transmission of LRIT information at the preset transmit intervals.

(3) All times should be indicated as Universal Co-ordinated Time (UTC).

3 System Architecture/High Level Design

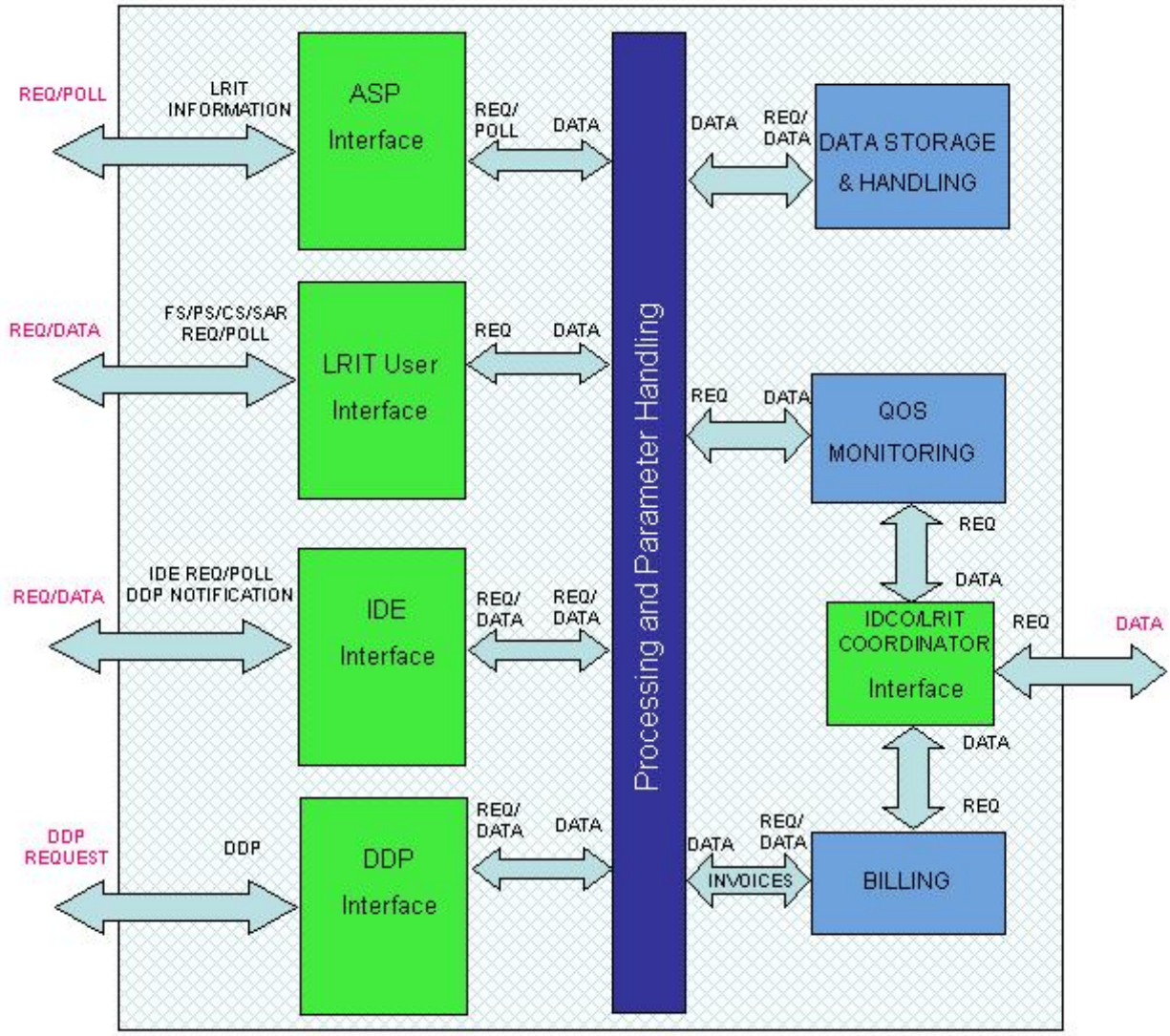
3.1 High level overview of IDC System Architecture

3.1.1 General

3.1.1.1 This section provides a high-level overview of the IDC system architecture. The flow of data is captured in Figure 2.

FIGURE 2

IDC TOP LEVEL BLOCK DIAGRAM (1)



Note: (1) REQ = Request; FS = Flag State; PS= Port State; CS = Coastal State

3.2 Functional Requirements

3.2.1 General

3.2.1.1 The IDC shall receive, store and disseminate LRIT information.

3.2.1.2 The IDC shall:

.1 verify communications and provide for data security using methods such as authorization; authentication; confidentiality; integrity and as specified in the "Draft Technical Specifications for Communication in the LRIT System";

.2 maintain a record of the ships that transmit LRIT information to the IDC including name of ship, IMO Ship Identification Number, Call Sign, ship's Flag State and Maritime Mobile Service Identity (MMSI), and current reporting intervals (as requested by the various LRIT Data Users); and

.3 maintain an up-to-date list of ships no longer transmitting data to the IDC (e.g., change of flag, taken out of service) in order to facilitate access to the mandated archive LRIT information.

3.2.1.3 The IDC shall amend the information above upon the transfer of a flag of a ship to include the following:

.1 the effective date and time (UTC) of the transfer; and

.2 the Administration whose flag the ship was formally entitled to fly, if known.

3.2.1.4 The IDC shall ensure, using appropriate hardware and software, that LRIT information is:

.1 backed-up at regular intervals;

.2 stored at suitable off-site location(s); and

.3 available as soon as possible in the event of disruption to ensure continuity of service.

3.2.1.5 The IDC shall maintain a list of ASPs connected to the Data Centre and those ships going through each ASP.

3.2.2 ASP Interface Function

3.2.2.1 The IDC shall:

.1 receive LRIT information from ships instructed by their Administrations to transmit the LRIT information to the IDC;

.2 process LRIT ship position report messages as defined in the "Draft Technical Specifications for Communication in the LRIT System" and adding the appropriate information prescribed in Table 2 of that document;

.3 send the LRIT position request message to the ASP after receiving a position request message received from a LRIT Data User via either the IDE interface or the LRIT Data User interface; and

.4 process LRIT position request messages based on the value of the request duration parameter. The message shall be relayed to the ASP if it is a poll, periodic or stop request. Otherwise, the request is for archived data and the IDC shall retrieve the appropriate data from data storage and handling and send it to the Contracting Government.

3.2.3 LRIT Information Storage and Handling Function

3.2.3.1 The IDC shall be audited by the LRIT Co-ordinator.

3.2.3.2 The IDC shall archive LRIT information from ships that transmit the information to the IDC, for at least one year and until such time as the Committee reviews and accepts the annual report of the audit of its performance by the LRIT Co-ordinator.

3.2.3.3 Further to the above, the IDC shall perform database storage and retrieval in accordance with the following schedule:

.1 for LRIT information archived within the last 4 days, sends the LRIT information within 30 minutes of receiving a request;

.2 for LRIT information archived between 4 and 30 days (including 30th day) previously, sends the LRIT information within 1 hour of receiving a request; and

.3 for LRIT information archived more than 30 days previously, sends the LRIT information within 5 days of receiving a request.

.4 The LRIT Information Storage and Handling function shall provide information regarding status of the request for archived LRIT information to the ASP interface.

3.2.4 IDC LRIT Data User Interface Function

3.2.4.1 The IDC shall process polling, requests, and standing orders directly from Contracting Governments whose ships are reporting to the IDC as per the message format defined in the "Technical Specifications for Communication in the LRIT System."

3.2.4.2 Further to Article 3.2.4.1, the IDC shall:

.1 perform authentication of the LRIT Data User based on the Digital Certificates in accordance with the "Technical Specifications for Communication in the LRIT System";

.2 establish and continuously maintain systems that ensure that LRIT Data Users are only provided with the LRIT information they are entitled to receive in accordance with the DDP and as specified in SOLAS regulation V/19-1;

.3 when requested, disseminate to Contracting Governments the LRIT information they are entitled to receive in accordance with the agreed arrangements and notify the LRIT Data User and the Administration when a ship stops transmitting LRIT information; and

.4 prohibit the dissemination of LRIT information to Contracting Governments in accordance with SOLAS regulation V/19-1.9.1 and as provided in the LRIT DDP.

3.2.4.3 The IDC shall provide to Search and rescue (SAR) services, LRIT information transmitted by all ships located within the geographic area specified by the SAR service requesting the information so as to permit the rapid identification of ships that may be called upon to provide assistance in relation to the search and rescue of persons in distress at sea.

3.2.4.4 The LRIT information referenced in Article 3.2.4.3. shall be provided irrespective of the location of the geographic area.

3.2.4.5 The IDC shall ensure that a LRIT Data User does not receive both a Port and a Coastal position report by utilizing the functionality contained in Article 2.2.3.12 in "Technical Specifications for Communication within the LRIT System."

3.2.5 IDE Interface Function

3.2.5.1 The IDC shall:

.1 communicate with LRIT Data Centres through the International LRIT Data Exchange in accordance with the "Draft Technical Specifications for the International LRIT Data Exchange," and the "Draft Technical Specifications for Communications within the LRIT System;

.2 perform authentication of the LRIT Data User based on the Digital Certificates in accordance with the "Draft Technical Specifications for Communication in the LRIT System";

.3 establish and continuously maintain systems that ensure that Contracting Governments are only provided with the LRIT information they are entitled to receive in accordance with the DDP and as specified in SOLAS regulation V/19-1;

.4 process notification of an updated DDP received from the DDP through the IDE.

.5 respond to all queries from other DCs through the IDE;

.6 obtain, when requested, LRIT information transmitted by ships other than those that transmit information to the IDC, LRIT information from other LRIT Data Centres through the IDE;

.7 make available, when requested by one of its LRIT Data Users, LRIT information transmitted by ships other than those associated with the IDC, LRIT information transmitted to the IDC from other LRIT DCs through the IDE;

.8 relay, when required, requests received from LRIT Data Users through the IDE for polling of LRIT information or for change(s) in the interval(s) of transmission of LRIT information by a ship or a group of ships not transmitting the information to the IDC;

.9 the Request for Proposals (RFP) for the IDE and the IDC has been issued by the LRIT Co-ordinator. It will be left to the successful bidder to propose whether or not transactions between two Contracting Governments subscribing to the IDC are internally routed within the IDC or are looped through the IDE. Clauses 3.2.5.1.9 to 3.2.5.1.13 are dependent on which scenario is proposed and selected.

.10 further to Clause 3.2.5.1.9, respond to all queries from LRIT Data users within the IDC either;

.10.1. directly to the requesting LRIT Data User and record these transactions in the Journal immediately and [*based on a policy decision by the Committee* send to the IDE on a monthly basis], or

.10.2. through the IDE.

.11 further to Clause 3.2.5.1.9, obtain, when requested, LRIT information from LRIT Data users within the IDC either;

.11.1. directly to the requesting LRIT Data User and record these transactions in the journal immediately and [*based on a policy decision by the Committee* send to the IDE on a monthly basis], or

.11.2. through the IDE.

.12 further to Clause 3.2.5.1.9, make available, when requested, LRIT information from LRIT Data users within the IDC either;

.12.1. directly to the requesting LRIT Data User and record these transactions in the journal immediately and [*based on a policy decision by the Committee* send to the IDE on a monthly basis], or

.12.2. through the IDE.

.13 further to Clause 3.2.5.1.9, relay requests for polling of LRIT information or for change(s) in the interval(s) of transmission of LRIT information received from a LRIT Data User either;

.13.1. to the appropriate ASP and record these transactions in the journal immediately and [*based on a policy decision by the Committee* send to the IDE on a monthly basis], or

.13.2. to the IDE.

.14 upon request, disseminate to LRIT Data Users the LRIT information they are entitled to receive in accordance with the agreed arrangements and notify the LRIT Data User and the Administration when a particular ship stops transmitting LRIT information;

.15 upon request, cease the distribution of LRIT information to Contracting Governments in accordance with SOLAS regulation V/19-1.7;

.16 prohibit the dissemination of LRIT information to Contracting Governments in accordance with SOLAS regulation V/19-1.9.1 and as provided in the LRIT DDP; and

.17 provide to Search and rescue (SAR) services, LRIT information transmitted by all ships located within the geographic area specified by the SAR service requesting the information to permit the rapid identification of ships that may be called upon to provide assistance in relation to the search and rescue of persons in distress at sea. The LRIT information shall be provided irrespective of the location of the geographic area and shall be provided even if the geographic area is outside the SAR region associated with the SAR service requesting the information (SOLAS regulation V/19-1.12 refers).

3.2.6 DDP Interface Function

3.2.6.1 Upon receipt of a DDP Notification Message, the IDC shall request the updated DDP by means of a DDP Update Message directly from the DDP server and update the DDP within the IDC upon receipt of the DDP Update Message.

3.2.7 Quality of Service Monitoring Function

3.2.7.1 The IDC shall monitor the IDC (i.e. self-monitoring), ASP, IDE, and LRIT Data User interfaces.

3.2.7.2 Further to Article 3.2.7.1, the IDC shall:

.1 respond to quality-related requests from the IDC operator and the LRIT Co-ordinator;

.2 monitor the IDE interface by processing System Status messages from the IDE. If a System Status message is not received at the interval specified in the "Draft Technical Specifications for the International LRIT Data Exchange" the IDC shall notify the IDC operator;

.3 provide to the LRIT Co-ordinator the required level of access to management, charging, technical and operational data to enable the satisfactory completion of an audit of the IDC performance;

.4 provide information to an IDC operator necessary for daily operation at required levels of reliability, maintenance and availability; and

.5 monitor delivery status on LRIT information provided to the Contracting Governments so that the LRIT operator can take the appropriate actions.

3.2.7.3 The IDC shall archive LRIT information to provide a complete record of the activities between two consecutive annual audits of its performance.

3.2.7.4 The IDC shall measure Quality of Service as defined in resolution MSC.210(81).

3.2.7.5 The IDC shall send a System Status Message to the IDE every 30 minutes.

3.2.8 Billing Handling Function

3.2.8.1 The IDC shall monitor the IDC, ASP, IDE and LRIT Data User interfaces for billable transactions and related data.

3.2.8.2 Further to Article 3.2.8.1, the IDC shall:

.1 ensure relevant data are processed;

.2 maintain a journal of all LRIT information requests, polls, reporting interval changes and any other billable transactions;

.3 [*if decided by a policy decision by the Committee:* generate reports to the IDE];

.4 generate invoices and send them to the Contracting Governments;

.5 validate bills received from other Data Centres;

.6 send pricing information to the IDE; and

.7 request pricing information on other Data Centres from the IDE.

3.2.9 Processing and Parameter Handling Function

3.2.9.1 The IDC shall process LRIT Messages received from the ASP, IDE and LRIT Data User interfaces.

3.2.9.2 The IDC shall fill in all messages according to the 'Parameter Provided By' column within the tables in "the Draft Technical Specifications for Communications in the LRIT System."

3.2.9.3 The IDC shall identify the message type parameter of the LRIT message received.

.1 For LRIT Messages Type 1, 2 and 3 (LRIT Ship Position Report Messages):

.1.1. The IDC shall check the received LRIT ship position report message from the ASP interface against the criteria established in the DDP. If a match is identified, then further processing will be required in addition to relaying the message to the data storage function for archiving.

.1.2. The IDC shall read the LRIT Data User requestor parameter of positional messages it receives from the IDE interface. This information is required in order to determine which LRIT Data User shall receive the message. The IDE Interface shall relay the message to the LRIT Data User interface, which will send the message to the appropriate LRIT Data User.

.1.3. For LRIT Messages Type 4 and 5 (Request Messages):

1.3.1. LRIT messages received from the LRIT Data User interface or the IDE interface that have been identified as ship position request messages or SAR poll request messages shall be checked to determine if the ship of interest is reporting to the IDC.

1.3.2. Request messages from the LRIT Data User interface associated with ships that are not registered to the IDC shall be relayed to the IDE.

1.3.3. Request messages from the IDE interface associated with ships that are not registered to the IDC shall result in an error. A Receipt Message with the appropriate receipt code shall be sent via the IDE to the Data Centre originating the request.

1.3.4. Request messages associated with ships reporting to the IDC shall be processed to determine if the requesting LRIT Data User is eligible to receive the information requested in accordance to the DDP.

1.3.5. LRIT Data Users that have issued request messages for data they are not entitled to receive shall be notified thereof.

1.3.6. LRIT request messages received at the LRIT Data User interface will be sent to the IDE.

1.3.7. LRIT request messages received at the IDE interface will;

3.2.9.3.1.3.7.1. if it is a poll, a stop or a change of periodic reporting interval, be sent to the ASP interface.

3.2.9.3.1.3.7.2. if it is a request for archived data, be passed on as a request to Data storage and handling.

.1.4. For LRIT Message Type 6 (SAR SURPIC Request Message):

1.4.1. SAR SURPIC Request Messages received at the LRIT Data User interface shall be sent to the IDE for broadcasting to all Data Centres in addition to being processed by the IDC.

1.4.2. The IDC shall respond to SAR SURPIC Request Messages with the requested number of positions for each ship located within the SURPIC.

1.4.3. If there are no positional data messages to send, then the IDC shall send a Receipt Message to the LRIT Data User that sent the SAR SURPIC Request Message.

.1.5. For Message Type 7 (receipt messages):

1.5.1. The IDC shall process receipt messages and store a copy of the messages in its data storage.

.1.6. For Message Type 8 (DDP Notification Message):

1.6.1. The IDC shall process the DDP Notification Message and ensure that IDC has the most recent version by immediately sending a DDP Request Message to the DDP server.

.1.7. For Message Type 9 (DDP Request Message):

1.7.1. The IDC shall transmit the DDP Request Message to the DDP web server.

1.7.2. The IDC can either request an incremental or a full DDP update. It is recommended that the incremental update be used wherever possible.

.1.8. For Message Type 10 (DDP Update Message):

1.8.1. The IDC shall update the DDP in accordance with the DDP Update Message.

1.8.2. The IDC shall be capable of processing both a full and incremental update to the DDP.

.1.9. For Message Type 11 (System Status Messages):

1.9.1. The IDC shall notify the IDC operator if it receives a System Status Message that indicates that there is an LRIT system problem.

.1.10. [*Depending on the policy issue decision by the Committee:* For Message Type 12 (R/CDC issued Billing and transaction Report):

1.10.1. The IDC shall generate and send a Billing and Transaction message to the IDE Interface in accordance with the "Draft LRIT Costing and Billing Standard."]

.1.11. [*Depending on the policy issue decision by the Committee:* For Message Type 13 (Pricing Notification):

1.11.1. The IDC shall process the Pricing Notification message and ensure that the IDC has the most recent version by immediately sending a Pricing Request message (Message Type 14) in accordance with the "Draft LRIT Costing & Billing Standard".

.1.12. For Message Type 14 (Pricing Request):

1.12.1. The IDC shall transmit the Pricing Request Message to the IDE.

.1.13. For Message Type 15 (Pricing Update):

1.13.1. The IDC shall update the pricing.]

3.3 IDC System Performance

3.3.1 General

3.3.1.1 The IDC shall process and handle any input within 60 seconds of receipt of the input and shall give the appropriate output. This output may be a direct response to the request or it may be a request for information from another part of the LRIT system. This shall include validation of requests in accordance with the DDP.

3.3.1.2 The IDC shall be capable of receiving and storing at least 5 reports per second.

3.3.2 Availability and Reliability

3.3.2.1 The IDC shall provide data to the LRIT system 24 hours per day 7 days per week with better than 99.9% availability measured over a year and better than 95% availability per day.

3.3.2.2 The IDC shall follow the industry's best practices for back up and recovery.

3.3.3 Maintainability

3.3.3.1 IDC equipment shall be designed so that the main units can be replaced readily, without elaborate recalibration or readjustment.

3.3.3.2 IDC equipment shall be constructed and installed so that it is readily accessible for inspection and maintenance purposes.

3.4 IDC External Interfaces

3.4.1 Application Service Providers Interface

3.4.1.1 The IDC shall interact with CSPs through a communications protocol provided by an ASP to enable the following minimum functionality:

.1 remote integration of the shipborne equipment into the IDC;

.2 automatic configuration of transmission of LRIT information;

.3 automatic modification of the interval of transmission of LRIT information;

.4 automatic suspension of transmission of LRIT information;

.5 on demand transmission of LRIT information; and

.6 automatic recovery and management of transmission of LRIT information.

3.4.1.2 The IDC shall:

.1 provide an integrated transaction management system for the monitoring of LRIT information throughput and routing; and

.2 ensure that LRIT information is collected, stored and routed in a reliable and secure manner.

3.4.2 IDE Interface

3.4.2.1 The IDC shall interface with the IDE using the protocols defined in the "Draft Technical Specifications for Communications in the LRIT System."

3.4.2.2 The IDC shall send a System Status message to the IDE every 30 minutes.

3.4.2.3 The IDC shall be capable of processing a System Status message from the IDE every 30 minutes.

3.4.2.4 The IDC shall alert the IDC operator if the System Status message is not received from the IDE.

3.4.2.5 The IDC shall be able to initiate a request for a copy of the most recent DDP.

3.4.3 IDC LRIT Data User Interface

3.4.3.1 The IDC shall interface with the LRIT Data User using the protocols defined in the "Draft Technical Specifications for Communications in the LRIT System."

3.4.4 LRIT Co-ordinator Interface

3.4.4.1 As required by the LRIT Co-ordinator, the IDC shall:

.1 perform authentication of the LRIT Co-ordinator based on the Digital Certificates in accordance with the "Draft Technical Specifications for Communication in the LRIT System";

.2 make available to the LRIT Co-ordinator the information required to enable the satisfactory completion of an audit of its performance;

.3 grant access to the LRIT Co-ordinator for monitoring the billing, technical and operational data as applicable to the IDC;

.4 provide compiled IDC statistics, error reports, and other required information to the LRIT Co-ordinator; and

.5 [*Subject to a policy issue decision by the Committee* Make available to the LRIT Co-ordinator the ability to bar access to LRIT information by Contracting Government or Data Centre for non-performance or non-payment.]

4 Use Cases

4.1 Overview of Contracting Government Use Cases

4.1.1 General

4.1.1.1 A Contracting Government, from a Flag State, Port State, or Coastal State perspective, may receive LRIT information pursuant to the provisions of SOLAS regulation V/19-1 (resolution MSC.202(81)). Specifically, reference is made to:

.1 section 8.1.1 for Flag State entitlement;

.2 section 8.1.2 for Port State entitlement; and

.3 section 8.1.3 for Coastal State entitlements.

4.1.1.2 A Contracting Government, from a Search and rescue perspective, may receive LRIT information pursuant to the provisions of SOLAS regulation V/19-1 (resolution MSC.202(81)), section 12.

4.1.1.3 The basic performance standards and functional requirements related to Articles 4.1.1.1 and 4.1.1.2 are as stated in resolution MSC.202(81).

4.1.1.4 References in Part 4 of this document related to a Contracting Government communicating with its Data Centre are prescriptive when the Data Centre is the IDC, and descriptive when it is any other Data Centre (i.e. National or Regional/Co-operative).

4.1.1.5 References in Part 4 of this document related to communications between Data Centres, the IDE and the DDP are prescriptive.

4.2 Flag Request

4.2.1 General

4.2.1.1 A Contracting Government that wishes to receive LRIT information on one of its registered ships can either:

.1 send a request message to the Data Centre to which it is connected; or

.2 submit standing orders regarding the criteria for receiving LRIT information to the LRIT Data Centre to which it is connected, which are included in the DDP.

4.2.1.2 The standing order information should include the ship name, IMO ship identification number and reporting rate.

4.2.1.3 The Contracting Government may use LRIT request messages to start tracking, stop tracking or alter the reporting rate of the LRIT information.

4.3 Port State Access to LRIT Information

4.3.1 General

4.3.1.1 A Port State may only request LRIT Information based upon receipt of a Notice of Arrival.

4.3.1.2 A Contracting Government that wishes to receive LRIT information as a port State can send either:

.1 a request message including all applicable port state parameters; or

.2 a request message referring the Receiving Data Centre to the standing orders applicable to that Port State contained within the DDP.

4.3.1.3 The standing order criteria may include a combination of: ship name, IMO ship identification number, flag, reporting rate, and the distance from the Contracting Government's port or the distance from the coastline, or a point in time (null values will provide flexibility).

4.3.1.4 If the Contracting Government wishes to stop receiving LRIT information, it must actively send a request message to the ship's Data Centre instructing the Data Centre to stop sending reports. This can also be done automatically if it is correctly entered into the DDP.

4.3.2 Example: Port State Request With Port Parameters

4.3.2.1 Ship A approaching port State X without Standing Order makes a request message (including all applicable port state parameters).
NOA lists the flag associated with ship A. DC X of port State X sends the Position Request message to the IDE, identifying Receiving LRIT Data User A (in this case Contracting Government) associated with ship A.
The IDE maps LRIT Data User A to its DC (in this case DC A), and routes the request to Receiving DC A.
DC A starts to transmit LRIT position reports based upon the specified criteria contained in the port State perimeters as requested to the IDE, addressing the Receiving LRIT Data User (Data User X).
IDE maps Data User X to DC X and routes the message to DC X, storing Journal data.
DC X forwards information to LRIT Data User X.

4.3.3 Example: Port State Request Referring to a Standing Order

4.3.3.1 Ship A approaching port State X and sending NOA to port authority.
NOA lists the flag associated with ship A. DC X of port State X sends the Position Request message to the IDE, identifying Receiving LRIT Data User A (in this case Contracting Government) associated with ship A.
The IDE maps LRIT Data User A to its DC (in this case DC A), and routes the request to Receiving DC A.
DC A checks the DDP and extracts the applicable information from the Standing Orders in the DDP.

DC A starts to transmit LRIT position reports as requested to the IDE, addressing the Receiving LRIT Data User (Data User X).
IDE maps Data User X to DC X and routes the message to DC X, storing Journal data.
DC X forwards information to LRIT Data User X.

4.4 Coastal State Access to LRIT Information

4.4.1 General

4.4.1.1 A Contracting Government that wishes to receive LRIT information as a coastal State must submit standing orders regarding the criteria for receiving LRIT information, which are included in the DDP.

4.4.1.2 The standing order criteria should include: the distance from its coast within which the Contracting Government wishes to track ships, reporting rate and, optionally, the flag of ships it does not (or does) wish to track. Thus, Data Centres will be capable of filtering LRIT data reports based upon a ship's distance from the Contracting Government's coast as well as the flag of the ship.

4.4.1.3 All Data Centres will check the incoming LRIT position reports of their registered ships against the standing orders and geographical boundaries contained in the DDP. Once the Data Centre has discovered a match, it will begin transmitting LRIT information to the entitled Contracting Government.

4.4.1.4 If the Contracting Government wishes to stop receiving LRIT information, it must either:

.1 actively send a request message to the ship's Data Centre instructing the Data Centre to stop sending reports for this transit through the coastal state area; or

.2 within the DDP only request that the first regular position message inside the coastal State area be transmitted to the Contracting Government.

4.4.2 Example: Coastal State Request

4.4.2.1 Ship A approaching coastal waters of LRIT Data User X (entering area that is included in the DDP requesting scheduled transmissions).
DC A (to which ship A belongs) checks the DDP to verify that ship A entered the area covered by the adopted standing orders related to LRIT Data User X in the DDP.
DC A starts to transmit LRIT position reports as requested to the IDE, addressing the Receiving LRIT Data User X.
IDE maps Data User X to DC X and routes the message to DC X and stores Journal data.
DC X forwards information to LRIT Data User X.

4.5 SAR Request

4.5.1 General

4.5.1.1 A Contracting Government that wishes to receive LRIT information as a SAR entity can use either a SAR SURPIC Request Message or a Poll Request Message to obtain information.

4.5.1.2 A SAR SURPIC is typically used in the first stage of responding to a SAR incident. The SAR SURPIC will provide the SAR service with the ships within a requested vicinity.

4.5.1.3 The SAR SURPIC message will be sent to the IDE by the Data Centre associated with the SAR service. The IDE will broadcast the message to all Data Centres. Only Data Centres with a ship or ships with the specified SURPIC will respond to the SAR SURPIC message.

4.5.1.4 SAR Authorities may use a SAR poll request message to retrieve additional positional data on ships in the vicinity of a SAR incident.

4.5.2 Example: SAR Request

4.5.2.1 As per SOLAS regulation V/19.1 paragraph 12: Ship B in distress falling under the responsibility of an RCC of State X.
RCC wants to check for ships in vicinity.
DC X associated to RCC X sends the SAR SURPIC Request message to the IDE.
IDE broadcasts this request to all DCs.

Every DC checks its database to determine whether an associated ship is within the area of the incident.
If yes, DC responds with SAR position reports as requested with LRIT Data User X as the destination address.
If no, DC sends a receipt message indicating “no ships in area.”
IDE maps Data User X to DC X and routes the received messages from one or multiple DC’s to Requesting DC X.
DC X forwards information to LRIT Data User X.
RCC decides to track one (or more) ship A in SAR area at higher rate.
DC X associated to with RCC X sends the SAR Polling Request message addressed to ship A with destination LRIT Data User A to the IDE.
IDE maps LRIT Data User A to DC A and routes the message to DC A.
DC A starts to transmit SAR position reports as requested to IDE addressing the receiving LRIT Data User X.
IDE maps LRIT Data User X to DC X and routes the message to DC X.
DC X forwards information to LRIT Data User X.

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ANNEX 3

Revised Draft Technical Specifications for Communication in the LRIT System

Prepared by: *Ad Hoc* Engineering Working Group
Date of Issue of this Draft: July 3, 2007

Table of Contents

REVISED DRAFT TECHNICAL SPECIFICATIONS FOR COMMUNICATION IN THE LRIT SYSTEM

1 General Provisions

1.1 Scope and Background

1.1.1 Scope

1.1.1.1 The intent of this document is to outline the technical specifications for communication within the international Long-Range Identification and Tracking (LRIT) system as stated in the terms of reference of resolution MSC.211(81).

1.1.1.2 This document has been prepared by the *Ad Hoc* Working Group on Engineering Aspects of Long-Range Identification and Tracking of Ships.

1.1.1.3 In preparing the document, the *Ad Hoc* Working Group has taken into account the provisions of SOLAS regulation V/19-1 and resolution MSC.210(81), "Performance Standards and Functional Requirements for the Long Range Identification and Tracking of Ships."

1.1.2 Background

1.1.2.1 The Maritime Safety Committee, at its eighty-first session in May 2006, adopted amendments to chapter V of the SOLAS convention in relation of LRIT. These amendments will come into force on 1 January 2008 provided that acceptance criteria have been fulfilled by 1 July 2007.

1.1.2.2 The LRIT system provides for the global identification and tracking of ships.

1.1.2.3 In operating the LRIT system, recognition shall be given to international conventions, agreements, rules or standards that provide for the protection of navigational information.

1.1.2.4 Communication specifications within the international LRIT system will detail the messaging format between LRIT components, data security throughout the network, and the protocols required for transporting data from one network point to another.

1.1.2.5 The draft specifications for Communications for the International LRIT system as outlined in this document will be established and recognized by the Committee.

1.2 General Description of the System and Definitions

1.2.1 LRIT System Description

1.2.1.1 As described in resolution MSC.210(81), sub-section 1.2, the LRIT system consists of the following components:

.1 the shipborne LRIT information transmitting equipment;

.2 the Communication Service Provider(s);

.3 the Application Service Provider(s);

.4 the LRIT Data Centre(s), including any related Vessel Monitoring System(s);

.5 the LRIT Data Distribution Plan;

.6 the International LRIT Data Exchange; and

.7 LRIT Data Users.

1.2.1.2 As described in resolution MSC.210(81), sub-section 1.2, certain aspects of the performance of the LRIT system are reviewed or audited by an LRIT Co-ordinator acting on behalf of all Contracting Governments.

1.2.2 LRIT System Operation

1.2.2.1 Subsections 1.2.2.1 to 1.2.2.11. provide a high-level overview of the LRIT system architecture. The LRIT system performance standards, resolution MSC.210(81), provide further details on the functions associated with each component of the system.

1.2.2.2 Tracking of any applicable ship begins with LRIT positional data being transmitted from the shipborne equipment. The LRIT information transmitted includes the ship's GNSS position (based on the WGS84 datum), time and identification, as described in resolution MSC.210(81), Table 1.

1.2.2.3 The Communication Service Provider (CSP) provides the communication infrastructure and services that are necessary for establishing a communication path between the ship and the Application Service Provider (ASP). The LRIT information transmitted from the ship will travel across the communication path set up by the CSP to the ASP.

1.2.2.4 The ASP, after receiving the LRIT information from the ship, will add additional information to the LRIT message and pass the expanded message to its associated LRIT Data Centre. Functionality required for the programming and communicating of commands to the shipborne equipment is provided by the ASP.

1.2.2.5 The LRIT data, along with all the parameters added by the various LRIT components, is described in the messaging section of this document.

1.2.2.6 LRIT Data Centres will store all incoming LRIT information from ships instructed by their Administrations to transmit LRIT information to that Data Centre. LRIT Data Centres will disseminate LRIT information to LRIT Data Users according to the Data Distribution Plan (DDP).

1.2.2.7 The LRIT DDP will contain the information required by the Data Centres for determining how LRIT information will be distributed to the various Contracting Governments. The DDP will contain information such as standing orders from Contracting Governments and geographical polygons relating to Contracting Governments' coastal waters and ports and port facilities.

1.2.2.8 LRIT Data Centres will process all LRIT messages to and from the International LRIT Data Exchange (IDE). The IDE will process all LRIT messages between LRIT Data Centres. The IDE will route the message to the appropriate Data Centre based upon the address in the message and the IP addresses in the DDP. The IDE will neither process nor store the positional data contained within LRIT messages.

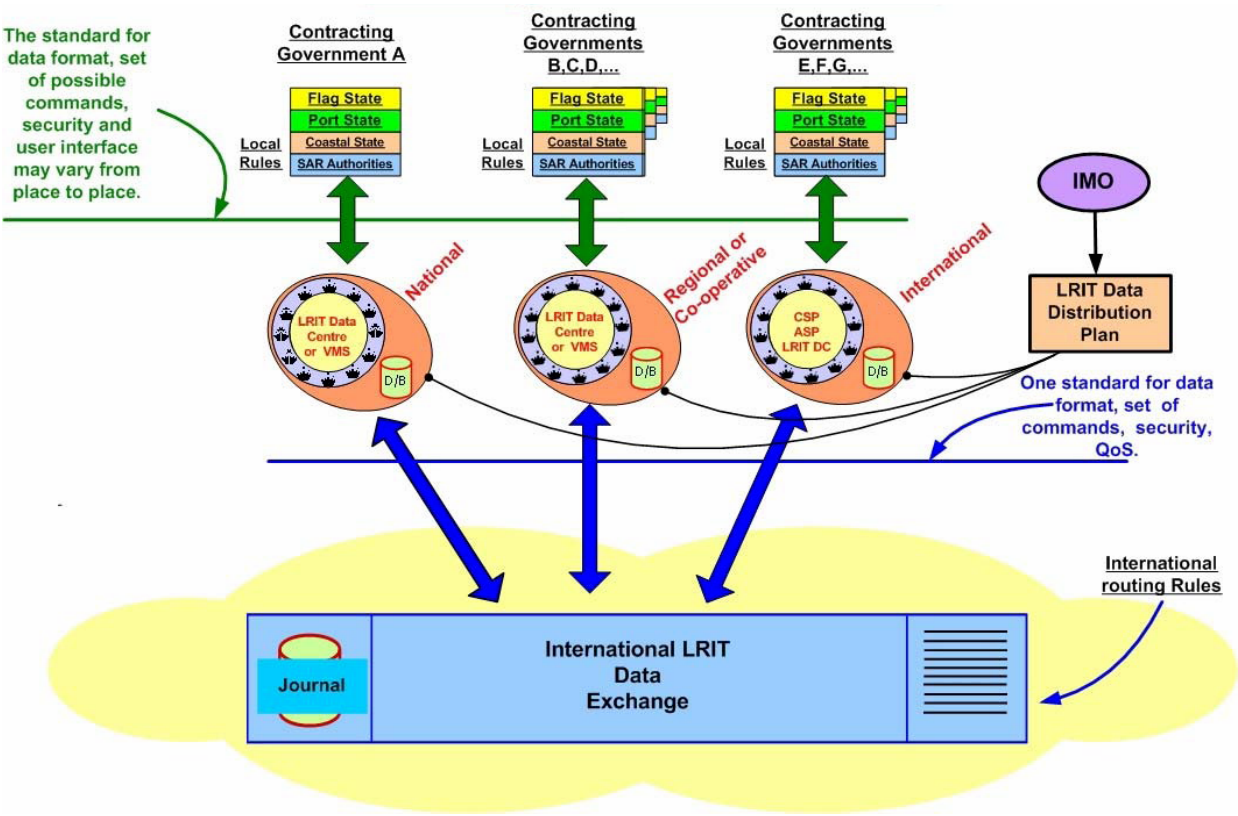
1.2.2.9 LRIT Data Users may be entitled to receive or request LRIT information in their capacity as a Flag State, Port State, Coastal State or Search and rescue (SAR) services.

1.2.2.10 The LRIT Co-ordinator will assist in the establishment of the international components of the LRIT system, perform administrative functions, and review and audits certain components of the LRIT system.

1.2.2.11 Figure 1 provides a high-level illustration of the basic LRIT system architecture.

FIGURE 1

TYPICAL LRIT SYSTEM ARCHITECTURE



1.2.3 Definitions

1.2.3.1 Unless expressly provided otherwise:

.1 *Convention* means the International Convention for the Safety of Life at Sea, 1974, as amended.

.2 *Regulation* means a regulation of the Convention.

.3 *Chapter* means a chapter of the Convention.

.4 *LRIT Data User* means a Contracting Government or a Search and rescue service that opts to receive the LRIT information it is entitled to.

.5 *Committee* means the Maritime Safety Committee.

.6 *High-speed craft* means a craft as defined in regulation X/1.3.

.7 *Mobile offshore drilling unit* means a mobile offshore drilling unit as defined in regulation XI-2/1.1.5.

.8 *International Routing Rules* – a list of all Data Centres with their associated IP addresses as identified in the DDP

.9 *Organization* means the International Maritime Organization.

.10 *Vessel Monitoring System* means a system established by a Contracting Government or a group of Contracting Governments to monitor the movements of the ships entitled to fly its or their flag. A Vessel Monitoring System may also collect from the ships information specified by the Contracting Government(s) that has established it.

.11 *LRIT information* means the information specified in SOLAS regulation V/19-1.5.

.12 *IDC operator* means the individual responsible for the daily operation and maintenance of the International LRIT Data Centre.

.13 The term "*ship*," when used in the present Performance standards and functional requirements for long-range identification and tracking of ships, includes mobile offshore drilling units and high-speed craft as specified in SOLAS regulation V/19-1.4.1 and means a ship that is required to transmit LRIT information.

1.2.3.2 Terms not otherwise defined should have the same meaning as the meaning attributed to them in the Convention.

1.2.4 Acronyms

1.2.4.1 The acronyms that appear within this document shall have the meanings assigned to them in this Article:

.1	ASP	Application Service Provider
.2	CSP	Communication Service Provider
.3	DC	LRIT Data Centre
.4	DDP	LRIT Data Distribution Plan
.5	IDC	International LRIT Data Centre
.6	IDE	International LRIT Data Exchange
.7	LES	Land Earth Station
.8	NDC	National Data Centre
.9	MMSI	Maritime Mobile Service Identity
.10	R/CDC	Regional/Co-operative Data Centre
.11	RFP	Request for Proposal
.12	SAR	Search and Rescue
.13	SAR SURPIC	Search and Rescue Surface Picture
.14	SOLAS	International Convention for the Safety of Life at Sea
.15	SSL	Secure Sockets Layer
.16	VPN	Virtual Private Network
.17	SOAP	Simple Object Access Protocol
.18	OASIS	Oganization for the Advancement of Structured Information Standards
.19	PKI	Public Key Encryption
.20	HMAC	Hash Message Authentication Code
.21	WS	Web Service
.22	TLS	Transport Layer Security

2 Communication within the LRIT System

2.1 Overview and Message Types

2.1.1 Overview

2.1.1.1 Communication within the LRIT system is described in Parts 2 to 4 of this document.

2.1.2 Message Types

2.1.2.1 Communication within the LRIT system is based upon three types of messages passing between the various LRIT system components: LRIT request messages; LRIT ship position report messages; and other system messages.

2.1.2.2 Request messages are those requesting specific LRIT information.

2.1.2.3 LRIT ship position report messages are those containing LRIT ship positional data.

2.1.2.4 Other messages managed by the system include: Billing and transaction messages; receipt messages; DDP related messages, costing and billing related messages, system status messages and pricing messages.

2.1.2.5 Parts 2 to 4 of this document outline the parameters associated with each message, as well as the functional operational flow of the messages within the LRIT system.

2.1.2.6 Each LRIT system component referenced in Article 1.2.1.1 (with the exception of the shipborne equipment, which will have its own unique identifier) will have its own unique LRIT identifier (LRIT ID) that will enable other components within the LRIT system to identify that particular component. The Organization shall manage the list of unique LRIT identifiers (LRIT IDs) and be

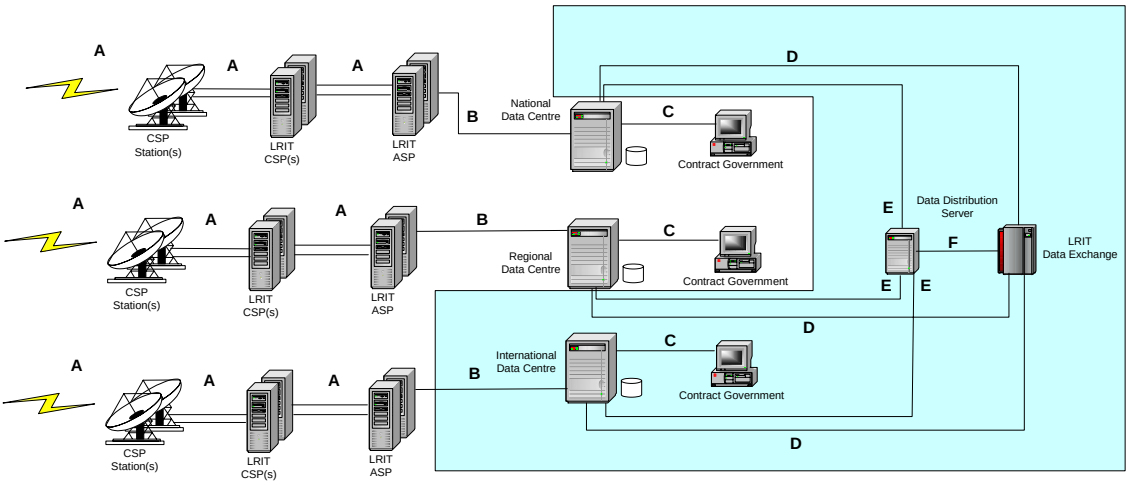
responsible for assigning, to the various LRIT system components, their designated LRIT identifier (LRIT ID) number.

2.1.2.7 Figure 2 illustrates the LRIT system components as well as the various communications segments (A to F) in the LRIT network. The shaded area represents the communication paths specified in this document.

2.1.2.8 The design of communications segments A and B for National Data Centres (NDC) and Regional/Co-operative Data Centres (R/CDCs) are at the discretion of the Contracting Governments. Communication segment A for the IDC is at the discretion of ASPs and CSPs. Part 3, Communication Protocol Strategy, provides further detail to the responsibilities of the various LRIT system components with respect to the communications segments.

FIGURE 2

LRIT COMMUNICATIONS SEGMENTS



2.2 LRIT Messaging Format Summary

2.2.1 Summary of LRIT Messages

2.2.1.1 Table 1 provides a summary of all LRIT messages.

TABLE 1

SUMMARY OF LRIT MESSAGES

Message Type	Message Name	Message Description
LRIT Positional Data (position report) Messages		
1	Periodic Position Report	Regular periodic ship position report.
2	Polled Position Report	Ship position report as a result of a poll request.
3	SAR Position Report	Ship position report as a result of a SAR request.
LRIT Request Messages		
LRIT Ship Position Request Messages		
4	Ship Position Request	Request for polled ship position report.
5	SAR Poll Request	SAR request for poll of specific ship's position.
LRIT SAR SURPIC Request Message		
6	SAR SURPIC Request	SAR request for poll of ships in specific area.
Other Messages		
7	Receipt	Receipt message relaying inability to respond to a LRIT request or report message (e.g. Time Stamp).
8	DDP Notification	Notification that an updated version of the DDP file is available.
9	DDP Request	Request for current copy of the DDP or incremental copy.
10	DDP Update	Updated DDP (full or partial).
11	System Status	Routine 30-minute status message from the IDE to each Data Centre (or vice versa), advising that the system is "healthy."
[12	R/CDC issued Billing and transaction Report	Routine monthly report generated by a R/CDC or the IDC and sent to the IDE.]*
[13	Pricing Notification	Notification that a new pricing list for between DC charges is in place
14	Pricing Request	Request for updated pricing list
15	Pricing Update	Updated pricing list full]**

* Awaiting policy decision

** Awaiting policy decision related to set published price list in the IDE

Sections 2.2.2 to 2.2.8 describe each of the LRIT messages. Each messages is presented in tabular format with the following columns:

.1 "Parameter Provided By" column - indicating the particular LRIT component that provides the parameter information contained in the LRIT message;

.2 "Parameter" column - listing the various parameter names contained within the LRIT message;

.3 "Values" column - listing the potential values of each associated parameter;

.4 "Description" column - providing brief information pertaining to each of the various parameters in the LRIT message;

.5 "LRIT Segments" column - indicating which of the LRIT communications segments of Figure 2 contain each parameter; and

.6 "Processed Format" column - defining the specific format for each parameter.

2.2.1.2 The definition of the various processed formats listed in the "Processed format" column of the tables in Subsections 2.2.2 to 2.2.8 are:

.1 n – represents 1 ASCII decimal digit (0-9).

.2 $n_1 \ldots n_n$ – represents 1 to n ASCII decimal digits.

.3 c – represents 1 ASCII alphabetic character.

.4 $c_1 \ldots c_n$- represents 1 to n ASCII alphabetic characters.

.5 YYYY:MM:DD:HH:mm – represents the Year:Month:Day:Hour:Minute. Year is 4 ASCII decimal digits from 2007-9999, Month is 2 ASCII decimal digits from 01 to 12, Day is 2 ASCII decimal digits from 01 to 31, Hour is a 2 ASCII decimal digits from 00 – 23, Minute is 2 ASCII decimal digits from 00 – 59. ss (where required) represents seconds, which is 2 ASCII decimal digits from 00 – 59.

.6 TEXT – unformatted alpha numeric text string

2.2.2 LRIT Ship Position Reports (Messages 1, 2 and 3)

2.2.2.1 Table 2 outlines the parameters associated with the positional data messages (ship position reports).

2.2.2.2 NDCs and R/CDCs are responsible for formatting the LRIT ship position reports as specified in table 2 before transmitting the positional message to the IDE. The Ship to CSP to ASP to NDC or R/CDC communication path may transmit LRIT position report messages amongst themselves in any format that they choose.

2.2.2.3 The ASP to IDC to IDE communication path must transmit LRIT ship position reports in a processed format as specified in table 2. The Ship to CSP to ASP communication path used by the IDC may transmit LRIT position report messages amongst themselves in any format that they choose.

2.2.2.4 The LRIT ship position messages are intended to provide LRIT Data Users with positional information pertaining to ships being tracked by the Data User.

2.2.2.5 The message header, as stated in resolution MSC.210(81), "Performance standards and Functional Requirements for the Long Range Identification and Tracking of Ships." refers to all parameters with the exception of the parameters provided by the LRIT shipborne equipment (Latitude, Longitude, Time Stamp1, Ship unique equipment number).

2.2.2.6 The parameters provided by the LRIT shipborne equipment include: the latitude; longitude; Time Stamp when the position was generated; and the shipborne equipment identifier.

2.2.2.7 The "Processed Format" of these parameters as outlined in table 2 indicates how the parameters shall be formatted (Refer Article 2.2.1.3.) while the information is contained within the LRIT message and does not specify the format of how the shipborne equipment transmits the information.

2.2.2.8 The parameter "ASP ID#" provides the unique LRIT component ID of the ASP that has received the LRIT positional data.

2.2.2.9 The parameter "CSP ID#" provides the unique LRIT component ID of the CSP that transmitted the LRIT positional data message to the ASP.

2.2.2.10 The “Message Type” parameter indicates the type of message of the associated LRIT message. The LRIT components such as the LRIT Data Centres can use this parameter to distinguish between the various LRIT messages listed in table 1.

2.2.2.11 The “Message ID#” parameter is a unique identification number that LRIT components can use to identify individual messages within the LRIT network. The Message ID# is generated by linking together the LRIT ASP ID, UTC date time stamp and a 5 digit unique sequence decimal number. The unique sequence number is generated by the ASP and the date consists of the year, month, day, hour, minute and second in which the parameter was generated. An example of a message ID would be 01992007013011552311111 (LRIT ASP ID = 0199, year = 2007, month = 01, day = 30, hour = 11, minute = 55, second = 23, unique number = 11111).

2.2.2.12 The “Reference ID#” parameter will either be a message ID of an associated request message or a 0 value. The 0 value is populated if the message is not the result of a request message. A valid “Message ID” value indicates that a request message has initiated the LRIT positional data report.

2.2.2.13 The “IMO#” and “MMSI#” parameters are the IMO ship identification number and the Maritime Mobile Service Identity (MMSI) number of the ship being tracked, respectively.

2.2.2.14 The “Time Stamp 2” and “Time Stamp 3” parameters represent the date and time associated with when the ASP received and transmitted the positional data message, respectively. Both Time Stamps shall be indicated as Universal Co-ordinated Time (UTC).

2.2.2.15 The parameter “DC ID#” provides the unique LRIT component ID of the Data Centre receiving the LRIT positional data.

2.2.2.16 The “Time Stamp 4” and “Time Stamp 5” parameters represent the date and time associated with when the Data Centre received and transmitted the positional data message, respectively. Both Time Stamps shall be indicated as Universal Co-ordinated Time (UTC).

2.2.2.17 The “Response Type” parameter provides information with respect to why the receiving LRIT Data User (value of Destination parameter) is receiving the LRIT ship positional data. The LRIT Data User will be entitled to receive the LRIT ship positional data based upon functioning as: a Flag State; a Port State; a Coastal State; or a SAR service. If responding to a SAR request, the response type would be SAR; if responding to a port request, the response type would be Port; if responding to a coastal request, the response type would be Coastal; if responding to a flag request, the response type would be Flag.

2.2.2.18 The “LRIT Data User Requestor” parameter shall be populated with the LRIT ID of the LRIT Data User that is intended to receive the ship position report message as a result of a request message or standing order. The IDE shall look at this parameter during processing of the message and use it to correctly route the message to the appropriate Data Centre.

2.2.2.19 The “Ship Name” parameter represents the ship name.

2.2.2.20 The “LRIT Data User Provider” parameter provides the LRIT ID of the LRIT Data User to which the ship is registered.

2.2.2.21 The “DDP Version #” parameter indicates the version number of the DDP that is being used by the Data Centre routing the request.

2.2.2.22 The “Test” parameter indicates whether the message is a test message intended for testing purposes only, or a regular LRIT message.

TABLE 2

SUMMARY OF LRIT POSITIONAL DATA (POSITION REPORT) MESSAGES (MESSAGE 1, 2 AND 3)[1]

Parameter Provided By	Parameter	Values	Description	LRIT Segments [3]	Processed Format [4]
LRIT Shipborne equipment	Latitude	Latitude	WGS84 latitude position of the ship: degrees, minutes and decimal minutes to two decimal places N (North) / S (South).	B, C, D	nn.nn.nn.c
	Longitude	Longitude	WGS84 longitude position of the ship, degrees, minutes and decimal minutes to two decimal places E (East) / W (West).	B, C, D	nnn.nn.nn.c
	Time Stamp 1	Time1	Date and time when position was taken in UTC.	B, C, D	YYYY:MM:DD:HH:mm
	Shipborne equipment identifier	Equip#	The identifier used by the shipborne equipment.	B, C, D	$c_1 \ldots c_n$
LRIT ASP[2]	ASP ID#	ASP#	LRIT ID of the ASP.	B, C, D	nnnn
	CSP ID#	CSP#	LRIT ID of the CSP.	B, C, D	nnnn
	Message Type	1, 2, 3	Message type number: 1 – Periodic Report 2 – Polled Report 3 – SAR Report	B, C, D	nn
	Message ID#	Unique number	Unique message number generated by using: ASP ID, local date time stamp and unique sequence number.	B, C, D	nnnnYYYYMMDDHHmmssnnnnn
	Reference ID#	0, Message ID	The Message ID# of the associated request message. It is only valid for a response to a request message (a 0 value indicates the message is not the result of a request message).	B, C, D	nnnnYYYYMMDDHHmmssnnnnn
	IMO#	IMO#	IMO ship identification number of the ship being tracked.	B, C, D	nnnnnnn
	MMSI#	MMSI#	Maritime Mobile Service Identity number of the ship being tracked.	B, C, D	nnnnnnnnn
	Time Stamp 2	Time2	Date and time ASP receives message. (UTC)	B, C, D	YYYY:MM:DD:HH:mm:ss
	Time Stamp 3	Time3	Date and time ASP transmits message. (UTC)	B, C, D	YYYY:MM:DD:HH:mm:ss
LRIT Data Centre	DC ID#	DC#	LRIT ID of Data Centre.	D, C	nnnn
	Time Stamp 4	Time4	Date and time when the Data Centre receives message from ASP (UTC).	D, C	YYYY:MM:DD:HH:mm:ss
	Time Stamp 5	Time5	Date and time when the Data Centre transmits a message to a LRIT Data User (UTC).	D, C	YYYY:MM:DD:HH:mm:ss
	Response Type	1, 2, 3, 4	One of the following four values is added by the Data Centre when the message is transmitted: 1 - Coastal 2 - Flag 3 - Port 4 – SAR	D, C	n

Parameter Provided By	Parameter	Values	Description	LRIT Segments (3)	Processed Format (4)
	LRIT Data User Requestor	UserID#	LRIT ID of the LRIT Data User requesting the position report as a result of a request message or standing orders. For a coastal State the request is part of the Standing Order in the DDP.	D, C	nnnn
	Ship Name	Name	Name of ship associated with position report.	D, C	TEXT roman alphabet
	LRIT Data User Provider	UserID#	LRIT ID of LRIT Data User to which the ship is registered.	D, C	nnnn
	DDP Version #	Unique number	DDP version number used by DC.	D, C	$n_1...n_n$
	Test	0, 1	Setting indicates if message is test message or regular LRIT message. 0 – Regular LRIT message 1 – Test message	D, C	n

Notes: (1) Refer 2.2.1.2 for description of column headings.
(2) LRIT ASP connected to the IDC.
(3) Refer 2.1.2.7.
(4) Refer 2.2.1.3.

2.2.3 LRIT Ship Position Request Messages (Message 4 and 5)

2.2.3.1 Table 3 outlines the parameters associated with the ship position request messages.

2.2.3.2 NDCs and R/CDCs are responsible for formatting the LRIT ship position request messages as specified in table 3 before transmitting the request message to the IDE. The LRIT Data User to NDCs or R/CDC communication path may transmit LRIT request messages amongst themselves in any format they choose.

2.2.3.3 The LRIT Data User to IDC to IDE communication path must transmit LRIT ship position request messages in a processed format as specified in table 3.

2.2.3.4 The LRIT ship position request messages are intended to provide LRIT Data Users with the ability to poll a ship's specific position, change the LRIT positional reporting rate of a ship, query archived LRIT ship position report messages or stop receiving LRIT ship position reports from a given ship.

2.2.3.5 The "Message Type" parameter indicates the type of message of the associated LRIT message. The LRIT components such as the LRIT Data Centres can use this parameter to distinguish between the various LRIT messages listed in table 1.

2.2.3.6 The "Message ID#" parameter is a unique identification number that LRIT components can use to identify individual messages within the LRIT network. The Message ID# is generated by linking the LRIT Data User ID#, UTC date time stamp and a 5 digit unique sequence number together. The unique sequence number is generated by the LRIT Data User and the date consists of the year, month, day, hour, minute and second in which the parameter was generated. An example of a message ID would be 03002007013011552322222 (LRIT Data User ID = 0300, year = 2007, month = 01, day = 30, hour = 11 minute = 55, second = 23. unique sequence number = 22222).

2.2.3.7 The "IMO#" and "Ship name" parameters are the IMO ship identification number of the ship being tracked and the ship name respectively.

2.2.3.8 The "LRIT Data User Provider" parameter is populated with the LRIT ID of the LRIT Data User to which the ship is registered. This parameter is used to identify the destination of the request message. The IDE will look at this parameter during processing of the request message and use it to correctly route the message to the appropriate Data Centre.

2.2.3.9 The “Access Type” parameter indicates the requesting LRIT Data User’s entitlement to receive the LRIT data. The LRIT Data User may be requesting the LRIT data as: a Flag State; a Port State; a Coastal State; or a SAR service. If the Access type is Port State, then the trigger mechanism can be either a distance from a port, distance from a coast, reference to Standing Orders or commence tracking upon receiving request message or a specific time.

2.2.3.10 The “Port or Port facility” parameter is populated with the UN/LOCODE code for the port or port facility that the ship is intending to enter. This parameter should be set to “00000” for a Port State access involving tracking a ship based upon a distance from a coast line or if the request is not a Port State request. This parameter is only valid for “Access Type” 3, 4 and 5.

2.2.3.11 The “Distance” parameter indicates the distance in nautical miles from a port, port facility or coastline where the requesting Contracting Government wishes to track the designated ship. This parameter is only valid when the “Access type” parameter is set to 3 or 4. If this parameter is a null value, then the distance values in the DDP should be used for the request access.

2.2.3.12 The “Request Type” parameter indicates whether the request is for either a one-time poll, polls at a specified rate, archived data, stop tracking or do not start sending position reports. The ‘do not start sending position reports’ message option provides Contracting Governments with the ability to temporarily override Standing Orders in the DDP. Consider the scenario where a Contracting Government is tracking a ship via Port State access and does not want to receive positional reports as a Coastal State. The Contracting Governments could build a request message with coastal for the “Access Type” parameter and stop / don’t start sending for the “Request Type.” The providing Data Centre, after receiving such a request message, would not start sending any coastal position reports for the period of time stated in the “Request Duration” parameter.

2.2.3.13 The “Request Duration” parameter provides information on the start and stop times for tracking of a ship. If the Access Type is 3 or 4, then the request duration and the distance are both valid parameters. If the request duration is set to 0, then only distance from port is valid for the port request with distance trigger.

2.2.3.14 The “LRIT Data User Requestor” parameter represents the LRIT Data User originating the request message.

2.2.3.15 The “Time Stamp” parameter represents the date and time associated with the generation of the LRIT request message. All times should be indicated as Universal Co-ordinated Time (UTC).

2.2.3.16 The “DDP version #” parameter indicates the version number of the DDP that is being used by the Data Centre routing the request.

2.2.3.17 The “Test” parameter indicates whether the message is a test message intended for testing purposes only, or a regular LRIT message.

TABLE 3

SUMMARY OF LRIT REQUEST MESSAGES (MESSAGES 4 AND 5)
SHIP POSITION REQUEST MESSAGES [1]

Parameter Provided By	Parameter	Value	Description	LRIT Segment[3]	Processed Format[4]
LRIT Data User [2]	Message Type	4, 5	Message type number: 4 – Ship position request 5 – SAR poll request	B, C, D	nn
	Message ID#	Unique number	Unique message number generated by using: LRIT ASP ID, Date and unique sequence number.	B, C, D	nnnnYYYYMMDDHHmmssnnnnn
	IMO#	IMO#	IMO ship identification number of the ship to be tracked.	B, C, D	nnnnnnn
	Ship name	Registered Ship Name, Unknown	Name of the ship to be tracked, if available. (Unknown value if the ship name is not available.)	B, C, D	TEXT roman alphabet
	LRIT Data User Provider	UserID#	LRIT ID of the LRIT Data User (Contracting Government) to which the ship is registered.	B, C, D	nnnn
	Access Type	1, 2, 3, 4, 5, 6	This LRIT parameter is set based upon the LRIT Data User requestor's entitlement to receive LRIT data. 1 – Coastal 2 – Flag 3 – Port with distance trigger from port or port facility 4 – Port with distance trigger from coast 5 – Port with time trigger 6 – SAR	B, C, D	n
	Port or Port facility	00000, UN/LOCODE or IMO port facility #	UN/LOCODE code for the port or IMO port facility # for the port facility that the ship is planning on entering. Parameter is only valid for Access Type 3, 4 and 5.	B, C, D	$c_1...c_n$
	Distance	Nautical Miles	Distance in nautical miles from the Port, Port facility or coastline where tracking should commence. Parameter is only valid for Access Type 3 and 4.	B, C, D	nnnn
	Request Type	1, 2, 3, 4, 5, 6, 7, 8, 9	Request Type: 1 – One time poll of ship. 2 – 15 minute periodic rate. 3 – 30 minute periodic rate. 4 – 1 hour periodic rate. 5 – 3 hour periodic rate. 6 – 6 hour periodic rate. 7 – Archived Data request. 8 – Stop / don't start sending position reports. 9 – Most recent position report.	B, C, D	n

Parameter Provided By	Parameter	Value	Description	LRIT Segment[3]	Processed Format[4]
	Request Duration	Start:Stop	START refers to the time when LRIT position reports are requested to begin. STOP refers to the end time for receiving LRIT reports. A value of 0000:00:00:00:00.0000:00:00:00:00 indicates the parameter is not valid. (Contracting Governments may decide to use repeat polling or periodic rate modification to obtain variable position report intervals.)	B, C, D	YYYY:MM:DD:HH:mm:YYYY:MM:DD:HH:mm
	LRIT Data User Requestor	UserID#	LRIT ID of the LRIT Data User issuing the request.	B, C, D	nnnn
	Time Stamp	Time YYYY:MM:DD:hh:mm:ss	Date and time when LRIT Data User transmits message to its DC.	B, C, D	YYYY:MM:DD:HH:mm:ss
LRIT Data Centre	DDP Version #	Unique number	DDP version number used by DC.	D, C	$n_1...n_n$
	Test	0, 1	Setting indicates if message is test message or regular LRIT message. 0 – Regular LRIT message 1 – Test message	D, C	n

Notes:

(1) Refer 2.2.1.2 for description of column headings.

(2) LRIT Data users connected to the IDC have to provide the parameter information listed in the table. The connection between LRIT Data Users and NDCs or R/CDCs is not mandated in this document and thus the parameter information listed in the table will be provided by the Data Centre.

(3) Refer 2.1.2.7.

(4) Refer 2.2.1.3.

2.2.4 SAR SURPIC Request (Message 6)

2.2.4.1 Table 4 outlines the SAR SURPIC request message.

2.2.4.2 NDCs and R/CDCs are responsible for formatting the LRIT SAR SURPIC message as specified in table 4 before transmitting the SAR SURPIC message to the IDE. The LRIT Data User to NDCs or R/CDC communication path may transmit LRIT SAR SURPIC messages amongst themselves in any format that they choose.

2.2.4.3 The LRIT Data User to IDC to IDE communication segment must transmit LRIT SAR SURPIC messages in a processed format as specified in table 4.

2.2.4.4 This message requests the most recent data from the databases within the Data Centres. It provides SAR authorities with the ability to obtain a picture of ships in a given geographical area where a Search and Rescue incident has occurred.

2.2.4.5 The “Message Type” parameter indicates the type of message of the associated LRIT message. The LRIT components such as the LRIT Data Centres can use this parameter to distinguish between the various LRIT messages listed in table 1.

2.2.4.6 The "Message ID#" parameter is a unique identification number that LRIT components can use to identify individual messages within the LRIT network. The Message ID# is generated by linking the LRIT Data User ID, date and a 5 digit unique sequence number together. The unique sequence number is generated by the LRIT Data User and the date consists of the year, month, day, hour, minute and second in which the parameter was generated. An example of a message ID would be 03002007013021552344444 (LRIT Data User ID = 0300, year = 2007, month = 01, day = 30, hour = 21, minute = 55, second = 23, unique sequence number = 44444).

2.2.4.7 The "SAR Circular Area" parameter provides information on the circular geographical area in which the requestor wishes to check for ships. The centre of the SAR circular Area is indicated by the WGS84 latitude and longitude position: degrees.minutes. North / South (Latitude) or East/West (Longitude). Radius is the radius of the SAR circle in nautical miles. This parameter is only valid if the parameter is populated (Requestor wishes to perform a search based on a circular area.)

2.2.4.8 The "SAR Rectangular Area" parameter provides information on the rectangular geographical area in which the requestor wishes to check for ships. The rectangular geographical area is expressed by providing the WGS84 latitude and longitude of the SouthWest corner of the rectangular and the north east offset from the corner. The SouthWest corner and offset are expressed as: degrees.minutes. North / South (Latitude) or East / West (Longitude). This parameter is only valid if the parameter is populated (Requestor wishes to perform a search based on a rectangular area).

2.2.4.9 The "Number of Positions" parameter indicates the number of the most recent LRIT positional data reports requested. If, for example, the value is 2, then the requesting SAR service is asking for the last two positional data reports of all ships within the defined SAR geographical area.

2.2.4.10 The "LRIT Data User Requestor" parameter represents the LRIT Data User originating the request message.

2.2.4.11 The "Time Stamp" parameter represents the date and time associated with the generation of the LRIT SAR SURPIC request message. All times should be indicated as Universal Co-ordinated Time (UTC).

2.2.4.12 The "DDP version #" parameter indicates the version number of the DDP that is being used by the Data Centre routing the request.

2.2.4.13 The "Test" parameter indicates whether the message is a test message intended for testing purposes only, or a regular LRIT message.

TABLE 4

SUMMARY OF SAR SURPIC REQUEST (MESSAGE 6) (1)

Parameter Provided By	Parameter	Value	Description	LRIT Segment (2)	Processed Format (3)
	Message Type	6	Message type number: 6 – SAR SURPIC request	C, D	nn
	Message ID	Unique number	Unique message number generated by using: LRIT ASP ID, Date and unique sequence number.	C, D	nnnnYYYYMMDDHHmmssnnnnn
	SAR Circular Area	Centre:Radius	Centre indicates the WGS84 latitude and longitude position of the SAR Circular Area: degrees.minutes. North / South (Latitude) or East / West (Longitude). Radius is the radius of the SAR circle in nautical miles.	C, D	nn.nn.c:nnn.nn.c:nnn

LRIT Data User [1]	SAR Rectangular Area	SouthWest :Offset	SouthWest indicates the WGS84 latitude and longitude of the SouthWest corner of the SAR rectangle. Offset indicates the northeast offset from the southwest corner. SouthWest corner and offset are expressed as: degrees.minutes.North / South (Latitude) or East / West (Longitude).	C, D	nn.nn.c:nn n.nn.c: nn.nn.N:nn n.nn.E
	Number of Positions	Number	Last 'N' number of positions of ship.	C, D	nnn
	LRIT Data User Requestor	UserID#	LRIT ID of the LRIT Data User issuing the request	C, D	nnnn
	Time Stamp	Time YYYY:MM:DD:hh:mm:ss	Date and time when LRIT Data User transmits SAR SURPIC message.	C, D	YYYY:MM:DD:HH:mm:ss
LRIT Data Centre	DDP Version #	Unique number	DDP version number used by DC	C, D	$n_1..n_n$
	Test	0, 1	Setting indicates if message is test message or regular LRIT message. 0 – Regular LRIT message 1 – Test message	C, D	n

Notes:
(1) Refer 2.2.1.2 for description of column headings.
(2) LRIT Data users connected to the IDC have to provide the parameter information listed in the table. The connection between LRIT Data Users and NDCs or R/CDCs is not mandated in this document and thus the parameter information listed in the table will be provided by the Data Centre.
(3) Refer 2.1.2.7.
(4) Refer 2.2.1.3.

2.2.5 Receipt Message (Message 7)

2.2.5.1 Table 5 outlines the receipt message.

2.2.5.2 The receipt message is issued in order to acknowledge the receipt of an LRIT request message that cannot be processed for some reason. When an LRIT component receives a LRIT request message it should process the request message and either send the requested information or send a receipt message with the appropriate "receipt code" informing the originating LRIT component why the request message could not be fulfilled.

2.2.5.3 The "Message Type" parameter indicates the type of message of the associated LRIT message. The LRIT components such as the LRIT Data Centres can use this parameter to distinguish between the various LRIT messages listed in table 1.

2.2.5.4 The "Message ID#" parameter is a unique identification number that LRIT components can use to identify individual messages within the LRIT network. The Message ID# is generated by linking the LRIT Component ID, date and a 5 digit unique sequence number together. The unique sequence number is generated by the LRIT Component and the date consists of the year, month, day, hour, minute and second in which the parameter was generated. An example of a message ID would be 01992007013012552377777 (LRIT Data Centre ID = 0199, year = 2007, month = 01, day = 30, hour=12, minute = 55, second = 23, unique sequence number= 77777).

2.2.5.5 The "Reference ID" parameter is a Message ID# of an associated request message.

2.2.5.6 The "Receipt code" parameter in table 6 provides information with respect to the specific receipt message that has been generated.

.1 Receipt code 0 – "Not entitled to data" receipt message is generated by a Data Centre when it determines that the requesting LRIT Data User is not entitled to receive the data it has requested.

.2 Receipt code 1 – "No ship in SAR SURPIC area" is generated in response to a SAR SURPIC request message if a Data Centre that is processing a LRIT SAR SURPIC request message determines that there are no ships contained within the geographical area defined in the SAR SURPIC message.

.3 Receipt Code 2 – "IDE not available" is generated when the IDE is not available for any reason. The receipt message will typically be generated by a Data Centre in order to indicate that the IDE is off line. A Data Centre can detect this type of error by using the System Status message transmitted from the IDE.

.4 Receipt Code 3 – "DC not available" is generated when a Data Centre is not available. The IDE is responsible for determining if all Data Centres are on line, as indicated by the System Status message.

.5 Receipt Code 4 – "CSP not available" is generated when a Data Centre has determined a CSP is off line. The Data Centre would be responsible for detecting when the CSP is not available.

.6 Receipt Code 5 – "Ship not responding" can be generated by any Data Centre. All Data Centres will be responsible for detecting if ships registered to that Data Centre are transmitting regular LRIT position reports. If a LRIT Data User requests LRIT reports from a ship that is not responding, then the Data Centre to which the ship is registered should generate a receipt message with text content stating how long the ship has not been responding.

.7 Receipt Code 6 – "Ship not available" will be generated by a Data Centre when a request has been made for position reports associated with a ship registered to that Data Centre that has never reported.

.8 Receipt Code 7 – "System Fault" is generated when a fault occurs in the system that is not covered by the other receipt codes.

.9 Receipt Code 8 – "Could not load DDP" is generated when a Data Centre or the IDE is unable to process the received DDP. The message will be sent to the DDP server for appropriate action.

.10 Receipt Code 9 – "Incorrect DDP Version, message discarded" is generated by the IDE when the DDP version # parameter contained within the LRIT message does not match the DDP version # being used by the IDE. The IDE will discard the message and build a receipt message with the reference ID populated with the message ID of the discarded message.

2.2.5.7 The "Destination" parameter is the LRIT ID number associated with the LRIT component to which the receipt message is destined.

2.2.5.8 The "Originator" parameter is the LRIT ID number associated with the LRIT component generating the receipt message. This parameter is used to identify where the receipt message originated.

2.2.5.9 The "Message" parameter can contain text information relating to the nature of the receipt. The text characters will be characters from the roman alphabet.

2.2.5.10 The "Time Stamp" parameter represents the date and time when the originator transmits the receipt message. All times should be indicated as Universal Co-ordinated Time (UTC).

2.2.5.11 The "DDP version #" parameter indicates the version number of the DDP that is being used by the Data Centre routing the request.

2.2.5.12 The "Test" parameter indicates whether the message is a test message intended for testing purposes only or if it is a regular LRIT message.

TABLE 5

SUMMARY OF RECEIPT MESSAGE (MESSAGE 7) [(1)]

Parameter Provided By	Parameter	Value	Description	LRIT Segment [(3)]	Processed Format [(4)]
LRIT network component: Data Centre, ASP, IDE or LRIT Data User	Message Type	7	Message type number: 7 – Receipt message	B, C, D, E, F	nn
	Message ID#	Unique number	Unique message number generated by using: LRIT Component ID, Date and unique sequence number.	B, C, D, E, F	nnnnYYYYMMDDHHmmssnnnnn
	Reference ID	Message ID of a request message	The reference ID is the message ID of a request message that has been received.	B, C, D, E, F	nnnnYYYYMMDDHHmmssnnnnn
	Receipt Code	0, 1, 2, 3, 4, 5, 6, 7, 8	0 – Not entitled to data 1 – No ships in SAR SURPIC area 2 – IDE not available 3 – DC not available 4 – CSP not available 5 – Ship not responding 6 – Ship not available 7 – System Fault 8 – Could not load DDP 9 – Incorrect DDP version, message not transmitted.	B, C, D, E, F	n
	Destination	LRIT network component ID	LRIT ID of intended recipient (ASP, DC, IDE, LRIT Data User, or LRIT Co-ordinator) of the receipt message.	B, C, D, E, F	nnnn
	Originator	LRIT network component ID	LRIT ID of issuer (ASP, DC, IDE, LRIT Data User) of receipt message.	B, C, D, E, F	nnnn
	Message	Text	Text message indicating the nature of the receipt message.	B, C, D, E, F	TEXT
	Time Stamp	Time UTC YYYY:MM:DD:hh:mm:ss	Date and time when LRIT node transmits receipt message	B, C, D, E, F	YYYY:MM:DD:HH:mm:ss
Data Centre or IDE [(2)]	DDP Version #	Unique number	DDP version number used by DC	C, D	$n_1..n_n$
	Test	0, 1	Setting indicates if message is test message or regular LRIT message. 0 – Regular LRIT message 1 – Test message	C, D	n

Notes:

(1) Refer 2.2.1.2 for description of column headings.

(2) IDE shall only add this information if it is the original LRIT component that has built the receipt message.

(3) Refer 2.1.2.7.

(4) Refer 2.2.1.3.

2.2.6 DDP Notification (Message 8)

2.2.6.1 Table 6 outlines the DDP Notification message.

2.2.6.2 The DDP notification message is transmitted directly from the DDP server to the IDE which in turn broadcasts the message to all the connected Data Centres. The message is intended to inform the Data Centres and the IDE that an updated DDP file is available..

2.2.6.3 The "Message Type" parameter indicates the type of message of the associated LRIT message. LRIT components such as the LRIT Data Centres can use this parameter to distinguish between the various LRIT messages listed in table 1.

2.2.6.4 The "Message ID" parameter is a unique identification number that LRIT components can use to identify individual messages within the LRIT network. The message ID# is generated by linking the DDP server ID, date and a 5 digit unique sequence number together. The unique sequence number is generated by the DDP server and the date consists of the year, month, day, hour, minute and second in which the parameter was generated. An example of a message ID would be 00502007013012552322222 (LRIT DDP server ID = 0050, year = 2007, month = 01, day = 30, hour = 12, minute = 55, second = 23, unique sequence number = 22222).

2.2.6.5 The "Message" parameter can contain text information relating to the nature of the DDP notification message. It may, for example, state that certain contracting governments have updated the standing orders in the DDP and this is the reason why a new DDP file is available.

2.2.6.6 The "Time Stamp" parameter represents the date and time when the originator transmits the receipt message. All times should be indicated as Universal Co-ordinated Time (UTC).

2.2.6.7 The "DDP version #" parameter indicates the version number of the DDP that is available for download.

2.2.6.8 The "Test" parameter indicates whether the message is a test message intended for testing purposes only or if it is a regular LRIT message.

TABLE 6

SUMMARY OF DDP NOTIFICATION MESSAGE (MESSAGE 8) (1)

Parameter Provided By	Parameter	Value	Description	LRIT Segment (2)	Format (3)
DDP Server	Message Type	8	Message type number: 8 – DDP Notification	D, F	nn
	Message ID#	Unique number	LRIT ID of DDP Administrator, Date and unique sequence number.	D, F	nnnnYYYYMMDDHHmmssnnnnn
	Message	Text	Text message indicating the nature of the update with respect to the DDP.	D, F	TEXT
	Time Stamp	Time UTC	Date and time when administrator transmits DDP message.	D, F	YYYY:MM:DD:HH:mm:ss
	DDP Version #	Unique number	DDP version number available for down load	D, F	$n_1...n_n$
	Test	0, 1	Setting indicates if message is test message or regular LRIT message. 0 – Regular LRIT message 1 – Test message	D, F	n

Notes:

(1) Refer 2.2.1.2 for description of column headings.

(2) Refer 2.1.2.7.

(3) Refer 2.2.1.3.

2.2.7 DDP Request (Message 9)

2.2.7.1 Table 7 outlines the DDP Request message.

2.2.7.2 The DDP Request message is transmitted directly from the IDE and Data Centres to the DDP server. The message is intended to inform the DDP server that the LRIT component (IDE or Data Centre) sending the message is requesting either the full DDP file or an incremental update to the DDP.

2.2.7.3 The "Message Type" parameter indicates the type of message of the associated LRIT message. LRIT components such as the LRIT Data Centres can use this parameter to distinguish between the various LRIT messages listed in table 1.

2.2.7.4 The "Message ID#" parameter is a unique identification number that LRIT components can use to identify individual messages within the LRIT network. The message ID# is generated by linking the LRIT component ID, date and a 5 digit unique sequence number together. The unique sequence number is generated by the LRIT component and the date consists of the year, month, day, hour, minute and second in which the parameter was generated. An example of a message ID would be 01992007013023552344444 (LRIT Data Centre ID = 0199, year = 2007, month = 01, day = 30, hour = 23, minute = 55, second = 23, unique sequence number = 44444).

2.2.7.5 The "DDP Request Type" parameter indicates if the current DDP request is for the full DDP file or just the incremental update (changes to the DDP file since last revision).

2.2.7.6 The "Originator" parameter is the LRIT ID number associated with the LRIT component generating the DDP Request message. This parameter is used to identify where the DDP Request message originated.

2.2.7.7 The "Time Stamp" parameter represents the date and time when the originator transmits the request message. All times should be indicated as Universal Co-ordinated Time (UTC).

2.2.7.8 The "DDP version #" parameter indicates the version number of the DDP that is being used by the Data Centre or IDE issuing the request for a new DDP.

2.2.7.9 The "Test" parameter indicates whether the message is a test message intended for testing purposes only or if it is a regular LRIT message.

TABLE 7
SUMMARY OF DDP REQUEST MESSAGE (MESSAGE 9) (1)

Parameter Provided By	Parameter	Value	Description	LRIT Segment (2)	Format (3)
IDE and Data Centres	Message Type	9	Message type number: 9 – DDP request	E, F	nn
	Message ID	Unique number	LRIT Component ID, Date and unique sequence number	E, F	nnnnYYYYMMDDHHmmssnnnnn
	DDP request Type	0, 1	0 – Incremental request 1 – Full DDP File	E, F	n
	Originator	LRIT network component ID	LRIT ID of issuer (DCs, IDE).	E, F	nnnn
	Time Stamp	Time	Date and time when DDP Request message transmitted.	E, F	YYYY:MM:DD:HH:mm:ss
	DDP version	Version #	The current version of the DDP.	E,F	$n_1 \ldots n_n$
	Test	0, 1	Setting indicates if message is test message or regular LRIT message. 0 – Regular LRIT message 1 – Test message	E, F	n

NOTES:
(1) Refer 2.2.1.2 for description of column headings.
(2) Refer 2.1.2.7.
(3) Refer 2.2.1.3.

2.2.8 DDP Update (Message 10)

2.2.8.1 Table 8 outlines the DDP Update message.

2.2.8.2 The DDP Update message is transmitted directly from the DDP server to the IDE and Data Centres. The message contains the latest DDP and is used by the IDE and Data Centres to update their local copies of the DDP.

2.2.8.3 The “Message Type” parameter indicates the type of message of the associated LRIT message. LRIT components such as the LRIT Data Centres can use this parameter to distinguish between the various LRIT messages listed in table 1.

2.2.8.4 The “Message ID” parameter is a unique identification number that LRIT components can use to identify individual messages within the LRIT network. The message ID# is generated by linking the DDP Server ID, date and a 5 digit unique sequence number together. The unique sequence number is generated by the DDP Server and the date consists of the year, month, day, hour, minute and second in which the parameter was generated. An example of a message ID would be 00502007013002552322222 (LRIT DDP Server ID = 0050, year = 2007, month = 01, day = 30, hours = 02, minute = 55, second = 23, unique sequence number = 22222).

2.2.8.5 The “Message” parameter can contain text information relating to the nature of the DDP Update message.

2.2.8.6 The “Time Stamp” parameter represents the date and time when the originator transmits the receipt message. All times should be indicated as Universal Co-ordinated Time (UTC).

2.2.8.7 The “DDP file” parameter is a file attachment containing either the full data distribution plan or an incremental update. The format of the file will be defined in the, “Draft Guidance on setting up and Maintaining the Data Distribution Plan”.

2.2.8.8 The "DDP version #" parameter indicates the version number of the DDP that is being used by the Data Centre routing the request.

2.2.8.9 The "Test" parameter indicates whether the message is a test message intended for testing purposes only or if it is a regular LRIT message.

TABLE 8

SUMMARY OF DDP UPDATE MESSAGE (MESSAGE 10) (1)

Parameter Provided By	Parameter	Value	Description	LRIT Segment (2)	Format (3)
DDP Server	Message Type	10	Message type number: 10 – DDP update	E, F	nn
	Message ID#	Unique number	LRIT ID of DDP Server, Date and unique sequence number.	E, F	nnnnYYYYMMDDHHmmssnnnnn
	Message	Text	Text message indicating the nature of the update with respect to the DDP.	E, F	TEXT
	Time Stamp	Time UTC	Date and time when administrator transmits DDP message.	E, F	YYYY:MM:DD:HH:mm:ss
	DDP Version #	Unique number	DDP version number used by DC	E, F	$n_1..n_n$
	DDP file	file	Updated DDP file.	E, F	file
	Test	0, 1	Setting indicates if message is test message or regular LRIT message. 0 – Regular LRIT message 1 – Test message	E, F	n

Notes:
(1) Refer 2.2.1.2 for description of column headings.
(2) Refer 2.1.2.7.
(3) Refer 2.2.1.3.

2.2.9 System Status Message (Message 11)

2.2.9.1 Table 9 outlines the System Status message. The system status message from the IDE is intended to provide all LRIT Data Centres with health information on the IDE while the system status message from the Data centres informs the IDE of the Data Centre's health.

2.2.9.2 The "Message Type" parameter indicates the type of message of the associated LRIT message. LRIT components such as the LRIT Data Centres can use this parameter to distinguish between the various LRIT messages listed in table 1.

2.2.9.3 The "Message ID#" parameter is a unique identification number that LRIT components can use to identify individual messages within the LRIT network. The Message ID# is generated by linking the LRIT component ID, date and a 5 digit unique sequence number together. The unique sequence number is generated by the LRIT component and the date consists of the year, month, day, hour, minute and second in which the parameter was generated. An example of a message ID would be 01992007013015552311111 (LRIT Data Centre ID = 0199, year = 2007, month = 01, day = 30, hour = 15, minute = 55, second = 23, unique sequence number = 11111.

2.2.9.4 The "Time Stamp" parameter represents the date and time associated with when the originating LRIT network component transmits the System Status message. All times should be indicated as Universal Co-ordinated Time (UTC).

2.2.9.5 The "System Status" parameter provides information pertaining to the operational status of the LRIT network component (IDE or DC) that transmitted the message. If the value is 0, then the LRIT component is functioning normally, while a value of 1 indicates that the component is not adhering to the Performance standards.

2.2.9.6 The "Message" parameter can contain text information relating to the nature of the LRIT system. It may, for example, state that a system administrator has turned off the DDP version validation function in the IDE since a catastrophic failure has occurred at the DDP server (contracting governments may not be able to retrieve the latest DDP file)

2.2.9.7 The "Originator" parameter is the LRIT ID number associated with the LRIT component generating the System Status message. This parameter is used to identify where the System Status message originated.

2.2.9.8 The "DDP version #" parameter indicates the version number of the DDP that is being used by the Data Centre routing the request.

2.2.9.9 The "Test" parameter indicates whether the message is a test message intended for testing purposes only or if it is a regular LRIT message.

TABLE 9

SUMMARY OF SYSTEM STATUS MESSAGE (MESSAGE 11) (1)

Parameter Provided By	Parameter	Value	Description	LRIT Segment (2)	Format (3)
International LRIT Data Exchange or Data Centres	Message Type	11	Message type number: 11 – System Status message	D	nn
	Message ID#	Unique number	LRIT Component ID, Date and unique sequence number.	D	nnnnYYYYMMDDHHmmssnnnn
	Time Stamp	Time	Date and time when the system status message is transmitted.	D	YYYY:MM:DD:HH:mm:ss
	DDP version	Version #	The current version of the DDP as received from the DDP web server.	D	$n_1 \ldots n_n$
	System Status	0 or 1	This is sent by both the IDE and all DCs. A value of 0 means normal function; a value of 1 means not able to provide functionality as described in the Performance standards.	D	n
	Message	Text	Text message indicating the nature of the system.	D	TEXT
	Originator	LRIT network component ID	LRIT ID of issuer (DCs and IDE).	D	nnnn
	Test	0, 1	Setting indicates if message is test message or regular LRIT message. 0 – Regular LRIT message 1 – Test message	D	n

Notes:
(1) Refer 2.2.1.2 for description of column headings.
(2) Refer 2.1.2.7.
(3) Refer 2.2.1.3.

2.2.10 [LRIT Billing and Transaction Report Message (Message 12)

2.2.10.1 This entire section is predicated on a policy decision by the Committee and can be removed if the policy decision warrants.

2.2.10.2 Table 10 outlines the Billing and Transaction message issued by either the IDC or R/CDCs.

2.2.10.3 The LRIT Billing and Transaction message is transmitted on a monthly basis from the IDC or R/CDCs to the IDE. Each message contains a file providing a summary of all message transactions and billing information. The report message contains a file that list all of the transactions between Contracting Governments associated with the R/CDC or IDC in addition to a billing summary of the transactions.

2.2.10.4 The "Message Type" parameter indicates the type of message of the associated LRIT message. LRIT components such as the LRIT Data Centres can use this parameter to distinguish between the various LRIT messages listed in table 1.

2.2.10.5 The "Message ID" parameter is a unique identification number that LRIT components can use to identify individual messages within the LRIT network. The message ID# is generated by linking the LRIT component ID, date and a 5 digit unique sequence number together. The unique sequence number is generated by the LRIT component (IDE, IDC or R/CDC) and the date consists of the year, month, day, hour, minute and second in which the parameter was generated. An example of a message ID would be 00502007013016552333333 (LRIT IDE ID = 0050, year = 2007, month = 01, day = 30, hour = 16, minute = 55, second = 23, unique sequence number = 33333).

2.2.10.6 The "Message" parameter can contain text information relating to the nature of the Billing and Transaction message.

2.2.10.7 The "Time Stamp" parameter represents the date and time when the originator transmits the receipt message. All times should be indicated as Universal Co-ordinated Time (UTC).

2.2.10.8 The "Originator" parameter is the LRIT ID number associated with the LRIT component generating the Billing and Transaction message. This parameter is used to identify where the Billing and Transaction message originated.

2.2.10.9 The "Billing and Transaction file" parameter is a file attachment containing the Billing and Transaction information for the LRIT component receiving the message.

2.2.10.10 The "DDP version #" parameter indicates the version number of the DDP that is being used by the Data Centre routing the request.

2.2.10.11 The "Test" parameter indicates whether the message is a test message intended for testing purposes only, or a regular LRIT message.

TABLE 10

SUMMARY OF LRIT BILLING AND TRANSACTION REPORT (MESSAGE 12) (1)

Parameter Provided By	Parameter	Value	Description	LRIT Segment (2)	Format (3)
R/CDC or IDC	Message Type	12	Message type number: 12 – R/CDC or IDC issued Billing and transaction Report	D	nn
	Message ID#	Unique number	LRIT ID of component, Date and unique sequence number.	D	nnnnYYYYMMDDHHmmssnnnnn
	Message	Text	Text message indicating the nature of the Billing and Transaction report.	D	TEXT
	Time Stamp	Time UTC	Date and time when the IDE, R/CDC or IDC transmitted the message.	D	YYYY:MM:DD:HH:mm:ss
	Orginator	LRIT network component ID	LRIT ID of issuer (R/CDCs or IDC).	D	nnnn

	Billing and Transaction file	file	Billing and Transaction file for the previous month.	D	XML
	DDP Version #	Unique number	DDP version number used by DC	D	$n_1 \ldots n_n$
	Test	0, 1	Setting indicates if message is test message or regular LRIT message. 0 – Regular LRIT message 1 – Test message	D	n

Notes:
(1) Refer 2.2.1.2 for description of column headings.
(2) Refer 2.1.2.7.
(3) Refer 2.2.1.3.]

2.2.11 [Pricing Notification (Message 13)

2.2.11.1 This entire section is predicated on a policy decision by the Committee and can be removed if the policy decision warrants.

2.2.11.2 Table 11 outlines the Pricing Notification message.

2.2.11.3 The Pricing notification message is transmitted directly from the IDE to all the Data centres informing the Data Centres that a new pricing table has been established.

2.2.11.4 The "Message Type" parameter indicates the type of message of the associated LRIT message. LRIT components such as the LRIT Data Centres can use this parameter to distinguish between the various LRIT messages listed in table 1.

2.2.11.5 The "Message ID" parameter is a unique identification number that LRIT components can use to identify individual messages within the LRIT network. The message ID# is generated by linking the IDE LRIT ID, date and a 5 digit unique sequence number together. The unique sequence number is generated by the IDE and the date consists of the year, month, day, hour, minute and second in which the parameter was generated. An example of a message ID would be 0502007013012552322222 (LRIT IDE ID = 050, year = 2007, month = 01, day = 30, hour = 12, minute = 55, second = 23, unique sequence number = 22222).

2.2.11.6 The "Message" parameter can contain text information relating to the nature of the Pricing notification message. It may, for example, state that certain Contracting Governments have updated their pricing policy and this is the reason why a new pricing policy file is available.

2.2.11.7 The "Time Stamp" parameter represents the date and time when the IDE transmits the pricing message. All times should be indicated as Universal Co-ordinated Time (UTC).

2.2.11.8 The "Pricing Version #" parameter indicates the version number of the Pricing file that is available from the IDE.

2.2.11.9 The "DDP Version #" parameter indicates the version number of the DDP that is being used by the IDE sending the notification.

2.2.11.10 The "Test" parameter indicates whether the message is a test message intended for testing purposes only or if it is a regular LRIT message.

TABLE 11

SUMMARY OF PRICING NOTIFICATION MESSAGE (MESSAGE 13) (1)

Parameter Provided By	Parameter	Value	Description	LRIT Segment (2)	Format (3)
IDE	Message Type	13	Message type number: 13 – Pricing Notification	D, F	nn
	Message ID#	Unique number	LRIT ID of IDE, Date and unique sequence number.	D, F	nnnnYYYYMMDDHHmmssnnnnn
	Message	Text	Text message indicating the nature of the notification with respect to the notification.	D, F	TEXT
	Time Stamp	Time UTC	Date and time when IDE transmits the pricing notification.	D, F	YYYY:MM:DD:HH:mm:ss
	Pricing Version #	Unique number	Version # of pricing file available for update.	D, F	$n_{1..}n_n$
	DDP Version #	Unique number	DDP version number of IDE.	D, F	$n_{1..}n_n$
	Test	0, 1	Setting indicates if message is test message or regular LRIT message. 0 – Regular LRIT message 1 – Test message	D, F	n

Notes:

(1) Refer 2.2.1.2 for description of column headings.

(2) Refer 2.1.2.7.

(3) Refer 2.2.1.3.

2.2.12 Pricing Request (Message 14)

2.2.12.1 This entire section is predicated on a policy decision by the Committee and can be removed if the policy decision warrants.

2.2.12.2 Table 12 outlines the Pricing Request message.

2.2.12.3 The Pricing Request message is transmitted directly from a Data Centre to the IDE. The message is intended to inform the IDE that the Data Centre sending the request message requires an updated copy of the Data Centre pricing file.

2.2.12.4 The “Message Type” parameter indicates the type of message of the associated LRIT message. LRIT components such as the LRIT Data Centres can use this parameter to distinguish between the various LRIT messages listed in table 1.

2.2.12.5 The “Message ID#” parameter is a unique identification number that LRIT components can use to identify individual messages within the LRIT network. The message ID# is generated by linking the LRIT component ID, date and a 5 digit unique sequence number together. The unique sequence number is generated by the LRIT component and the date consists of the year, month, day, hour, minute and second in which the parameter was generated. An example of a message ID would be 01992007013023552344444 (LRIT Data Centre ID = 0199, year = 2007, month = 01, day = 30, hour = 23, minute = 55, second = 23, unique sequence number = 44444).

2.2.12.6 The “Originator” parameter is the LRIT ID number associated with the LRIT component generating the Pricing Request message. This parameter is used to identify where the Pricing Request message originated.

2.2.12.7 The "Time Stamp" parameter represents the date and time when the originator transmits the request message. All times should be indicated as Universal Co-ordinated Time (UTC).

2.2.12.8 The "DDP version #" parameter indicates the version number of the DDP that is being used by the Data Centre issuing the request for a Pricing update file.

TABLE 12

SUMMARY OF PRICING REQUEST MESSAGE (MESSAGE 14) (1)

Parameter Provided By	Parameter	Value	Description	LRIT Segment (2)	Format (3)
Data Centres	Message Type	14	Message type number: 14 – Pricing request	E, F	nn
	Message ID	Unique number	LRIT Component ID, Date and unique sequence number	E, F	nnnnYYYYMMDDHHmmssnnnnn
	Originator	LRIT network component ID	LRIT ID of issuer (DCs).	E, F	nnnn
	Time Stamp	Time	Date and time when DC transmits Pricing message.	E, F	YYYY:MM:DD:HH:mm:ss
	DDP version	Version #	The current version of the DDP.	E, F	$n_1 \ldots n_n$
	Test	0, 1	Setting indicates if message is test message or regular LRIT message. 0 – Regular LRIT message 1 – Test message	E, F	n

Notes:
(1) Refer 2.2.1.2 for description of column headings.
(2) Refer 2.1.2.7.
(3) Refer 2.2.1.3.

2.2.13 Pricing Update (Message 15)

2.2.13.1 This entire section is predicated on a policy decision by the Committee and can be removed if the policy decision warrants.

2.2.13.2 Table 13 outlines the pricing Update message.

2.2.13.3 The Pricing Update message is transmitted directly from the IDE to the Data Centres or from the Data Centres to the IDE. The message contains the pricing file and is used by the IDE and Data Centres to update their local copies of the pricing file.

2.2.13.4 The "Message Type" parameter indicates the type of message of the associated LRIT message. LRIT components such as the LRIT Data Centres can use this parameter to distinguish between the various LRIT messages listed in table 1.

2.2.13.5 The "Message ID" parameter is a unique identification number that LRIT components can use to identify individual messages within the LRIT network. The message ID# is generated by linking the LRIT Component ID, date and a 5 digit unique sequence number together. The unique sequence number is generated by either the Data Centre or IDE (LRIT component generating the update message) and the date consists of the year, month, day, hour, minute and second in which the parameter was generated. An example of a message ID would be 00502007013002552322222 (LRIT Component ID = 0050, year = 2007, month = 01, day = 30, hours = 02, minute = 55, second = 23, unique sequence number = 22222).

2.2.13.6 The "Message" parameter can contain text information relating to the nature of the Pricing Update message.

2.2.13.7 The "Time Stamp" parameter represents the date and time when the originator transmits the receipt message. All times should be indicated as Universal Co-ordinated Time (UTC).

2.2.13.8 The "Pricing file" parameter is a file attachment containing either a partial pricing file update from a DC or the full pricing file from the IDE.

2.2.13.9 The "Pricing Version #" parameter indicates the version number of the Pricing file that is attached in the pricing update message.

2.2.13.10 The "DDP version #" parameter indicates the version number of the DDP that is being used by the Data Centre or IDE issuing the pricing file.

2.2.13.11 The "Test" parameter indicates whether the message is a test message intended for testing purposes only or if it is a regular LRIT message.

TABLE 13

SUMMARY OF PRICING UPDATE MESSAGE (MESSAGE 15) (1)

Parameter Provided By	Parameter	Value	Description	LRIT Segment (2)	Format (3)
IDE or DC	Message Type	15	Message type number: 15 – Pricing update	E, F	nn
	Message ID#	Unique number	LRIT ID of IDE or DC issuing the message, Date and unique sequence number.	E, F	nnnnYYYYMMDDHHmmssnnnnn
	Message	Text	Text message indicating the nature of the update with respect to the Pricing file.	E, F	TEXT
	Time Stamp	Time UTC	Date and time when the message is transmitted.	E, F	YYYY:MM:DD:HH:mm:ss
	DDP Version #	Unique number	DDP version number used by DC or IDE.	E, F	$n_1...n_n$
	Pricing Version #	Unique number	Version # of pricing file available for update.	E, F	$n_1...n_n$
	Pricing file	file	Updated Pricing file.	E, F	File
	Test	0, 1	Setting indicates if message is test message or regular LRIT message. 0 – Regular LRIT message 1 – Test message	E, F	N

Notes:

(1) Refer 2.2.1.2 for description of column headings.

(2) Refer 2.1.2.7.

(3) Refer 2.2.1.3.]

3 Communication Protocol Strategy

3.1 General

3.1.1 Overview

3.1.1.1 An illustration of the various communication links in the LRIT system is shown in Figure 3. LRIT messages will flow through the LRIT network and along each communication link. Communication protocols ensure that the LRIT messages are securely transported from one LRIT component to the next.

3.1.1.2 All communication links shall comply with the functional description as identified in MSC.210(81) while the specific communication protocols stated in the subsequent sections apply only to certain links as summarized in table 14. Communication links 1, 2, 3, 4 and 6 do not have to implement the specific communication protocols detailed in the subsequent sections.

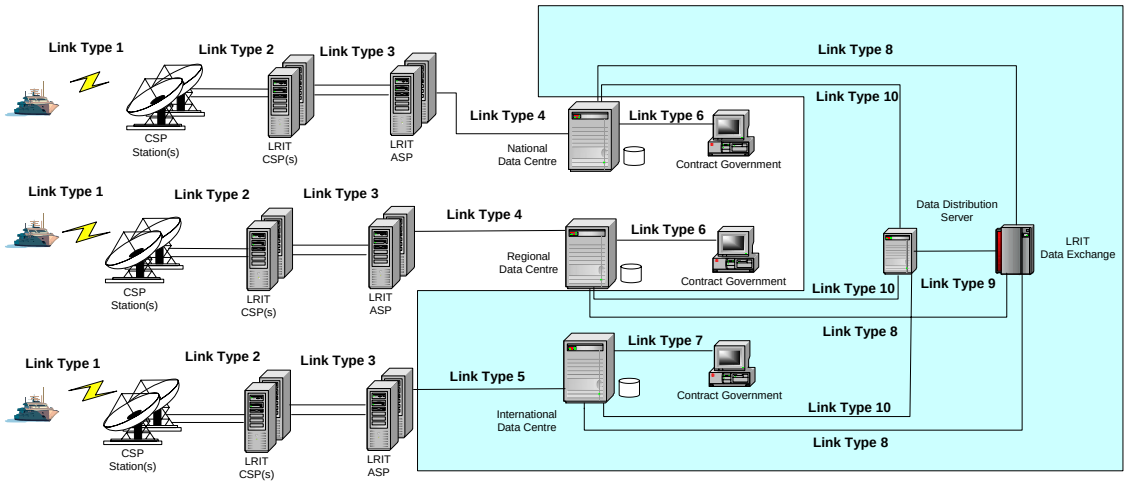
TABLE 14

SUMMARY OF LRIT COMMUNICATION LINKS

Communication Link	LRIT Components Connected	Adhere to Specific Communication Protocols
Link Type 1	Ship to CSP land terminal	NO
Link Type 2	CSP land terminal to CSP	NO
Link Type 3	CSP to ASP	NO
Link Type 4	ASP to NDC or R/CDC	NO
Link Type 5	ASP to IDC	YES
Link Type 6	Contracting Government to NDC or R/CDC	NO
Link Type 7	Contracting Government to IDC	YES
Link Type 8	Any DC to IDE	YES
Link Type 9	DDP Server to IDE	YES
Link Type 10	Any DC to DDP Server	YES

FIGURE 3

LRIT COMMUNICATION LINKS



3.2 Specific Communication Protocols

3.2.1 General

3.2.1.1 The communication protocols specified in the following sub-sections are standards based on the functional description of the communication strategy outlined in resolution MSC.210(81).

3.2.2 Physical Layer

3.2.2.1 The physical medium that the LRIT data messages transverse and the associated physical layer standards are not limited to one specific type or protocol. Thus, many different low-level mediums such as fibre optics, copper lines, microwave and their associated physical layer standard such as sonnet, OC192, T1, E1 are all applicable (examples only).

3.2.3 Data Link Layer

3.2.3.1 The data link layer that sits on top of the physical layer is also not limited to one single standard. There are numerous data link layer protocols that are acceptable and can be used in the implementation of data communication between the various LRIT network components. Some examples of applicable standards are: Ethernet, ATM, ISDN and 802.X.

3.2.4 Network Layer

3.2.4.1 The network layer shall be based upon version 4 (IPv4) of the Internet Protocol specification. Later versions of the Internet Protocol must be reviewed for compliance prior to implementation. Each component (e.g. IDE, Data Centres) in the LRIT network shall have its own unique IP address.

3.2.5 Transport Layer

3.2.5.1 The transport layer shall be based upon the Transmission Control Protocol (TCP).

3.2.6 Application Layer

3.2.6.1 The application layer shall use Transport Layer Security (TLS version 1.1 or later) subsequently referred to as TLS and shall communicate via XML-based SOAP messages between the various LRIT components. The SOAP messages will be exchanged between SOAP nodes by binding to the HTTPS protocol as defined by SOAP 1.2.

3.3 Simple Object Access Protocol (SOAP) Overview

3.3.1 General

3.3.1.1 The application layer for exchanging LRIT messages amongst the LRIT system components will be based upon version 1.2 of the SOAP ("Simple Object Access Protocol") as defined by the World Wide Web consortium (W3C). SOAP is an Application Layer protocol that allows communication between nodes without requiring any specific communication network, operating system or programming language. SOAP Version 1.2 specification is available at http://www.w3.org/TR/soap12.

3.3.1.2 As detailed under the SOAP Binding section below, SOAP messages will travel using HTTP as the underlying protocol. Although HTTP by definition is a request/response communication mechanism, it is suggested that designers and implementers adopt asynchronous patterns and reliable non-blocking mechanisms to receive the HTTP response message to ensure an optimum performance. From the application implementation perspective, messages travel one-way. SOAP messages embedded within the HTTP response body solely include information indicating the terminal state of the Request-Response message exchange (which could be "Success" or "Fail").

3.3.2 SOAP Nodes

3.3.2.1 The Data Centres, IDE and ASPs following the specific communication protocol strategy will functionally operate as SOAP nodes. Two asynchronous one-way message connections will be established between each connecting node. The LRIT messages as defined earlier will flow between SOAP nodes across the communication links illustrated in figure 2.

3.3.2.2 There will only be two nodes associated with the relaying of any SOAP message: the initial sender and the ultimate receiver. Thus, there will be zero intermediary SOAP nodes in the routing path of any SOAP message.

3.3.2.3 SOAP messages will have the role attribute omitted or set to "http://www.w3.org/2003/05/soap-envelope/role/ultimateReceiver" to indicate that messages are sent to ultimate receivers and no intermediates.

3.3.2.4 SOAP forwarding mechanism is not used given that there are no intermediate nodes involved. Whenever a received SOAP message content is to be sent to a different location, a new SOAP message is to be constructed and sent via a SOAP node acting as initial sender. Any possible association or correlation that may be established between an inbound SOAP message and an outbound one is to be established and maintained at the application level by the Software application modules.

3.3.3 SOAP Processing

3.3.3.1 Software application modules operating on Data Centres, the IDE and ASPs shall process SOAP messages as outlined in version 1.2 of the SOAP specification. As mentioned above, LRIT Software modules act as ultimate receivers and as such they shall process the SOAP messages.

3.3.4 SOAP Binding

3.3.4.1 SOAP messages will be exchanged between SOAP nodes by binding to the HTTP(S) protocol as defined by SOAP 1.2.

3.3.4.2 SOAP messages will be sent using the HTTP POST web method only. The body of an HTTP POST message will contain the message parameters embedded within a SOAP message structure.

3.3.4.3 Following there is an example of an HTTP header. Note that SOAP 1.2 message bound to HTTP should have the Content-Type set to "application/soap+xml" (without quotes).

```
POST /LRITSample/Service HTTP/1.1
Host: localhost
Content-Type: application/soap+xml; charset=utf-8
Content-Length: length
```

3.3.5 Additional considerations and other aspects

3.3.5.1 Data security (e.g. encryption), authentication and authorization are out of the scope of this sub-section and are to be managed by other layers.

3.3.5.2 In order to minimize complexity without jeopardizing security, data security will be accomplished by securing the channel of communication. For greater detail refer to Section 4.

4 Data Security Within The LRIT Network

4.1 General

4.1.1 Adherence to Performance standards

4.1.1.1 Data security for LRIT information exchanged between the various LRIT components is based upon the performance and functional requirements outlined in section 12 (LRIT security) of resolution MSC.210(81), Performance standards and Functional Requirements for LRIT of Ships.

4.1.1.2 Authorization, identification, authentication, confidentiality and integrity are the key functional concepts with respect to data security for the LRIT network. LRIT system availability will be addressed via conformance to resolution MSC.210(81).

4.1.2 Authorization

4.1.2.1 All LRIT information existing in the LRIT network shall not be made accessible to all LRIT Data Users. Data authorization to LRIT Data Users shall be based upon the policy requirements established and implemented in accordance with resolution MSC.202(81). Each LRIT component within the network shall ensure that the component with which it is communicating is authorized to receive the information being transmitted in accordance with the DDP.

4.1.3 Identification and Authentication

4.1.3.1 The various LRIT components in the LRIT network shall perform identification and authentication of each component before exchanging information using a standard authentication process.

4.1.4 Confidentiality

4.1.4.1 The data exchanged between LRIT components shall be encrypted for protection and shall not be disclosed to unauthorized entities during transit across the LRIT network. This shall be accomplished by using standard digital cryptography techniques featuring an encryption strength equivalent to or better than 128 bits.

4.1.5 Integrity

4.1.5.1 The LRIT data exchanged between LRIT components shall not be altered by any entity during transit across the LRIT network. Native TLS features providing integrity checks of the data transport shall be used. This must be accomplished by using standard digital cryptography techniques featuring an encryption strength equivalent to or better than 128 bits.

4.2 Point to Point Data Security Strategy and Protocol Options

4.2.1 General

4.2.1.1 LRIT components within the LRIT network shall communicate with one another through secure point to point communication links.

4.2.2 Application Layer Security

4.2.2.1 Each LRIT component that forms a point to point communication link must use Transport Layer Security (TLS version 1.1 or later) when exchanging LRIT information. The TLS specification is defined by the Internet Engineering Task Force in RFC 4346.

.1 The TLS protocol provides communications security over the Internet. The protocol allows client/server applications to communicate in a way that is designed to prevent eavesdropping, tampering, or message forgery and addresses the security requirements for confidentiality and integrity.

4.2.3 Data Confidentiality and Integrity

4.2.3.1 Confidentiality and Integrity is achieved via 128 bit (minimum) TLS encryption using a cryptographic Hash Message Authentication Code (HMAC) symmetric algorithm. The HMAC value protects both a message's integrity as well as its authenticity, by allowing verifiers (who also possess the secret key) to detect any changes to the message content. HMAC can be used with a variety of different hash algorithms.

4.2.3.2 Each LRIT component shall use Key Hashing for Message Authentication Code (HMAC) when communicating across a TLS secured link. HMAC shall ensure that LRIT data is not altered during transit and the data integrity is maintained.

4.2.3.3 HMAC can be used with a variety of different hash algorithms. TLS uses it in the handshake with two different algorithms, MD5 and SHA-1, denoting these as HMAC_MD5 (secret, data) and HMAC_SHA (secret, data). Additional hash algorithms can be defined by cipher suites and used to protect record data, but MD5 and SHA-1 are hard coded into the description of the handshaking for this version of the protocol.

4.2.4 Identification and Authentication

4.2.4.1 Public – Private Key Cryptography – Before exchanging LRIT information, LRIT components connecting over the TLS link shall use an industry standard, public – private (asymmetric) key infrastructure strategy to ensure positive identification and authentication of the LRIT components. The global industry standard public key infrastructure (PKI) certificate must be issued by a trusted party to ensure the vetting of, and vouchering for, user identities. The Organization will ensure that the LRIT IDs are populated in the PKI certificate.

4.2.4.2 If either component detects an issue with the other LRIT component's PKI certificate, then exchange of data information should not occur.

4.3 Virtual Private Network

4.3.1 General

4.3.1.1 Communication between a Data Centre and the IDE shall have the option of implementing a Virtual Private Network (VPN) in place of the secured point to point link described in the previous section. The established VPN shall meet all the functional specifications described in this document.

4.3.2 Application Layer Security VPN

4.3.2.1 Data Centres that choose to implement VPNs as a connection method shall use Transport Layer Security (TLS version 1.1 or later) based technology for creating secure VPN tunnels.

4.3.2.2 The IDE should provide VPN server functionality, with the Data Centres acting as VPN clients.

4.3.2.3 The data confidentiality, integrity, identification and authentication information specified for secure point to point links as described above shall also apply to VPNs.

5 ANNEX A – SOAP Message Examples

5.1 SOAP 1.2 Messages over HTTP

5.1.1 Examples of LRIT Messages encoded into SOAP 1.2 Messages over HTTP

5.1.1.1 Sub-sections 5.1.2 to 5.1.10 contain examples of LRIT messages encoded into the SOAP specific messaging format.

5.1.1.2 The examples provided form the suggested XML schema upon which the LRIT messages should be encoded.

5.1.2 LRIT Ship Position Report Soap Message

5.1.2.1 The following is an example of the LRIT ship position report encoded into a SOAP 1.2 message over HTTP message. The values of the various parameters may be different. The example provided is based upon a Canadian ship (Canadian DC LRIT ID = 0111, Canadian Country LRIT Data User LRIT ID = 0112) entering the LRIT coastal waters of country A (Country A DC LRIT ID = 0101, Country A LRIT Data User LRIT ID = 0100). The ASP (LRIT ID of 0099) connected to the Canadian DC starts building the message and passes it along to the LRIT Canadian Data Centre. The Canadian Data Centre processes the message and recognizes that country A is entitled to the data, and finishes building the following position message.

```
POST /LRITSample/Service HTTP/1.1
Host: localhost
Content-Type: application/soap+xml; charset=utf-8
Content-Length: length

<?xml version="1.0" encoding="utf-8"?>
<soap12:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
            xmlns:xsd="http://www.w3.org/2001/XMLSchema"
            xmlns:soap12="http://www.w3.org/2003/05/soap-envelope">
      <soap12:Body>
                <LRITShipPositionReport xmlns="http://www.imo.org/">
                <LRITShipborneEquipment>
                          <Latitude> 47.37.00.N </Latitude>
                          <Longitude>052.40.00.W </Longitude>
                          <Timestamp1>2006.07.15.23.00.00</Timestamp1>
                          <UniqueShipEquipmentNumber>123456789
                          </UniqueShipEquipmentNumber>
                </LRITShipborneEquipment>
                <LRITASP>
                           <ASPid>0099</ASPid>
                          <CSPid>0199</CSPid>
                          <MessageType>1</MessageType>
                           <MessageID>00992006071523000055555 </MessageID>
                          <ReferenceID>0</ReferenceID>
                          <IMONum>12345678 </IMONum>
                          <MMSINum>123453467123 </MMSINum>
                          <TimeStamp2>2006.07.15.23.01.00 </TimeStamp2>
                          <TimeStamp3>2006.07.15.23.01.30 </TimeStamp3>
                </LRITASP>
                <LRITDataCentre>
                          <DCID>0111</DCID>
```

```
                    <TimeStamp4>2006.07.15.23.04.00 </TimeStamp4>
                    <TimeStamp5>2006.07.15.23.04.30 </TimeStamp5>
                    <ResponseType>1</ResponseType>
                    <LRITDataUserRequestor>0100</LRITDataUserRequestor>
                    <ShipName> MapleLeaf </ShipName>
                    <LRITDataUserProvider>0112</LRITDatUserProvider>
                    <DDPVersion>123</DDPVersion>
                    <Test>0</Test>
                </LRITDataCentre>
            </LRITShipPositionReport>
  </soap12:Body>
</soap12:Envelope>
```

5.1.3 LRIT Ship Position Request Message

5.1.3.1 The following is an example of the LRIT ship position request message encoded into a SOAP 1.2 message over HTTP message. The values of the various parameters may be different. The example provided is based upon a Canadian ship (Canadian Country LRIT Data User LRIT ID = 0112) entering a port of country A (Country A DC LRIT ID = 0101, Country A LRIT Data User LRIT ID = 0100). Country A has requested LRIT reports at 1 hr intervals for the next 24 hours. The request was issued on July 15, 2007 at 23:00:00.

```
POST /LRITSample/Service HTTP/1.1
Host: localhost
Content-Type: application/soap+xml; charset=utf-8
Content-Length: length

<?xml version="1.0" encoding="utf-8"?>
<soap12:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xmlns:xsd="http://www.w3.org/2001/XMLSchema"
        xmlns:soap12="http://www.w3.org/2003/05/soap-envelope">
        <soap12:Body>
                <LRITShipPositionRequest xmlns="http://www.imo.org/">
                        <LRITDataUser>
                                <MessageType>4</MessageType>
                                <MessageID> 00992006071523000055555</MessageID>
                                < IMONum >12345678 </ IMONum >
                                <ShipName> MapleLeaf </ShipName>
                                < LRITDataUserProvider>0112</ LRITDataUserProvider>
                                <AccessType>5</AccessType>
                                <Port>a1111</Port>
                                <PortDis>0</PortDis>
                                <RequestType>4</RequestType>
                                <RequestDuration>2007:07:15 :23 :00.2007:07:16:23 :00</RequestDuration>
                                <LRITDataUserRequestor>0100</ LRITDataUserRequestor>
                                <TimeStamp>2007:07:15:23:00:00 </TimeStamp>
                        </LRITDataUser>
                        <LRITDataCentre>
                                <DDPVersion>123</DDPVersion>
                                <Test>0</Test>
                         </LRITDataCentre>
                </LRITShipPositionRequest>
        </soap12:Body>
</soap12:Envelope>
```

5.1.4 SAR SURPIC Request Message

5.1.4.1 The following is an example of a SAR SURPIC request message encoded into a SOAP 1.2 message over HTTP message. The values of the various parameters may be different. The example provided is based upon Canada (Canadian Country LRIT Data User LRIT ID = 0112) requesting a SAR SURPIC on July 15, 2006 at 23:00:00. Canada has requested the last 10 reports. The geographical area for the SAR SURPIC is a circle with a 5 nautical mile radius with a centre located at 47.37.00 N, 52.40.00 W.

```
POST /LRITSample/Service HTTP/1.1
Host: localhost
Content-Type: application/soap+xml; charset=utf-8
Content-Length: length
```

```
<?xml version="1.0" encoding="utf-8"?>
<soap12:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xmlns:xsd="http://www.w3.org/2001/XMLSchema"
        xmlns:soap12="http://www.w3.org/2003/05/soap-envelope">
        <soap12:Body>
                <SARSURPICRequest xmlns="http://www.imo.org/">
                <LRITDataUser2>
                        <MessageType>6</MessageType>
                        <MessageID>0112200607152300012345 </MessageID>
                        <SARCircularArea> 47.37.N :52.40.W:005<SARCircularArea>
                        <SARRectangularArea> <SARRectangularArea>
                        <Postions>10</Positions>
                       <LRITDataUserRequestor>0112</ LRITDataUserRequestor>
                        <TimeStamp>2006:07:15:23:00:00 </TimeStamp>
                </LRITDataUser2>
                <LRITDataCentre>
                        <DDPVersion>123</DDPVersion>
                        <Test>0</Test>
                 </LRITDataCentre>
                   </SARSURPICRequest>
        </soap12:Body>
</soap12:Envelope>
```

5.1.5 LRIT Receipt Message

5.1.5.1 The following is an example of the LRIT Receipt message encoded into a SOAP message. The values of the various parameters may be different.

```
ns0:LRITReceipt xmlns:ns0="http://www.imo.org/lrit/receipt/2007/06/20">
 <LRITNetwork>
     <MessageType>7</MessageType>
       <MessageID>11112007062010000099999</MessageID>
  <ReferenceID>0112200607152300012345</ReferenceID>
  <ReceiptCode>2</ReceiptCode>
  <Destination>1111</Destination>
  <Originator>2222</Originator>
  <Message>Message_0</Message>
  <TimeStamp>2007 :06 :20 :10 :30 :25</TimeStamp>
    </LRITNetwork>
<LRITDataCentre>
  <DDPVersionNumber>3</DDPVersionNumber>
  <Test>1</Test>
    </LRITDataCentre>
    </ns0:LRITReceipt>
```

5.1.6 DDP Notification Message

5.1.6.1 The following is an example of the LRIT DDP Notification message encoded into a SOAP message. The values of the various parameters may be different.

```
ns0:LRITDDPNotification
     xmlns:ns0="http://www.imo.org/lrit/ddpNotification/2007/06/20">
<DDPAdministrator>
  <MessageType>8</MessageType>
  <MessageID>11112007062010000099999</MessageID>
  <Message>Message_0</Message>
  <TimeStamp>2007:06:20:10:30:25</TimeStamp>
  <DDPVersionNumber>4</DDPVersionNumber>
  <Test>1</Test>
    </DDPAdministrator>
    </ns0:LRITDDPNotification>
```

5.1.7 DDP Request Message

5.1.7.1 The following is an example of the LRIT DDP Request message encoded into a SOAP message. The values of the various parameters may be different.

```
<ns0:LRITDDPRequest xmlns:ns0="http://www.imo.org/lrit/ddpRequest/2007/06/20">
<DataCentre>
  <MessageType>9</MessageType>
  <MessageID>11112007062010000099999</MessageID>
  <DDPRequestType>0</DDPRequestType>
  <Originator>1111</Originator>
  <TimeStamp>2007:06:20:10:30:25</TimeStamp>
 <DDPVersionNumber>4</DDPVersionNumber>
  <Test>1</Test>
   </DataCentre>
     </ns0:LRITDDPRequest>
```

5.1.8 LRIT DDP Update

5.1.8.1 The following is an example of the LRIT DDP update message encoded into a SOAP message. The values of the various parameters may be different.

```
<?xml version='1.0' ?>
<env:Envelope xmlns: env= 'http://www.w3.org/2003/05/soap-envelope'>
<env: Body>
        <p:LRITDDPAdmin>
                <p:MessageType> 10 </p:MessageType>
                <p:MessageID> 820060715230000 </p:MessageID>
                <p:Message> New DDP attached. </p:Message>
                <p:TimeStamp> 2006:07:15:23:00:00 </p:TimeStamp>
                <DDPVersion>123</DDPVersion>
                <Test>0</Test>
        </p:LRITDDPAdmin>
</env: Body>
</env:Envelope>
```

5.1.9 System Status Message

5.1.9.1 The following is an example of the LRIT System status message encoded into a SOAP message. The values of the various parameters may be different.

```
ns0:LRITSystemStatus xmlns:ns0="http://www.imo.org/lrit/systemStatus/2007/06/20">
 <DataCentre>
 <MessageType>11</MessageType>
 <MessageID>11112007062010000099999</MessageID>
 <TimeStamp>2007:06:20:10:30:25</TimeStamp>
 <DDPVersionNumber>2</DDPVersionNumber>
 <SystemStatus>1</SystemStatus>
 <Message>Message_0</Message>
 <Originator>3334</Originator>
 <Test>1</Test>
   </DataCentre>
   </ns0:LRITSystemStatus>
```

5.1.10 Billing & Transaction Report Message

5.1.10.1 The following is an example of the LRIT Billing & Transaction Report message encoded into a SOAP message. The values of the various parameters may be different.

```
<ns0:LRITBillingAndTransationReport
    xmlns:ns0="http://www.imo.org/lrit/billingAndTransationReport/2007/06/20">
<DataCentre>
  <MessageType>12</MessageType>
  <MessageID>11112007062010000099999</MessageID>
  <Message>Message_0</Message>
  <TimeStamp>2007:06:20:10:30:25</TimeStamp>
  <Originator>2222</Originator>
  <BillingAndTransactionFile />
  <DDPVersionNumber>2</DDPVersionNumber>
  <Test>1</Test>
    </DataCentre>
    </ns0:LRITBillingAndTransationReport>
```

5.1.11 Pricing Notification Message

5.1.11.1 The following is an example of the LRIT Pricing Notification message encoded into a SOAP message. The values of the various parameters may be different.

```
ns0:LRITPricingNotification
    xmlns:ns0="http://www.imo.org/lrit/PricingNotification/2007/06/20">
<LRITIDE>
  <MessageType>13</MessageType>
  <MessageID>11112007062010000099999</MessageID>
  <Message>Message_0</Message>
  <TimeStamp>2007:06:20:10:30:25</TimeStamp>
 <PricingVersionNumber>5</PricingVersionNumber>
 <DDPVersionNumber>4</DDPVersionNumber>
  <Test>1</Test>
    </LRITIDE>
    </ns0:LRITPricingNotification>
```

5.1.12 Pricing Request Message

5.1.12.1 The following is an example of the LRIT Pricing Request message encoded into a SOAP message. The values of the various parameters may be different.

```
<ns0:LRITPricingRequest
    xmlns:ns0="http://www.imo.org/lrit/PricingRequest/2007/06/20">
<DataCentre>
  <MessageType>14</MessageType>
  <MessageID>11112007062010000099999</MessageID>
  <Originator>1111</Originator>
   <TimeStamp>2007:06:20:10:30:25</TimeStamp>
  <DDPVersion>123</DDPVersion>
  <Test>0</Test>
    </DataCentre>
    </ns0:LRITPricingRequest>
```

5.1.13 LRIT Pricing Update

5.1.13.1 The following is an example of the LRIT Pricing update message encoded into a SOAP message. The values of the various parameters may be different.

```
<?xml version='1.0' ?>
<env:Envelope xmlns: env= 'http://www.w3.org/2003/05/soap-envelope'>
<env: Body>
        <p:LRITIDE>
                <p:MessageType> 15 </p:MessageType>
                <p:MessageID> 11112007062010000099999 </p:MessageID>
                <p:Message> New pricing file attached. </p:Message>
                <p:TimeStamp> 2006:07:15:23:00:00 </p:TimeStamp>
                <p:PricingVersionNumber>5</p:PricingVersionNumber>
                <p:DDPVersion>123</p:DDPVersion>
                <p:Test>0</p:Test>
        </p:LRITIDE>
</env: Body>
</env:Envelope>
```

6 Annex B – Examples of Message Flow Diagrams

FIGURE 4

MESSAGE FLOW EXAMPLE: POSITIONAL MESSAGE (MESSAGE TYPE 1)

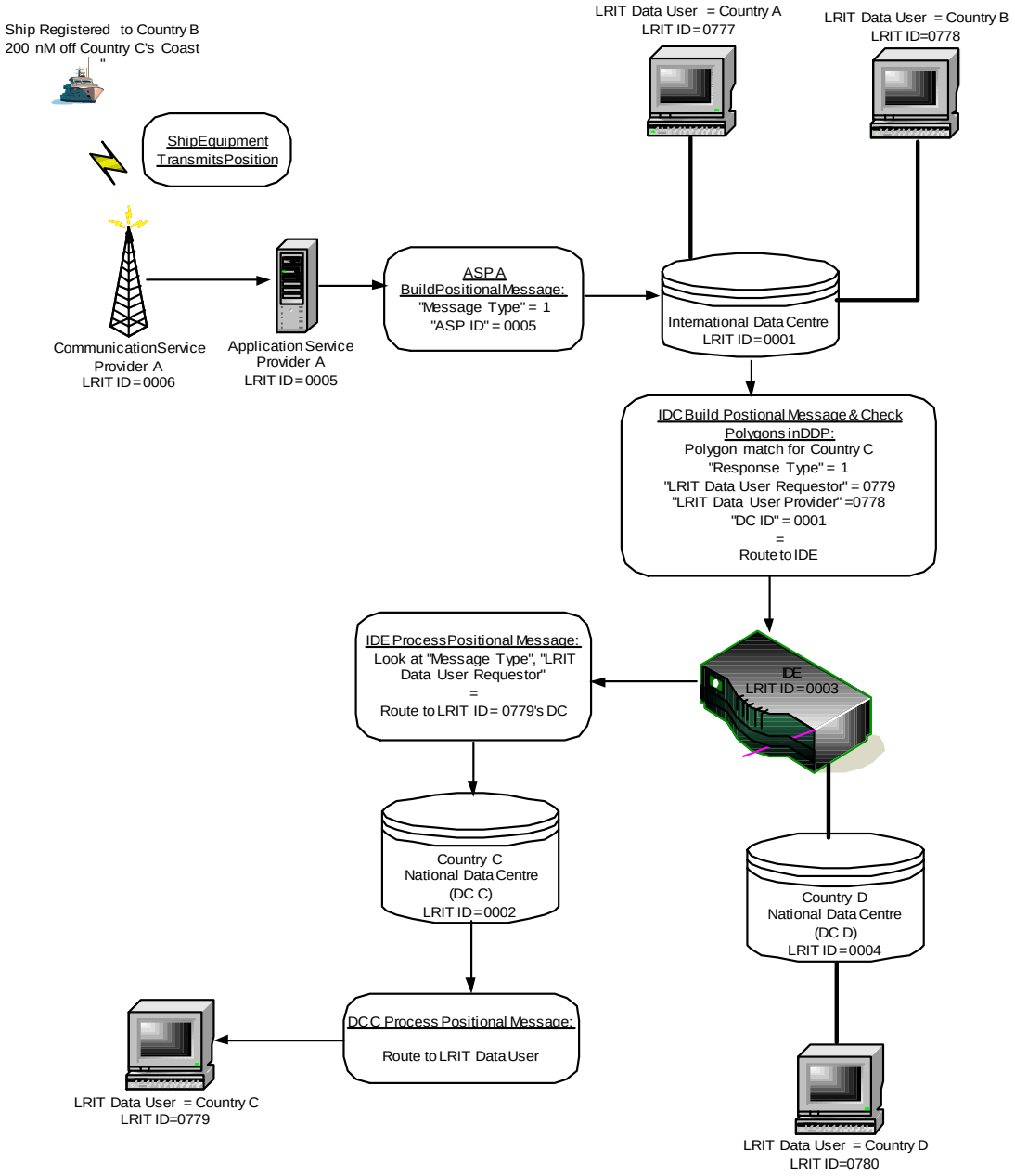


FIGURE 5

MESSAGE FLOW EXAMPLE: REQUEST AND POSITIONAL RESPONSE

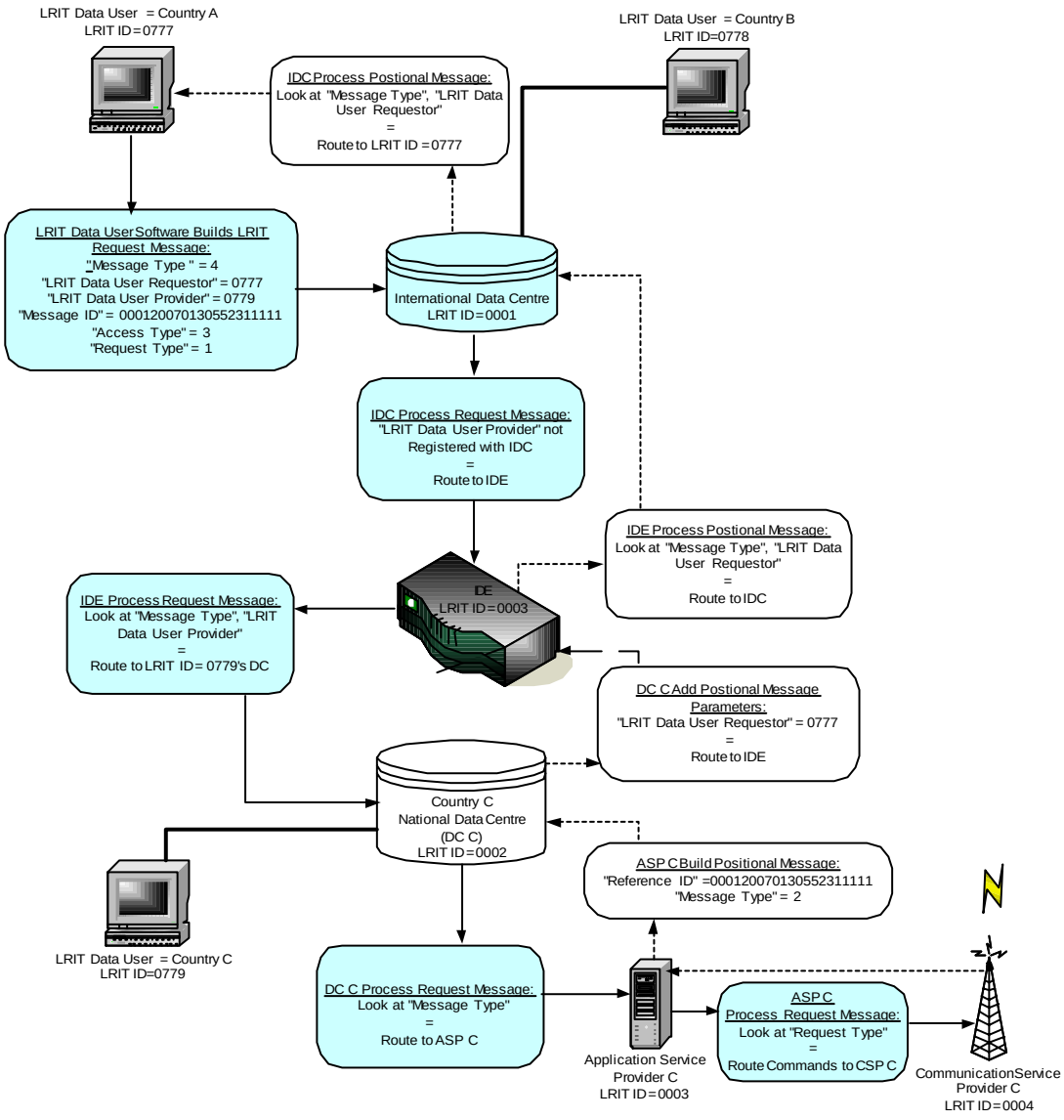
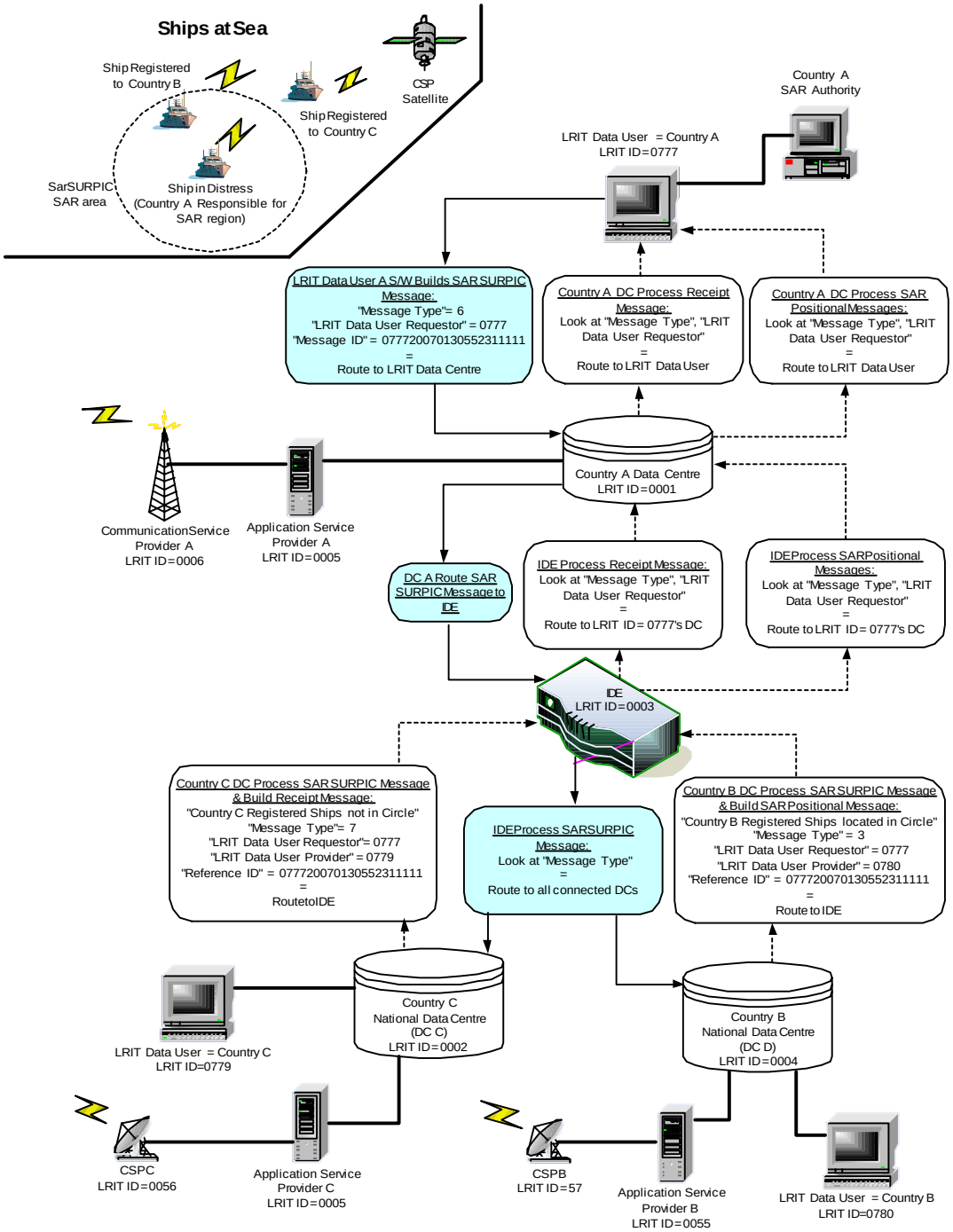


FIGURE 6

MESSAGE FLOW EXAMPLE: SAR SURPIC (MESSAGE 6), RECEIPT (MESSAGE 7) AND SAR POSITIONAL (MESSAGE 3)



***

ANNEX 4

Draft LRIT Technical Costing and Billing Standard

Prepared by: *Ad Hoc* Working Group on Engineering Aspects of LRIT

Date of issue of this Draft: July 3, 2007

Table of Contents

DRAFT LRIT COSTING AND BILLING STANDARD

1 General Provisions

1.1 Scope and Background

1.1.1 Scope

1.1.1.1 The intent of this document is to provide a draft standard for costing and billing in the International Long-Range Identification and Tracking (LRIT) system.

1.1.1.2 This document has been prepared by the *Ad Hoc* Working Group on Engineering Aspects of Long-Range Identification and Tracking of Ships.

1.1.1.3 In preparing the document, the *Ad Hoc* Working Group has taken into account the provisions of SOLAS regulation V/19-1 and resolution MSC.210(81), "Performance Standards and Functional Requirements for the Long Range Identification and Tracking of Ships."

1.1.2 Background

1.1.2.1 The Maritime Safety Committee, at its eighty-first session in May 2006, adopted amendments to chapter V of the SOLAS convention in relation of LRIT. These amendments will enter into force on 1 January 2008 provided that acceptance criteria have been fulfilled by 1 July 2007.

1.1.2.2 The LRIT system provides for the global identification and tracking of ships.

1.1.2.3 In operating the LRIT system, recognition shall be given to international conventions, agreements, rules or standards that provide for the protection of navigational information.

1.1.2.4 The draft Costing and Billing Standard for the LRIT system as outlined in this document will be established and recognised by the Committee.

1.2 General Description of the System and Definitions

1.2.1 LRIT System Description

1.2.1.1 As described in resolution MSC.210(81), sub-section 1.2, the LRIT system consists of the following components:

.1 the shipborne LRIT information transmitting equipment;
.2 the Communication Service Provider(s);
.3 the Application Service Provider(s);
.4 the LRIT Data Centre(s), including any related Vessel Monitoring System(s);
.5 the LRIT Data Distribution Plan;
.6 the International LRIT Data Exchange; and
.7 LRIT Data Users.

1.2.1.2 As described in resolution MSC.210(81), sub-section 1.2, certain aspects of the performance of the LRIT system are reviewed or audited by an LRIT Co-ordinator acting on behalf of all CGs.

1.2.2 LRIT System Operation

1.2.2.1 Articles 1.2.2.1 to 1.2.2.11 provide a high-level overview of the LRIT system architecture. The LRIT system Performance standards, resolution MSC.210(81), provide further details on the functions associated with each component of the system.

1.2.2.2 Tracking of any applicable ship begins with LRIT ship positional data being transmitted from the shipborne equipment. The LRIT information transmitted includes the ship's GNSS position (based on the WGS84 datum), time and identification, as described in resolution MSC.210(81), Table 1.

1.2.2.3 The Communication Service Provider (CSP) provides the communication infrastructure and services that are necessary for establishing a communication path between the ship and the Application Service Provider (ASP). The LRIT information transmitted from the ship will travel across the communication path set up by the CSP to the ASP.

1.2.2.4 The ASP, after receiving the LRIT information from the ship, will add additional information to the LRIT message and pass along the expanded message to its associated LRIT Data Centre. Functionality required for the programming and communicating of commands to the shipborne equipment is provided by the ASP.

1.2.2.5 The LRIT information, along with all the parameters added by the various LRIT components, is described in the messaging section of the "Draft Technical Specifications for Communication within the LRIT System."

1.2.2.6 LRIT Data Centres will store all incoming LRIT information from ships instructed by their Administrations to transmit LRIT information to that Data Centre. LRIT Data Centres will disseminate LRIT information to LRIT Data Users according to the Data Distribution Plan (DDP).

1.2.2.7 The LRIT Data Distribution Plan will contain the information required by the Data Centres for determining how LRIT information will be distributed to the various CGs. The DDP will contain information such as standing orders from CGs and geographical polygons relating to CGs' coastal waters and ports and port facilities.

1.2.2.8 The Data Centres will process all LRIT messages to and from the International LRIT Data Exchange (IDE). The IDE will process all LRIT messages between LRIT Data Centres. The IDE will route the message to the appropriate Data Centre based upon the information contained within the DDP. The IDE will neither process nor store the ship positional data contained within LRIT messages.

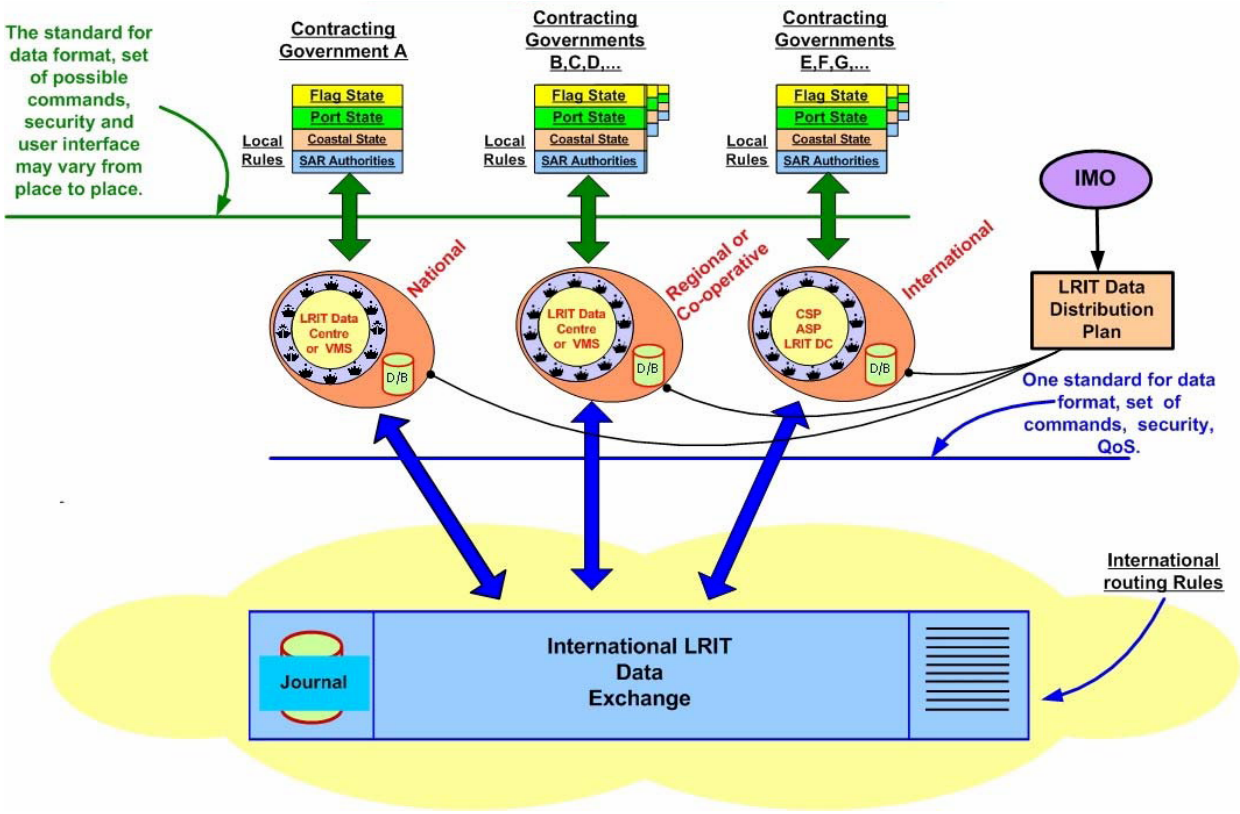
1.2.2.9 LRIT Data Users may be entitled to receive or request LRIT information in their capacity as a Flag State, Port State, Coastal State or Search and rescue (SAR) service.

1.2.2.10 The LRIT Co-ordinator assists in the establishment of the international components of the LRIT system, performs administrative functions, and reviews and audits certain components of the LRIT system.

1.2.2.11 Figure 1 provides a high-level illustration of the basic LRIT system architecture.

FIGURE 1

TYPICAL LRIT SYSTEM ARCHITECTURE



1.2.3 Definitions

1.2.3.1 Unless expressly provided otherwise:

.1 *Convention* means the International Convention for the Safety of Life at Sea, 1974, as amended.

.2 *Regulation* means a regulation of the Convention.

.3 *Chapter* means a chapter of the Convention.

.4 *LRIT Data User* means a CG or a Search and rescue service that opts to receive the LRIT information it is entitled to.

.5 *Committee* means the Maritime Safety Committee.

.6 *High-speed craft* means a craft as defined in regulation X/1.3.

.7 *Organization* means the International Maritime Organization.

.8 *Vessel Monitoring System* means a system established by a CG or a group of CGs to monitor the movements of the ships entitled to fly its or their Flag. A Vessel Monitoring System may also collect from the ships information specified by the CG(s) that has established it.

.9 *LRIT information* means the information specified in SOLAS regulation V/19-1.5.

.10 *IDC operator* means the individual responsible for the daily operation and maintenance of the International LRIT Data Centre.

1.2.3.2 The term *"ship,"* when used in the present Performance standards and functional requirements for long-range identification and tracking of ships, includes mobile offshore drilling units and high-speed craft as specified in SOLAS regulation V/19-1.4.1 and means a ship that is required to transmit LRIT information.

1.2.3.3 Terms not otherwise defined should have the same meaning as the meaning attributed to them in the Convention.

1.2.4 Acronyms Used Within This Document

1.2.4.1 The acronyms that appear within this document shall have the meanings assigned to them in this Article:

.1	ASP	Application Service Provider
.2	CG	Contracting Government
.3	CSP	Communication Service Provider
.4	DC	LRIT Data Centre
.5	DDP	LRIT Data Distribution Plan
.6	IDC	International LRIT Data Centre
.7	IDE	International LRIT Data Exchange
.8	NDC	National LRIT Data Centre
.9	R/CDC	Regional/Co-operative LRIT Data Centre
.10	RFP	Request for Proposal
.11	SAR	Search and rescue
.12	SAR SURPIC	Search and rescue Surface Picture
.13	SOLAS	International Convention for the Safety of Life at Sea

2 Standard for Costing and Billing

2.1 General

2.1.1 Framework

2.1.1.1 An accepted standard for costing and billing within the LRIT system is critical to ensuring a successful system.

2.1.1.2 Within the technical Costing and Billing Standard, both capital and operating costs shall be considered, as shall costs for developing, implementing and operating the IDE and the IDC; for the LRIT Co-ordinator; and for the DDP.

2.1.1.3 This document describes the overall costing and billing framework that must be followed to help ensure the successful implementation of the LRIT system and the long-term sustainability of that system.

2.1.2 Considerations

2.1.2.1 The overall cost of the LRIT system will be closely linked to the volume of data, i.e. the number of individual communications, estimates of which are unknown at this time.

2.1.2.2 An indication from Contracting Governments (CGs) with respect to their commitment to receive the minimum number of 4 position reports per day from their ships and to indicate whether they believe that they will be able to estimate an approximate volume of reports that they are likely to request in a particular period would be valuable input into the development of an international costing and billing framework.

2.2 Flow of Reports and Requests within the LRIT system

2.2.1 Overview

2.2.1.1 Costing and billing scenarios within the LRIT system are based upon the flow of requests and reports within the system.

2.2.1.2 Resolution MSC.202(81), "Long Range Identification and Tracking of Ships," states that the Search and rescue services of Contracting Governments shall be entitled to receive, free of any charges, LRIT information in relation to the Search and rescue of persons in distress at sea.

2.2.1.3 The cost associated with providing Search and rescue services to Contracting Governments free of charge will be recovered by the LRIT system through the billing structure established for Contracting Governments receiving LRIT information other than for the purpose of Search and rescue.

2.2.1.4 Three different types of data must be considered within the LRIT system for the purposes of developing a Costing and Billing Standard:

.1 The 4 standard position reports per day per ship (Refer Section 2.3),

.2 The poll position, or a change to the regular position report (Refer Section 2.6), and

.3 Search and rescue position reports (Refer Section 2.5).

2.2.1.5 CGs are entitled to receive data from the LRIT system as a:

.1 Flag State,

.2 Port State,

.3 Coastal State, and

.4 Search and rescue service.

2.2.1.6 For the purposes of a Costing and Billing Standard, Port State and Coastal State requests for ship data can be grouped together, because while the coastal trigger is the coastal state polygon (within the DDP) and the port state trigger is the Notice of Arrival (NOA), once the request is triggered the two scenarios are identical with respect to the flow of requests and responses that lead to the determination of costs and the related flow of billing and payments.

2.2.1.7 Further to Article 2.2.1.6, for the purposes of a Costing and Billing Standard there are therefore three distinct LRIT Data Users:

.1 Flag State,

.2 Port/Coastal State, and

.3 Search and rescue service.

2.2.1.8 All three distinct LRIT Data User Groups identified in Article 2.2.1.7 may use one of:

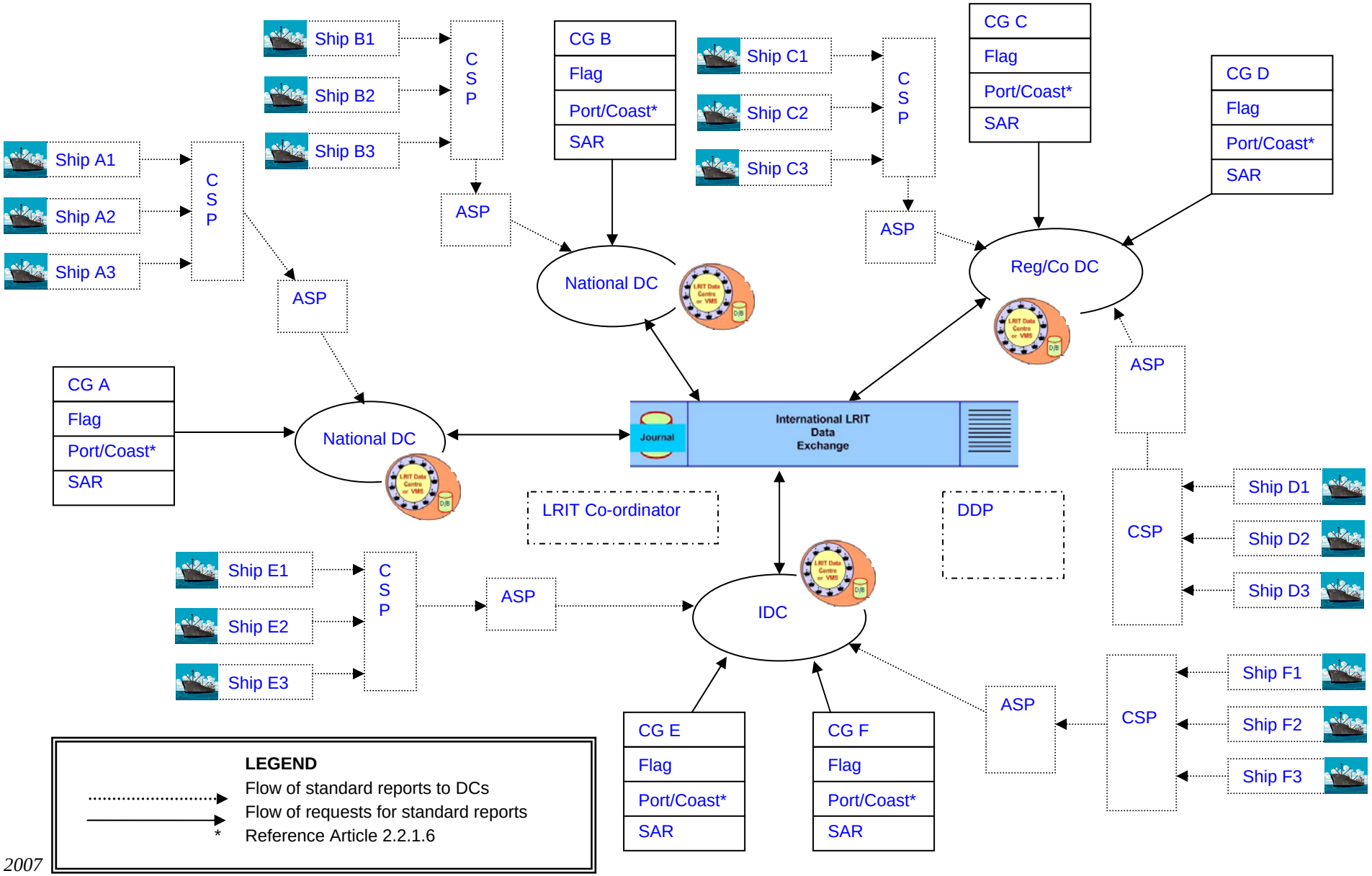
.1 a National Data Centre (NDC),

.2 a Regional/Co-operative DC (R/CDC), or

.3 the IDC.

2.2.1.9 The flow of reports and requests within the LRIT system is illustrated in Figure 2.

FIGURE 2
FLOW OF REPORTS AND REQUESTS WITHIN THE LRIT SYSTEM



2.2.2 General Guidance

2.2.2.1 Although NDCs, R/CDCs, the IDC and the IDE are all single functional entities from the perspective of the LRIT Performance standard, sub-contractors may be used to perform various functions, including those related to costing and billing. As is the case for all sub-contractual arrangements, the main contractor/LRIT entity remains accountable for the performance of its sub-contractors.

2.2.2.2 All commercial contractual agreements should be undertaken in accordance with standard commercial practice.

2.2.2.3 The format for bills and invoices within the LRIT system is not defined within this document. This is to avoid being overly prescriptive and hindering effective development of a sustainable system.

2.2.2.4 Billing by commercial entities, which should be in accordance with standard commercial billing practices, is not defined within this document. This is to avoid being overly prescriptive and hindering effective development of a sustainable system.

2.2.2.5 Notwithstanding Articles 2.2.2.3 and 2.2.2.4, where guidance was thought necessary related to specific transaction scenarios, such guidance is provided within the related section of this document.

2.2.2.6 Bills to be generated throughout the LRIT system may contain taxes according to the legislation of the individual CGs. The amounts and format of the relevant taxes are not defined within this document.

2.2.2.7 Bills may also contain profit. As the question of whether or not a CG can make a profit by means of the provision of LRIT information is a policy decision for the Committee, this standard discusses options to address both possibilities (Refer Article 2.4.1.1).

2.2.2.8 Further to Article 2.2.2.7, while this standard discusses options to address both possibilities, it is recommended to the Committee that a policy decision be made that a CG associated with specific ship positional data be entitled to recover its costs—but not make a profit—by means of billing DCs requesting that data.

2.2.2.9 Whether or not commercial entities participating in the LRIT system can make a profit is also a policy decision for the Committee. This document considers only the case where profit is allowed, the rationale being that if commercial entities were not allowed to make a profit, then there would be no reason for them to participate in the system and LRIT would fail.

2.2.2.10 Further to Article 2.2.2.9, it is therefore recommended to the Committee that a policy decision be made that if a CG(s) uses a third-party commercial entity as its DC, then the DC associated with the data shall be entitled to make a reasonable profit by such means as billing DCs requesting that data.

2.2.2.11 The following general principles apply to the technical Costing and Billing Standard:

.1 the system must be open and transparent, and

.2 as complex billing and costing algorithms by their nature are more costly, less easy to understand and thus not transparent, simple is better; thus simple algorithms are preferred.

2.3 Costing and Billing Scenarios for Minimum Four position reports per day

2.3.1 General

2.3.1.1 Given Articles 2.2.1.7 and 2.2.1.8, there are thus 10 distinct request/response scenarios—and therefore 10 distinct related costing and billing scenarios—that could occur within the LRIT system:

.1 Scenario 1: Flag State reporting to a NDC requesting its own ship positional data,

.2 Scenario 2: Flag State reporting to a R/CDC requesting its own ship positional data,

.3 Scenario 3: Flag State reporting to the IDC requesting its own ship positional data,

.4 Scenario 4: Flag State reporting to the IDC *not* requesting its own ship positional data,

.5 Scenario 5: Port State/Coastal State request from requestor using a R/CDC and requesting ship positional data from a ship associated with the same DC,

.6 Scenario 6: Port State/Coastal State request from requestor using a NDC or R/CDC and requesting ship positional data from a ship associated with a NDC,

.7 Scenario 7: Port State/Coastal State request from requestor using a NDC or R/CDC and requesting ship positional data from a ship associated with the IDC,

.8 Scenario 8: Port State/Coastal State request from requestor using the IDC and requesting ship positional data from a ship associated with a NDC or R/CDC,

.9 Scenario 9: Port State/Coastal State request from requestor using the IDC and requesting ship positional data from a ship associated with the IDC, and

.10 Scenario 10: SAR Request.

2.3.1.2 For CGs reporting to either a NDC or R/CDC, Article 2.3.1.1 assumes that:

.1 NDCs and R/CDCs would be established as Vessel Monitoring Systems,

.2 if a CG establishes a NDC or R/CDC, then that CG wants the LRIT information for all of its ships and would thus be requesting, receiving and paying for the minimum four position reports per day for all ships reporting to its Flag, and

.3 those CGs not wanting to receive or pay for their Flag ship data would select the option of using the IDC.

2.3.1.3 The assumptions made in Article 2.3.1.2 are a suggested policy direction based on an interpretation of the Performance Standard that provides an option for CGs not to pay for unrequested Flag data, while at the same time giving consideration to the long-term viability and sustainability of the LRIT system.

2.3.1.4 If policy direction is determined not to support the assumption in Article 2.3.1.2, then:

.1 CGs wishing to establish their own NDC or R/CDC would have the option of not requesting—and hence not paying—for some or all of the standard position reports from their Flag ships, meaning those DCs would face similar issues to that of the IDC,

.2 The overall viability of the entire LRIT system is threatened, as described in Subsection 2.3.3, and

.3 Two further scenarios must be added to Article 2.3.1.1:

Scenario 1A: Flag State reporting to a NDC *not* requesting its own ship positional data, and

Scenario 2A: Flag State reporting to a R/CDC *not* requesting its own ship positional data.

2.3.2 Scenario 1: Flag State – NDC

2.3.2.1 Scenario 1 is a Flag State reporting to a NDC requesting a ship position report from a ship entitled to fly its Flag.

2.3.2.2 Given the assumption made in Article 2.3.1.2, in Scenario 1, the CG acting as a Flag State is responsible to pay for all costs associated with the flow of the minimum four position reports per day from each ship entitled to fly its Flag to its NDC.

2.3.2.3 The billing scenario would be as outlined below and illustrated in Figure 3:

.1 The ship pays no money, and receives no bill,

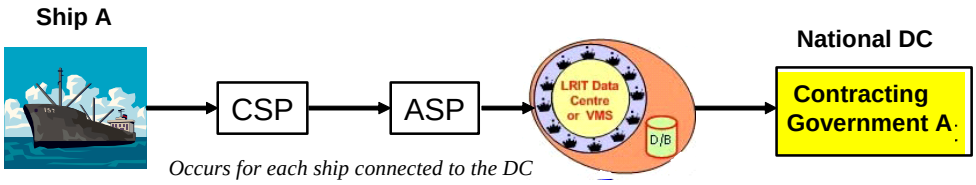
.2 The CSP bills the ASP (if a separate entity),

.3 The ASP bills the DC, and

.4 The DC (if a separate entity), bills the CG.

FIGURE 3

BILLING SCENARIO 1 – FLOW OF BILLS



2.3.2.4 Having the CG paying the bill from the DC directly helps ensure a stable business case by reducing the financial risk of commercial entities within the system (i.e. the CSP, ASP, and DC), who would otherwise be expected to assume all costs—including those for setting up the system—with no guaranteed rate of return.

2.3.2.5 This scenario does not preclude a CG—as the proprietor of data related to its Flag ships—from recovering costs from requestors of ship positional data by billing other DCs requesting that data should a policy decision supporting cost recovery be supported by the Committee as per Article 2.2.2.8. The various options for billing between DCs is discussed in Section 2.4.

2.3.2.6 How a CG receives the funds required to pay the DC is outside the scope of this document.

2.3.2.7 Resolution MSC.202(81) provides for CGs to direct shipping companies to pay for position reports. In such a case, national legislation to that effect is required as per Section 11.2 of the Regulation. In this case, the DC may be billing the CG or the shipping company depending on the specific legislation. While the specific flow of bills will be different than that given in Article 2.3.2.3, the commercial viability and sustainability of the system are the same.

2.3.2.8 Those commercial contractual agreements likely to be in place in Scenario 1 would be between the CG, its NDC, and the ASP and CSP. Contractual agreements should be in accordance with standard commercial practice.

2.3.2.9 The NDC would be the entity having a contract with an ASP, and paying for (at least) the minimum of four position reports per day called for in Resolution MSC.210(81).

2.3.2.10 If the NDC was not the Administration, then there would be an agreement between the Administration and the NDC whereby the Administration would pay the DC.

2.3.2.11 Resolution MSC.202(81) does not allow an Administration to go directly to a CSP, unless the CSP is acting as an ASP for the provision of LRIT information. It is possible that the bills for both the CSP and the ASP could be paid directly by the DC. In such a case, the DC would receive and pay both bills. This does not conflict with MSC.202(81) because no LRIT information is being transferred between the CSP and the DC.

2.3.2.12 This type of commercial contractual arrangement is not within the scope of the technical Costing and Billing Standard.

2.3.3 Scenario 1A: Flag State Does Not Pay – NDC

2.3.3.1 If policy direction is determined not to support the assumption in Article 2.3.1.2, then CGs wishing to establish their own NDC would have the option of not requesting—and hence not paying—for some or all of the standard position reports from their Flag ships. Scenario 1A is a Flag State reporting to a NDC and *not* paying the NDC for all of the position reports (i.e. does not want to underwrite the cost of the NDC).

2.3.3.2 The billing scenario would be as outlined below and illustrated in Figure 3:

.1 The ship pays no money, and receives no bill,

.2 The CSP bills the ASP (if a separate entity), or the DC (refer Article 2.3.2.11),

.3 The ASP bills the DC, and

.4 The DC (if a separate entity), bills other DCs and the CG for data that is provided.

2.3.3.3 This scenario—while it does not have significant technical ramifications for the LRIT system—is not considered to be commercially or administratively viable for the following reasons:

.1 Unlike in Scenario 1, the CG associated with the ship is not assuming start-up costs for development of the NDC; payment would only come following the first request for a position report, which may not occur for a significant period of time.

.2 Commercial entities that have been assuming start-up and communications costs would reasonably expect to be paid for their outlay within the standard 30-day period.

.3 The commercial entity responsible for the NDC would thus be expected to pay bills and assume all commercial risk for viability of the NDC, including both the start-up (capital) costs as well as the on-going (operating and maintenance).

.4 In assuming such significant commercial risk, the commercial entity responsible for the NDC would have to build a pricing regime that takes into account such high risk,

.5 Given that the only source of revenue for that commercial entity is requesting DCs/CGs, and that the revenue stream may not start up for some time after costs are first assumed, such a scenario could only translate into much higher prices for requesting DCs/CGs.

.6 Requesting DCs/CGs should reasonably expect that prices for positional reports in the LRIT system are reasonable and consistent.

.7 If they determine that prices are not reasonable and consistent, requesting DCs/CGs have the option of not requesting—and therefore not paying for—data.

.8 Unduly high prices would act as a deterrent to DCs and CGs using the data, which would undermine the integrity of the entire system.

.9 Unduly high prices could be used for nefarious intent, to deter CGs wishing to track ships entering or transiting their waters from requesting and paying for ship positional data.

.10 Given the high commercial risk, it is highly probable that no commercial entity would bid on a Request for Proposal related to this scenario.

2.3.3.4 It is therefore recommended that the Committee make a policy decision that precludes this scenario (Scenario 1A). If a CG does not wish to pay the costs for the operation of its NDC, then it has the option of using the IDC.

2.3.3.5 These comments and recommendations are the same for a R/CDC attempting to follow the same business model as outlined in Scenario 2A.

2.3.3.6 It is important to note that the IDC has the same general business case and billing regime as scenarios 1A and 2A, in that a CG using the IDC has the option of not paying for some or all position reports associated with ships entitled to fly its Flag. Thus, the initial capital costs as well as operating costs will be covered by the entity running the IDC, as it is assumed that costs of the IDC will not be pre-paid by the LRIT Co-ordinator, the Committee, IMSO Parties or SOLAS CGs.

2.3.3.7 While the IDC scenario (Scenario 4) outlined in Subsection 2.3.6.4 is essentially Scenario 1A, there are several differences:

.1 by allowing only the IDC to have this type of business model, economies of scale will reduce the capital costs as well as the overall financial risks,

.2 by having multiple CGs reporting to the IDC, the number of ships reporting to the IDC increases, as does the commercial viability of the system.

2.3.3.8 As a DC is being developed and commissioned, there will be significant capital and operating and maintenance (O&M) charges (e.g. satellite airtime) during set up and prior to any reports being provided in response to a request from another DC. This financial liability will have to be paid/covered by some entity. This financial liability also makes it unattractive for a commercial entity to invest the significant capital required with no short-term cash flow or revenue generation.

2.3.3.9 In order to ensure the viability of not only this DC but of the entire LRIT system, CGs should be encouraged as Flag, Coastal and Port States to actively utilize the LRIT system. The more data that all CGs request, the greater will be the financial viability of the system; thus helping ensure its successful development and sustainability.

2.3.4 Scenario 2: Flag State – R/CDC

2.3.4.1 Scenario 2 is a Flag State reporting to a R/CDC requesting a ship position report from a ship entitled to fly its Flag.

2.3.4.2 Given the assumption made in Article 2.3.1.2, in Scenario 2, CGs acting as a Flag State are responsible for paying all costs associated with the flow of the minimum four position reports per day from each ship entitled to fly their Flag to the R/CDC.

2.3.4.3 The responsibility of each CG acting as a Flag State to pay a portion of all costs of the ASP would be determined in a multi-level agreement amongst participating CGs.

2.3.4.4 The billing scenario would be as follows and as illustrated in Figure 4:

.1 The ship pays no money, and receives no bill,

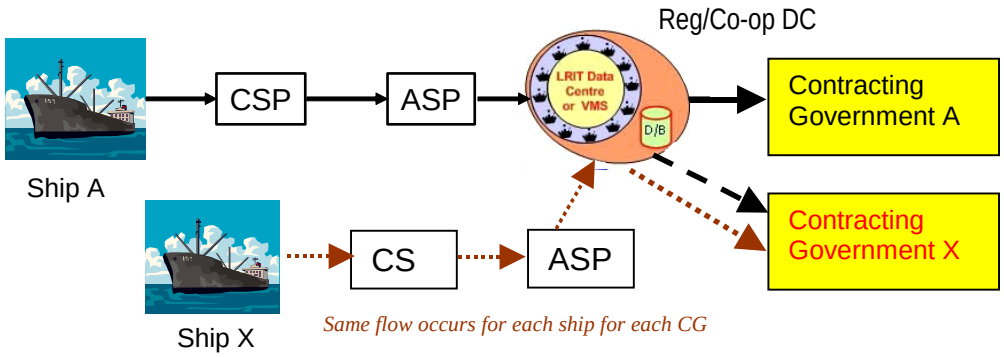
.2 The CSP bills the ASP (if a separate entity), or the DC (see Article 2.3.2.11),

.3 The ASP bills the DC, and

.4 The DC (if a separate entity), if it is operated on a commercial basis, its bill will be paid by the CGs based on the internal arrangements between the CGs; if it is not operated on a commercial basis, the cost sharing will be based on the internal arrangements between the CGs.

FIGURE 4

BILLING SCENARIO 2 – FLOW OF BILLS



2.3.4.5 Having the CG paying the bill from the DC directly helps ensure a stable business case by reducing the financial risk of commercial entities within the system (i.e. the CSP, ASP, and DC), who would otherwise be expected to assume all costs—including those for setting up the system—with no guaranteed rate of return.

2.3.4.6 Those contractual agreements likely to be in place would be between the various CGs, the R/CDC, and the ASP and CSP.

2.3.4.7 The R/CDC would be the entity having a contract with an ASP, and paying for (at least) the minimum of four messages per day called for in the Performance Specifications.

2.3.4.8 If the R/CDC was not the Administration, then there would be an agreement between the Administration and the R/CDC whereby the Administration would pay the DC.

2.3.4.9 Resolution MSC.210(81) does not allow an Administration to go directly to a CSP, unless the CSP is acting as an ASP (Refer 2.3.2.11).

2.3.4.10 This standard does not preclude each CG, as the proprietor of the data related to ships entitled to fly their Flag, from recovering costs from requestors of ship positional data (Refer 2.2.2.8).

2.3.4.11 This type of contractual arrangement is not within the scope of the technical Costing and Billing Standard.

2.3.4.12 This scenario deals only with the Flag State scenario. Later scenarios in which data is being exchanged between CGs that are members of the same R/CDC examine the issues surrounding whether such transactions are inside or outside of the LRIT system.

2.3.5 Scenario 2A: Flag State Does Not Pay – R/CDC

2.3.5.1 The comments and recommendations related to Scenario 1A in which the Flag State does not pay for a NDC are the same for this scenario in which the Flag does not pay for the R/CDC. Refer to Scenario 1A, Subsection 2.3.3, for the detailed description.

2.3.6 Scenario 3: Flag State Wants the Data – IDC

2.3.6.1 Scenario 3 is a Flag State reporting to the IDC and requesting the minimum four position reports per day.

2.3.6.2 As in Scenarios 2 and 3, CGs acting as a Flag State would be requesting and paying all costs associated with the flow of the minimum four position reports from each ship entitled to fly their Flag to the IDC.

2.3.6.3 The billing scenario would be as follows and as illustrated in Figure 5:

.1 The ship pays no money, and receives no bill,

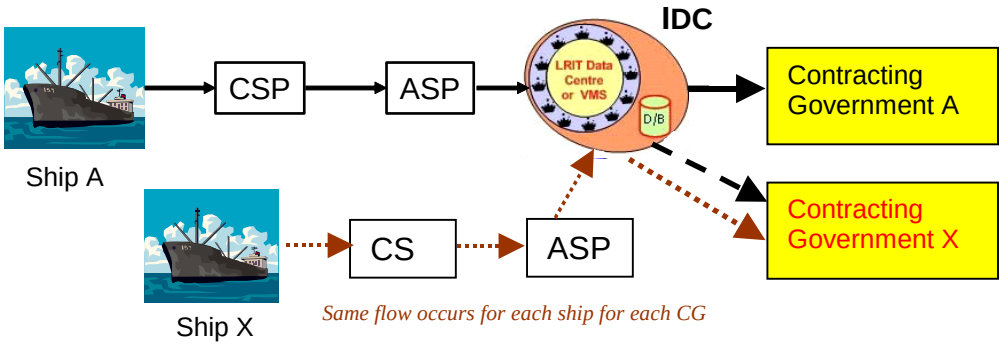
.2 The CSP bills the ASP (if a separate entity), or the DC refer Article 2.3.2.11),

.3 The ASP bills the IDC, and

.4 The IDC bills the CG.

FIGURE 5

BILLING SCENARIO 3 – FLOW OF BILLS



2.3.6.4 If the IDC is run by a CG, i.e. the IDC is part of the CG, then the IDC must be a separate entity (not necessarily a different legal entity) from a billing perspective. The IDC should be the entity that bills other DCs as well as the various CGs that are connected to the IDC. The IDC may also have to pay a bill from the LRIT Co-ordinator, and the Performance Standard specifies that CGs do not pay the LRIT Co-ordinator directly, thereby requiring a separate entity. The CG may have to sub-contract out the billing function of the IDC so that the funds collected are kept separate from the General Government Revenue.

2.3.7 Scenario 4: Flag State Does Not Want Some or all of the Data – IDC

2.3.7.1 Scenario 4 is a Flag State Reporting to the IDC and *not* requesting all or some of the minimum four position reports per day, as previously discussed in Articles 2.3.3.6 and 2.3.3.7.

2.3.7.2 Unlike Scenario 3, the CG would not be requesting—and would therefore not be responsible for the costs associated with—some or all of the minimum four position reports per day from each ship entitled to fly its Flag to the IDC.

2.3.7.3 The billing scenario would be as follows and as illustrated in Figure 6:

.1 The ship pays no money, and receives no bill,

.2 The CSP bills the ASP (if a separate entity), or the DC (refer Article 2.3.2.11),

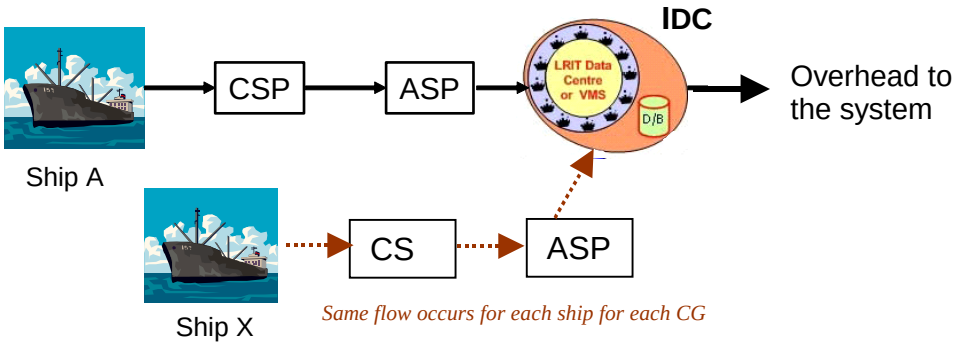
.3 The ASP bills the IDC,

.4 The IDC bills the CG for those reports it has requested and received, and

.5 Costs associated with the unrequested position reports become part of overhead. Whether the overhead is for that specific Flag, the IDC as a whole, or the entire LRIT system is outlined in Section 2.5.

FIGURE 6

BILLING SCENARIO 4 – FLOW OF BILLS



2.3.7.4 This type of contractual arrangement is within the scope of the Costing and Billing Standard.

2.3.7.5 As the IDC is being developed and commissioned, there will be significant capital and operating and maintenance (O&M) charges (e.g. satellite airtime) during set up and prior to any reports being provided in response to a request from another DC. This financial liability will have to be paid/covered by some entity. The details of how the various entities that are responding to the IMSO RFP intend to make the IDC financially viable will be determined when those entities submit their proposals to MSC 83.

2.3.7.6 In order to ensure the viability of not only the IDC but of the entire LRIT system, CGs should be encouraged as Flag, coastal and port states to actively utilize the LRIT system. The more data that all CGs request, the greater will be the financial viability of the system; thus helping ensure its successful development and sustainability.

2.3.8 Scenario 5: Port/Coastal State with same R/CDC

2.3.8.1 In Scenario 5, a Port/Coastal State is reporting to a R/CDC and requesting a ship position report from a ship associated with the same R/CDC.

2.3.8.2 The billing scenario for the flow of data from the ship to its associated DC would be as described in Scenario 2 and as illustrated in Figure 7:

.1 The ship pays no money, and receives no bill,

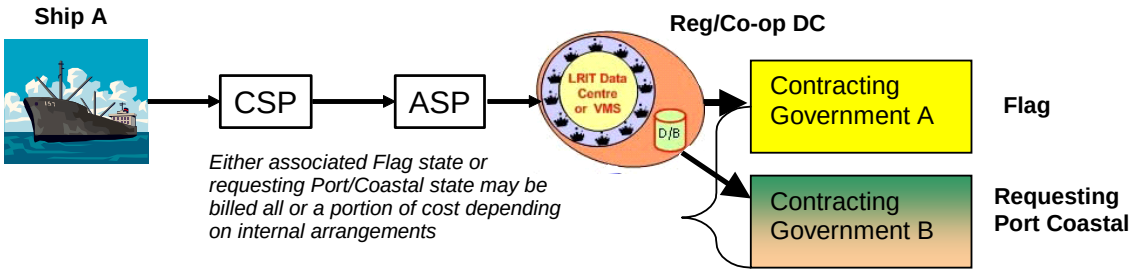
.2 The CSP bills the ASP (if a separate entity), or the DC (refer Article 2.3.2.11),

.3 The ASP bills the DC, and

.4 The DC (if a separate entity), if it is operated on a commercial basis, its bill will be paid by the CGs based on the internal arrangements between the CGs; if it is not operated on a commercial basis, the cost sharing will be based on the internal arrangements between the CGs.

FIGURE 7

BILLING SCENARIO 5 – FLOW OF BILLS



2.3.8.3 As in Scenario 2, this is an internal matter between Administrations using the R/CDC.

2.3.8.4 This type of contractual arrangement is therefore not within the scope of the Costing and Billing Standard.

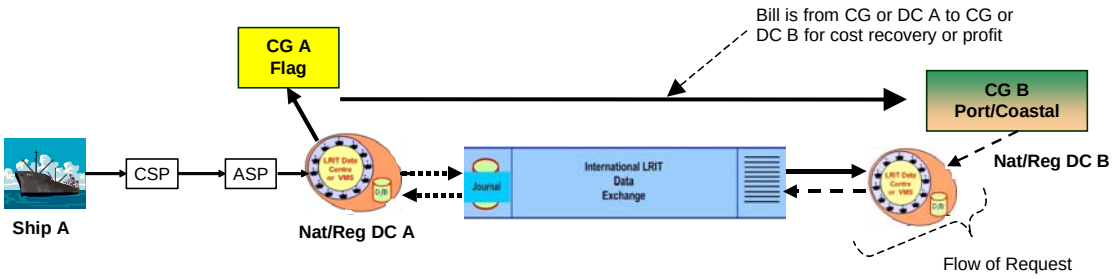
2.3.8.5 Notwithstanding Article 2.3.8.4, if a policy direction from the Committee specifies that overhead is to be charged on all these types of messages (refer Articles 2.5.4.3 and 2.5.4.4), then this transaction will also include international overhead. This would require the R/CDC to maintain some form of journal so that the proper overhead calculation can be made. This policy decision would require a change to the Performance standard, since a new requirement would be placed on the R/CDCs.

2.3.9 Scenario 6: Port/Coastal State NDC or R/CDC to a NDC or R/CDC

2.3.9.1 Scenario 6, as illustrated in Figure 8, is a Port or Coastal State request from an Administration belonging to one NDC or R/CDC via the IDE to a second NDC or R/CDC with which the ship is associated.

FIGURE 8

BILLING SCENARIO 6 – FLOW OF BILLS



2.3.9.2 Both the IDE and the DDP are required and must be considered as part of the overhead cost as described in Section 2.5.

2.3.9.3 The ASP has been paid by the DC for the transmission of reports from the ship to the DC, with the report now residing in the DC. The DC may or may not have been paid by the CG for the provision of the LRIT information; refer Scenarios 1 (Subsection 2.3.2), 1A (Section 2.3.3), 2 (Section 2.3.4) and 2A (Section 2.3.5). The charging mechanism between DCs is described in Section 2.4.

2.3.9.4 Scenario 6 raises the policy questions outlined in Articles 2.2.2.7 and 2.2.2.8 with respect to whether or not CGs are entitled to or will recover costs or realize profits, which leads to the following three possibilities as outlined in Article 2.4.1.1:

.1 No charge for the cost of the position report except the overhead cost of the IDE (implies that the regular position reports are being paid for by the Flag and provided free of charge to requesters, therefore no cost sharing);

.2 The cost could be shared (allowing for cost recovery); or

.3 The source CG could make a profit instead of cost sharing.

2.3.9.5 The billing scenario for the flow of data from the ship to its associated DC would be as described in Scenario 2, with the potential full billing scenario as illustrated in Figure 8.

2.3.9.6 The question arises as to what happens if there are multiple CGs within a single R/CDC (i.e. the requesting DC) that have access rights to the data. According to the technical documentation, the position report would be sent multiple times to the

associated DC; once for each CG that has requested the data and has the correct access rights. This raises several policy issues for the Committee:

.1 If a R/CDC receives the same message multiple times in accordance with the DDP entries, then how many times should it pay for it? The possible decisions are:

once, or

as many times as it is received.

.2 Is an R/CDC allowed to request a position report once and then route it internally within the R/CDC? If so, how many times must it pay? If it only has received it once, then it is either stopping the other transmissions, or the DDP entries for all CGs involved have been changed so that the message is only sent once. In order for the message to be internally routed within the R/CDC, the other CGs must have the access rights to the data in accordance with the LRIT Regulation.

.3 Are these interactions inside or outside of the LRIT system? If inside, then they will be charged overhead charges that must be audited and logged in a journal.

2.3.9.7 Whether or not this arrangement is inside or outside of the LRIT system will have potential cost ramifications to all of other users of the system because source DCs will not be receiving as much revenue from the provision of data to R/CDCs, which will result in higher costs to all DCs. In addition to this, if all transactions among users of a R/CDC are outside the scope of the LRIT system, the various overhead charges that are identified in this document will necessarily not be shared by those who use a R/CDC and will have to be paid by others that use the system. If the Committee decides that this arrangement is inside the LRIT system, then the above consequences will not occur, but the Performance standard will have to be modified in order to add a journal function into the R/CDC as described in Clause 2.3.9.6.3.

2.3.9.8 Many CGs will include the LRIT information that they receive in their security information systems. They may wish to share their security information with other Governments with which they have bilateral and/or multilateral agreements. This leads to two related policy questions:

.1 Under what circumstances can a Contracting Government share with other entities (i.e. other DCs, other Contracting Governments) outside its NDC or R/CDC, LRIT information the Contracting Government is entitled to, has requested and has received; and

.2 Are there any cost implications associated with the sharing of data?

2.3.10 Scenario 7: Port or Coastal State IDC to NDC or R/CDC

2.3.10.1 Scenario 7 is a Port or Coastal State request from an Administration belonging to the IDC via the IDE to the NDC or R/CDC with which the ship is associated.

2.3.10.2 The IDC, IDE and the DDP are required and must be considered as part of the overhead cost as described in Section 2.5.

2.3.10.3 As per Article 2.5.1.1, an equitable basis for cost distribution is recommended.

2.3.10.4 As this scenario uses the IDC, if a policy decision is taken that a different costing algorithm is to be applied based on whether or not the IDC is used (Reference 2.5.4), then the overhead cost in this Scenario would be different to that in Scenario 6.

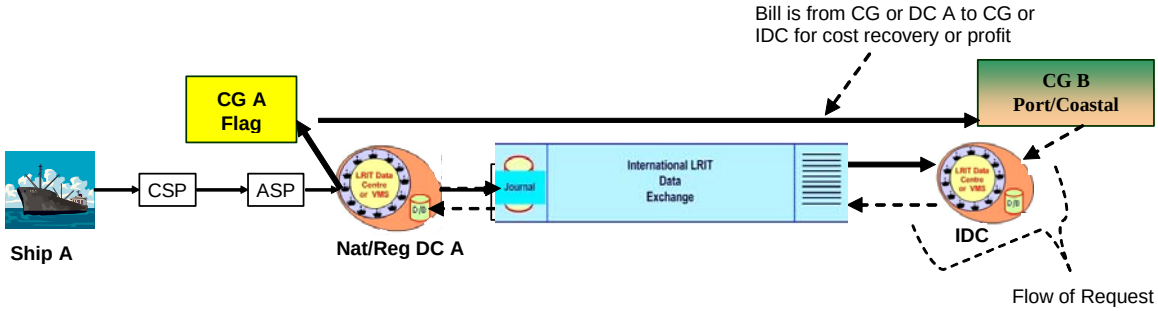
2.3.10.5 As this scenario uses the IDC, if a policy decision is taken the costing algorithm is the same regardless of whether or not the IDC is used (Reference 2.5.4), then the overhead cost in this Scenario would be the same as that in Scenario 6.

2.3.10.6 The three policy options outlined in Article 2.4.1.1 and the related issue of what type of costs might be shared must be considered.

2.3.10.7 The billing scenario for the flow of data from the ship to its associated DC would be as described in Scenario 1 or 2, with the potential full billing scenario as illustrated in Figure 9.

FIGURE 9

BILLING SCENARIO 7 – FLOW OF BILLS



2.3.10.8 The question arises as to what happens if there are multiple CGs within the IDC that have access rights to the data. According to the technical documentation, the position report would be sent multiple times to the IDC; once for every CG that has requested the data and has the correct access rights. This raises several policy issues for the Committee:

.1 If the IDC receives the same message multiple times in accordance with the DDP entries, then how many times should it pay for it? The possible decisions are:

once, or

as many times as it is received.

.2 Is the IDC allowed to request a position report once and then route it internally? If so, how many times must it pay? If it only has received the report once, then it is either stopping the other transmissions, or the DDP entries for all CGs involved is causing the message to be sent only once. In order for the message to be internally routed within the IDC, the other CGs must have the access rights to the data in accordance with the LRIT Regulation.

2.3.10.9 Many CGs will include the LRIT information that they receive in their security information systems. They may wish to share their security information with other Governments with which they have bilateral and/or multilateral agreements. This leads to two related policy questions:

.1 Under what circumstances can a Contracting Government share with other entities (i.e. other DCs, other Contracting Governments) outside its DC, LRIT information the Contracting Government is entitled to, has requested and has received; and

.2 Are there any cost implications associated with the sharing of data?

2.3.10.10 Since these transactions are occurring within one of the international components of the system, they are already subject to an audit and will be logged within the journal process within the IDC.

2.3.11 Scenario 8: Port or Coastal State NDC or R/CDC to IDC

2.3.11.1 Scenario 8 is a Port or Coastal State request from an Administration belonging to one NDC or R/CDC, via the IDE to the IDC, with which the ship is associated.

2.3.11.2 The IDC, IDE and the DDP are required and must be considered as part of the overhead cost.

2.3.11.3 The ASP may (Scenario 3) or may not (Scenario 4) have been paid by the Flag for the transmission of reports from the ship to the IDC, with the report now residing in the IDC.

2.3.11.4 The requestor of the data would be the entity responsible for paying both the direct and indirect (overhead costs) of that data.

2.3.11.5 As per Article 2.5.1.1, an equitable basis for cost distribution is recommended.

2.3.11.6 The three policy options outlined in Article 2.4.1.1 and the related issue of what type of costs might be shared must be considered. As the IDC is involved, unlike Scenario 7, and assuming the Flag itself has not requested the data, then the four minimum position reports per day that have been provided but not requested and therefore not paid for may become part of the overhead cost depending on the final policy decision related to overhead costs.

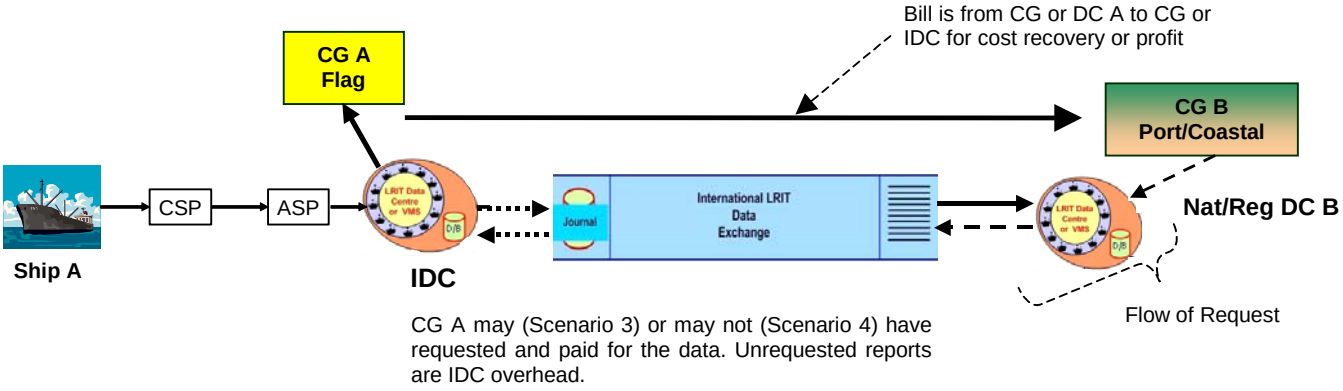
2.3.11.7 As this Scenario uses the IDC, if a policy decision is taken that a different costing algorithm is to be applied based on whether or not the IDC is used (Reference 2.5.4), then the overhead cost in this Scenario would be different to that in Scenario 6.

2.3.11.8 As this Scenario uses the IDC, if a policy decision is taken the costing algorithm is the same regardless of whether or not the IDC is used (Reference 2.5.4), then the overhead cost in this Scenario would be the same as that in Scenario 6.

2.3.11.9 The billing scenario would be as illustrated in Figure 10.

FIGURE 10

BILLING SCENARIO 8 – FLOW OF BILLS



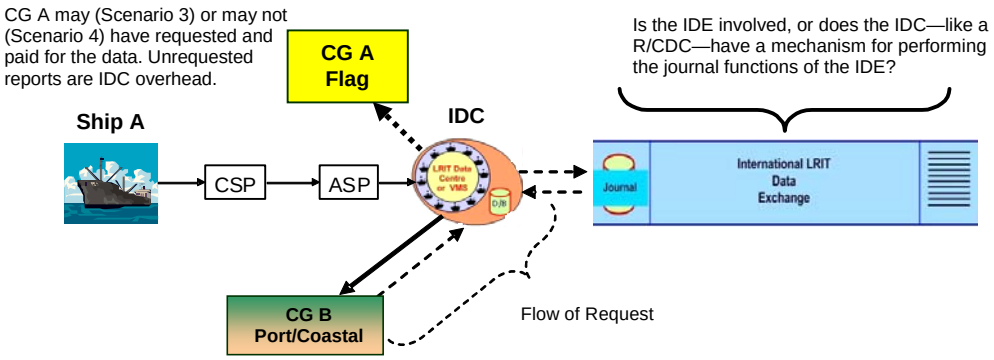
2.3.12 Scenario 9: IDC to IDC

2.3.12.1 Scenario 9 is a Port or Coastal State request from an Administration belonging to the IDC for a ship that is also associated with the IDC.

2.3.12.2 The billing scenario would be as illustrated in Figure 11.

FIGURE 11

BILLING SCENARIO 9 – FLOW OF BILLS



2.3.12.3 The IDC and DDP are required and must be considered as part of the overhead cost.

2.3.12.4 Similar to the internal R/CDC case outlined in Article 2.3.9.6, if the Committee specifies that IDE overhead is to be charged on all these types of messages, then this transaction will also include IDE overhead.

2.3.12.5 The ASP may (Scenario 3) or may not (Scenario 4) have been paid by the Flag for the transmission of reports from the ship to the IDC, with the report now residing in the IDC.

2.3.12.6 The requestor of the data would be the entity responsible for paying both the direct and indirect (overhead costs) of that data.

2.3.12.7 As this Scenario uses the IDC, if a policy decision is taken that a different costing algorithm is to be applied based on whether or not the IDC is used (Reference 2.5.4), then the overhead cost in this Scenario would be different to that in Scenario 6.

2.3.12.8 As this Scenario uses the IDC, if a policy decision is taken the costing algorithm is the same regardless of whether or not the IDC is used (Reference 2.5.4), then the overhead cost in this Scenario would be the same as that in Scenario 6.

2.3.13 Scenario 10: SAR Request

2.3.13.1 SAR requesters do not pay for ship position reports.

2.3.13.2 NDCs would assume costs for requests associated with ships reporting to that DC. If the NDC is a commercial entity, then the associated Administration would be billed.

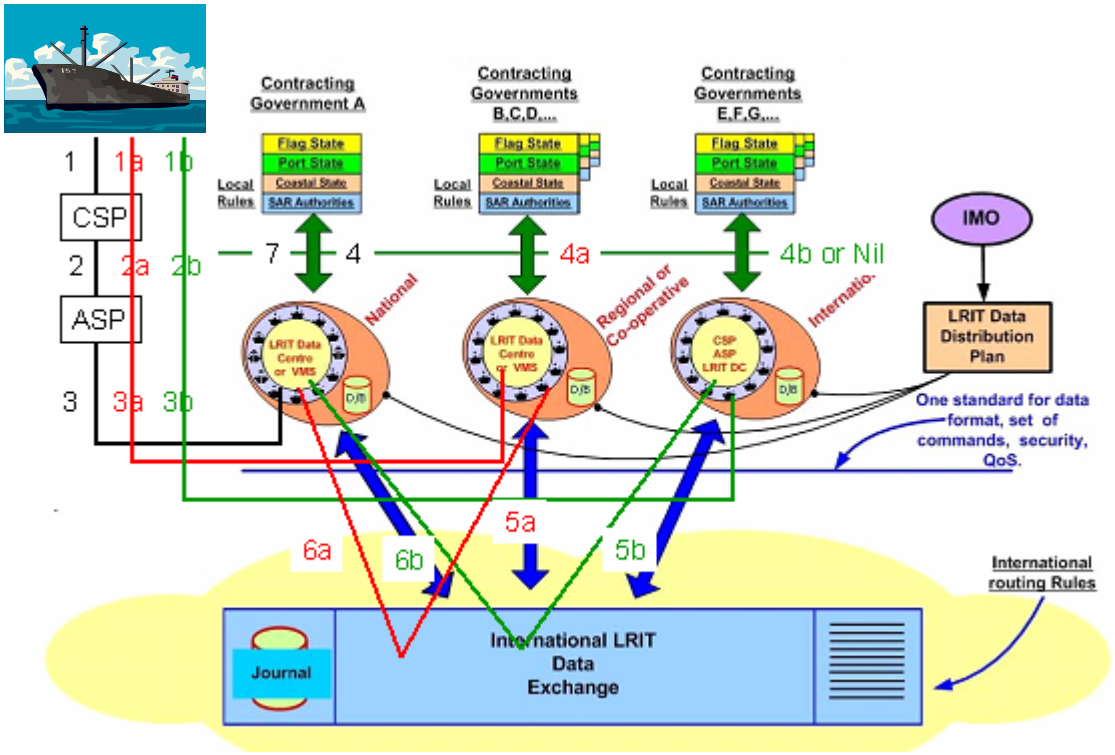
2.3.13.3 R/CDC s would assume costs for requests associated with ships reporting to that DC. If the DC is a commercial entity, then the Administrations associated with that DC would have arrangements with respect to cost distribution amongst participating Administrations.

2.3.13.4 There is no overhead charge for the data that flows through the IDE because the request is related to Search and rescue (Refer 2.5.6).

2.3.13.5 SAR can ask for archived data without charge. There would be no overhead charges because the data (a minimum of four position reports) is already within the LRIT system.

FIGURE 12

BILLING SCENARIO – FLOW OF BILLS



2.4 Data Between DCs

2.4.1 Costing and Billing between DCs

2.4.1.1 Three options are possible for the costing and billing related to the sharing of the minimum four position reports per day between DCs:

.1 No charge for the cost of the position report except the overhead cost of the IDE (implies that the regular position reports are being paid for by the Flag and provided free of charge to requesters, therefore no cost sharing);

.2 The cost could be shared (allowing for cost recovery as recommended in Article 2.2.2.8); or

.3 The source CG (refer Article 2.2.2.8.) or DC (refer Article 2.2.2.10) could make a profit.

2.4.1.2 Further to Article 2.4.1.1, if a CG and/or DC is entitled to recover its costs and/or make a profit, costs can be either:

.1 Position report by report, i.e. if one report is requested by five DCs, then each DC pays 20% of the cost, or

.2 A calculation based on the total volume over a time period:

The time period can be x/hour/day/month/year.

Total number of position reports out of the DC over the time period shares total cost.

2.4.1.3 As noted in Clause 2.2.2.11.2, the more complex the billing algorithm, the less transparent it will be for the entire system. It is therefore recommended that a simple billing algorithm be selected for costs between DCs as well as from the IDC to other DCs and CGs connected to the IDC.

2.4.1.4 To ensure transparency, it is recommended that costing and billing information be published within the IDE.

2.4.1.5 Costs as published in the IDE could be differentiated by the following elements, all of which are currently supported by the technical specifications:

.1 Requestor,

.2 ASP,

.3 CSP,

.4 Message Type (regular, poll, rate change), and

.5 Volume of data requested.

2.4.1.6 While the specifications enable pricing differentiation based on the five elements listed in Article 2.4.1.5, it is recommended that variable pricing based on changeable aspects such as the CSP used for a given communication not be pursued given that:

.1 The majority of the costs associated with running a DC relate to the infrastructure,

.2 Associating costs with all five elements would add considerable complexity and cost differentials,

.3 Variable pricing on a report-by-report basis would require significant administrative overhead and would negatively impact the ability of CGs to accurately predict expenditures for total annual report requests required to meet yearly budgeting processes, and

.4 Fluctuating prices would make it more difficult to determine if a fair pricing scheme was in place.

2.4.1.7 Further to Article 2.4.1.6, it is therefore recommended that the only variable to be used in the differentiation of prices be the Message Type (regular, poll, rate change). This set published price scenario would result in the publication of three prices by every DC. A single price for each message type for all other DCs and CGs is the simplest and most transparent method, easily auditable by the LRIT Co-ordinator. A published price scenario will also facilitate the development of viable business plans by the various entities within the system.

2.4.1.8 Notwithstanding Article 2.4.1.7, given the number of LRIT position reports likely to be exchanged throughout the LRIT system, a set published price scenario should not preclude the option of volume discounts to DCs wishing to offer volume discount prices by means of published discounts in the IDE. Having a published discount rate ensures that the system remains open and transparent, while offering a degree of pricing flexibility to commercial entities wishing to market discounts by volume to encourage requestors within the LRIT system to increase the number of position reports requested. This option should apply to all DCs (NDCs, R/CDCs, and the IDC).

2.4.1.9 As the LRIT system goes into operation there will be numerous unknowns, among them:

.1 Costs of establishing, operating and maintaining a DC, and

.2 Market demand with respect to volume of requests.

2.4.1.10 The unknowns referenced in Article 2.4.1.9 will make it difficult for entities within the LRIT system to:

.1 develop a resulting pricing scheme for report requests that results in a positive business model for entities establishing a DC, and

.2 accurately predict the total annual costs associated with purchasing reports in the absence of an established pricing schema.

2.4.1.11 Given Articles 2.4.1.9 and 2.4.1.10, it is recommended that the regulation of prices be left to market forces. It is understood that published prices may be inconsistent

and change rapidly during the initial set-up phase. It is imperative that policies and standards do not prevent the market from reaching equilibrium. It is recommended that the LRIT Co-ordinator be closely involved at this stage to help all stakeholders with the growing pains associated with establishing the LRIT system. Once the transient start-up period has passed, prices should stabilize and the demands on the LRIT Co-ordinator for this service should lessen.

2.4.1.12 Under the set published price model recommended in Article 2.4.1.7, if a CG (Article 2.2.2.8) and/or DC if it is a commercial entity (Article 2.2.2.10) is allowed to make a profit, then the published price is auditable by the LRIT Co-ordinator.

2.4.1.13 Further to Article 2.4.1.12, if the LRIT Co-ordinator determines that a CG or DC is making an "unfair" profit, then this would be reported to the Committee and the Committee would take appropriate action.

2.4.1.14 This document does not attempt to define the concept of "unfair" profit referenced in Article 2.4.1.13; this must be left to the LRIT Co-ordinator and the Committee to determine. Standard outlier statistical analysis can be used to identify outlying entities.

2.4.1.15 Further to Article 2.4.1.12, if a CG (Article 2.2.2.8) and/or DC (Article 2.2.2.10) is *not* allowed to make a profit, then it is recommended that a profit adjustment be made every fiscal year for that CG. A set published price model as described above would still be used, and by the end of the fiscal year of that CG, the CG would determine how to modify its prices in order to either recoup its loss from the previous year or reimburse its clients in the subsequent year.

2.4.1.16 For simplicity, it is not recommended that rebates or price corrections go back in time for the scenario outlined in Article 2.4.1.15. Rather, the published price should be the price until it is changed. If a CG finds throughout the year that it is either making or losing a significant amount of money, then it should adjust it price accordingly. While more complex algorithms can be used that make use of the volume of data in real time; a complex algorithm will likely lead to further complication rather than resolution of issues. Similar to the scenario described above, the profit / loss of the CG will be audited by the LRIT Co-ordinator and reported to the Committee, thus ensuring openness and transparency of the system.

2.4.1.17 This type of pricing scheme should work well for all types of DCs within the LRIT system. The strong audit and review function of the LRIT Co-ordinator should ensure that fair prices are used throughout the system. The group recommends that the LRIT Co-coordinator's annual report to the Committee address the LRIT pricing and costing issues.

2.4.1.18 The LRIT pricing system should be non-discriminatory; therefore the group recommends that the Committee make the policy decision that all prices should be independent of the requesting CG or DC.

2.5 Overhead Costs

2.5.1 General

2.5.1.1 An equitable basis for cost distribution is recommended.

2.5.1.2 It is recommended that overhead costs should be consistent with the volume of transaction and, as per Article 2.2.2.11, the simplest algorithm should be employed wherever possible.

2.5.2 LRIT Co-ordinator Cost and Billing

2.5.2.1 Guidance recommended to the Committee: The cost of the LRIT Co-ordinator should be apportioned across all elements to which the LRIT Co-ordinator is providing services as per the Performance standard:

.1 all DCs,

.2 the ASP reporting to the IDC, and

.3 the IDE.

2.5.2.2 Guidance recommended to the Committee: The charge should be fair and equitable, and should take into account the level of effort of the LRIT Co-ordinator.

2.5.2.3 The charges should be developed by the LRIT Co-ordinator and advised to the Committee.

2.5.2.4 This document will not address the details of the agreements between the IMO Secretary General acting on behalf of all SOLAS Contracting Governments and IMSO; this is a matter for both organizations to address.

2.5.3 DDP Cost and Billing

2.5.3.1 [The IMO Secretariat is covering the entire cost of the DDP from its annual budget. Therefore there is no separate DDP overhead charge within the LRIT System.]

2.5.3.2 [Since the DDP is used by all CGs and all DCs, its overhead charge should be apportioned throughout the system. The following are several options for determining the overhead charge:

.1 Charge each CG the same amount directly, with the DDP / the IMO Secretariat billing all CGs directly. This may be problematic; it is much easier to bill the DCs.

.2 Charge each DC the same amount. This removes the problem of the IMO Secretariat billing CGs, however, it doesn't take into account the case where there are multiple CGs making use of a single DC.

.3 Charge each DC an amount based on the number of CGs that make use of the DC. This appears to be the fairest option and is recommended by the group.

2.5.3.3 This overhead charge should be less than that of the other international components of the system. Therefore, the group recommends that the simple billing algorithm in 2.5.3.2.3 be employed.]

2.5.4 IDC Cost Allocation

2.5.4.1 There may be both capital and operating and maintenance (O&M) costs associated with operation of the IDC. There may be no capital costs, because existing systems or alternative financial models are being used. This document does not list all possible costs related to operation of the IDC as such a list could be overly prescriptive and/or restrictive. As stated in Article 2.2.2.10, it is assumed that commercial entities within the LRIT system will be entitled to make a profit, which would apply to the IDC if operated by a commercial entity (and if operated by a CG if the recommended policy decision under Article 2.2.2.8. is not taken). These details will be known only once the Committee selects the winning IDC proposal at its next session.

2.5.4.2 The Request for Proposals (RFP) for the IDE and the IDC has been issued by the LRIT Co-ordinator. Within the RFP, bidders are being asked to propose the financial / revenue generating system to be utilized for the international components of the system. Since there are still many unknowns regarding the funding mechanism for the international components of the system, it is imperative that this standard not be overly prescriptive.

2.5.4.3 For the purposes of discussions within this document, it is assumed that the overhead charge is purely an O&M charge and any capital portion has been amortised over the life of the system and included in the O&M cost. The two options for addressing the IDC overhead are as follows:

.1 Option 1: Treat the IDC like all other DCs, with its published prices including all costs including overhead. Doing anything else distorts the market. The IDC should be able to compete on a level playing field with NDCs and R/CDCs. Since the pricing for all DCs will be consistent, CGs will be able to directly compare the costs of operating their NDC or R/CDC with the operation of the IDC.

.2 Option 2: The published prices for the IDC only include the individual position report costs (i.e. the CSP and ASP costs), with the overhead being charged separately. The overhead incorporates the cost of unrequested position reports, the amortized capital cost, and all other costs incurred in operating and maintaining the IDC.

2.5.4.4 Further to Option 2, above, the overhead cost could be allocated as follows:

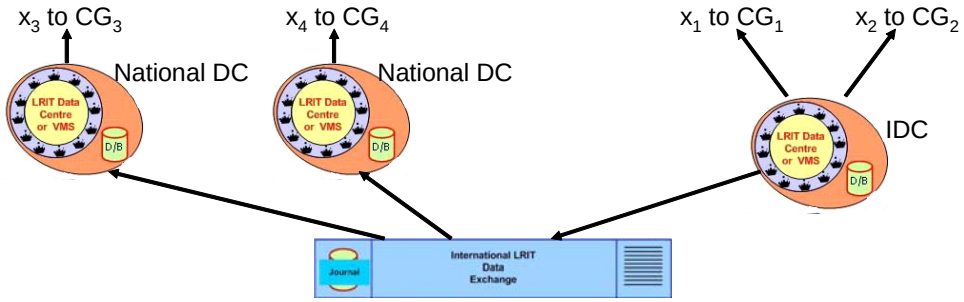
.1 Each NDC and R/CDC pays a percentage of the IDC overhead cost. The cost could be apportioned based on the number of CGs using each DC or the number of ships reporting to each DC. Expecting CGs forming their own DC to directly subsidize the overhead costs of the IDC is not considered to be fair and equitable because those CGs would have already paid a separate capital associated with setting up their own DC. Thus, overhead costs of the IDC should be charged to those CGs making use of the IDC.

.2 The overhead could be apportioned based on the usage volume. All CGs/DCs requesting data would pay a weighted percentage of the overhead, this is equivalent to setting one price for a position report and including the overhead cost in that price. By separating the functions there are now two different bills, which is not as transparent, and it also creates more administrative overhead. Having to calculate a volume percentage after the fact is much more complex than having a single price. This option is therefore more complex, less transparent, and more expensive by definition.

2.5.4.5 Option 1 – the published price option as described in Clause 2.5.4.3.1 – is therefore the recommended option for allocating costs associated with IDC overhead, as it is simpler, fairer and easier to administer.

2.5.4.6 Refer to Figure 13.

FIGURE 13



2.5.5 IDE Charge/Allocation

2.5.5.1 There may be both capital and operating and maintenance (O&M) costs associated with operation of the IDE. There may be no capital costs, because existing systems or alternative financial models are being used. This document does not list all possible costs related to operation of the IDE as such a list could be overly prescriptive and/or restrictive. As stated in Article 2.2.2.10, it is assumed that commercial entities within the LRIT system will be entitled to make a profit, which would apply to the IDE if operated by a commercial entity (and if operated by a CG if the recommended policy decision under Article 2.2.2.8. is not taken). These

details will be known only once the Committee selects the winning IDC proposal at its next session.

2.5.5.2 The LRIT Co-ordinator has just issued the RFP for the IDE and the IDC. Within the RFP, bidders are being asked to propose the financial / revenue generating system to be utilized for the international components of the system. Since there are still many unknowns regarding the funding mechanism for the international components of the system, it is imperative that this document not be overly prescriptive.

2.5.5.3 For the purposes of discussions within this document, it is assumed that:

.1 the overhead charge is purely an O&M charge and any capital portion has been amortised over the life of the system and included in the O&M cost, and

.2 that the cost for the IDE will be significantly less than the IDC (this situation will be clarified once the proposals from LRIT Co-ordinator's RFP have been received by the Committee at MSC 83), and

.3 that using a complicated billing algorithm may cost more than the actual charge for the system.

2.5.5.4 The three options for addressing the IDE overhead are as follows:

.1 Option 1: The overhead cost of the IDE could be shared by each DC within the system based on some variable determined by the Committee, e.g. number of CGs, number of ships,

.2 Option 2: The overhead cost of the IDE for each DC could be based on the volume of data requested through the IDE over the billing period; similar to cell phone and internet billing throughout the world, which is often billed by the second / kilobyte. SAR data that is free of charge should be excluded from the calculation of overhead. This would require processing journal entries and adds complexity and cost.

.3 Option 3: It could be covered from the IMO Secretariat's Budget; however the IMO would not operate the IDE, it would merely cover the cost. It should be noted that there may be an associated legal issue with respect to the budget allocation for the IDE.

2.5.5.5 Given the assumptions in Article 2.5.5.3, Option 1 is the recommended option for allocating overhead costs associated with the IDE, as it is the simplest and least costly method. However; should the IDE costs be much greater; then consideration should be given to Option 2.

2.5.5.6 If Option 2 in Article 2.5.5.4, then whether or not the IDE overhead should apply to transactions that do not use the IDE (i.e. transactions within a NDC or R/CDC) is a policy decision for the Committee. For example:

.1 Should transactions related to Flag data from a NDC be charged IDE overhead? It is recommended that no IDE overhead be charged, since the NDC is not utilizing the IDE for this transaction.

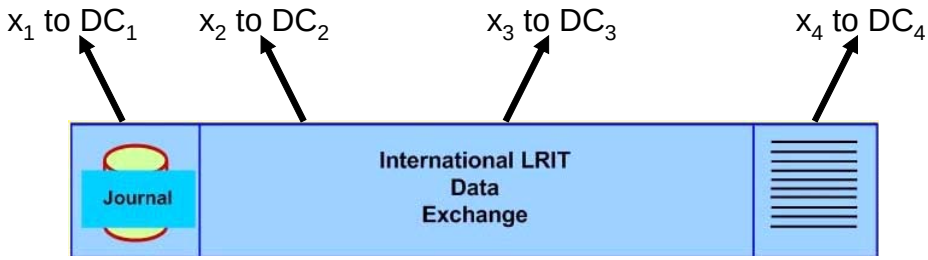
.2 The same reasoning applies for Flag data from a R/CDC and the IDC.

.3 With respect to Port / Coastal data that may be exchanged within a R/CDC, there is no consensus recommendation regarding this scenario. Some representatives felt that the exchange of LRIT information within an R/CDC was equivalent to two NDCs exchanging data, thus IDE overhead should be charged. On the other hand, by exchanging messages within the R/CDC, the IDE was not being used and therefore no overhead should be charged. The R/CDC has already implemented and paid for the internal routing function and if it were to pay for the external routing function as well for those messages, this did not seem like a fair situation.

.4 The same reasoning applied for Port / data being exchanged within the IDC. It is recommended that the IDC be treated just like an R/CDC with respect to this costing policy issue.

.5 The IDE overhead charge should therefore be based on the volume of data to a DC (applying the final policy decisions described above) divided by the total volume of data to all DCs, as in Figure 14, where x_1 to x_4 represent amounts of data to a DC. The resulting Charge for $DC_1 = x_1 / (x_1+x_2+x_3+x_4)$*IDE Overhead

FIGURE 14



2.5.5.7 The IDE bills should follow standard commercial practise for issuance of bills. The IDE should bill each DC at the same intervals as the other components within the system (Refer Article 2.7.1.6). Each DC would follow its specific paying scenario described above for the payment of the IDE overhead.

2.5.6 SAR Overhead Costs

2.5.6.1 The Committee has already made the policy decision that SAR services shall be entitled to receive, free of any charges, LRIT information. The Group assumed that this applied to all SAR requests: regular position report, poll, and rate change. This policy requires Committee confirmation.

2.5.6.2 Assuming that all SAR reports regardless of their type are free to SAR, the question remains as to how should they be treated within the system.

2.5.6.3 Concerning any overhead being charged by the DDP, IDC, or IDE there should be no overhead charged for any SAR related report. This addresses all of the indirect charges.

2.5.6.4 With respect to direct charges (i.e. CSP, ASP and DC costs for processing SAR related messages), the following are some potential options:

.1 SAR overhead costs could be shared by each DC within the system based on some variable determined by the Committee, e.g. number of CGs, number of ships. This would be administratively intensive, and would require a complex billing mechanism, which is not recommended.

.2 Include the SAR direct costs within the one pricing strategy for each DC. DCs would have to treat SAR overhead like all of the other internal overheads for the DC. This is the simplest and most straightforward method of handling SAR overhead. In this case, the DCs with the largest number of ships would have the highest overhead due to SAR, while at the same time having the largest customer base and resultant potential for cost recovery. This is the recommended option.

2.5.6.5 As stated in other sections of this document there are a large number of unknowns surrounding the costs within the LRIT system. It is assumed that the SAR overhead costs will be a second or third order affect on the overall financial viability of the system. That being said, they will still be audited by the LRIT Co-ordinator, and if this assumption turns out not to be valid then the overall structure can be modified by the Committee. Similarly if the audit determines that only a few DCs are paying

for the SAR overhead, then the Committee can revisit the overhead allocation algorithm for SAR.

2.5.6.6 The Group recommends that the Committee request COMSAR to develop procedures for the use of LRIT for Search and rescue operations.

2.6 Costing and Billing Framework related to additional polled requests

2.6.1 Initial Payment

2.6.1.1 The entities that paid for the provision of the regular minimum four position reports each day would also initially pay the full cost for this polled position report / increased rate position report. This applies to all of the scenarios that have been presented.

2.6.1.2 The billing scenario for the flow of data from the ship to its associated DC would be as follows:

.1 The ship pays no money, and receives no bill,

.2 The CSP bills the ASP (if a separate entity), or the DC (refer Article 2.3.2.11),

.3 The ASP bills the DC, and

.4 The DC (if a separate entity), would either bill the Flag CG, follow the internal arrangements between all CGs associated with that R/CDC, pay the bill itself and wait to recover its costs by means of the billing mechanism established for costing and billing between DCs as referenced in Section 2.4.

2.6.1.3 The initial bills from the CSP and ASP have been paid and the DC's bill may or may not have been paid depending on the specifics of that DC.

2.6.2 Between DC Charges

2.6.2.1 This data would then be treated just like all other between DC charges, as described in the previous section. The price for the polling action or for the rate change would be published within the IDE and the requesting DC would pay the charge according to the commercially agreed billing interval.

2.6.3 SAR Poll Requests

2.6.3.1 As stated in Article 2.5.6.1, the Committee must first clarify the free access rights for SAR.

2.6.3.2 Since the Communications Message Protocol contains a SAR poll request parameter, the technical specifications can support either policy decision from the Committee.

2.7 Centralized versus decentralized billing options/scenarios

2.7.1 Billing Options

2.7.1.1 It is imperative that the billing scenario respects standard accounting practises and procedures.

2.7.1.2 As described in the Performance standard, the LRIT Co-ordinator can be called upon to help resolve any billing disputes that may occur within the system.

2.7.1.3 There is currently no commercial relationship between DCs. Depending on the various policy decisions made by the Committee, there may be signed agreements between various entities within the overall LRIT system.

2.7.1.4 Billing/invoicing between DCs can be either centralized or distributed. The following are the potential options:

.1 Option 1: Each DC could produce its own bills at some common frequency. The LRIT Co-ordinator would audit all of the bills during the audit process. This would require each DC to have a billing / invoicing function. Since the journal is maintained by the IDE, each DC could ask the IDE for its portion of the journal so that it can generate its bill. As highlighted in Article 2.2.2.1, sub-contractors may be utilized for various functions as required. Thus DCs can sub-contract their billing functions to a commercial entity that specializes in billing and invoicing. This is simple and fully respects all of the accounting rules.

.2 Option 2: Since the IDE already has all the journals, it could produce each of the bills. Each DC would receive "x" bills from the IDE one for each DC to which it owes, This would require the IDE to either implement an internal billing function, or sub-contract with a billing entity. Although the IDE generated the bills, the DCs would pay each other bypassing the IDE. This option adds another function to the IDE and it must be verified if it complies with standard accounting rules.

.3 Option 3: A single consolidated bill could be generated by the IDE for each DC. The IDE would then be acting as the LRIT clearing house, issuing all of the bills, receiving the funds and issuing funds according to the billing schedule. This option adds additional functions to the IDE and also could add potential financial risk and liability to the entity since it is receiving and issuing funds. Billing / accounting rules must be respected. There may be an overhead cost for the billing entity. Financial liability must be quantified.

.4 Option 4: The LRIT Co-ordinator could issue the bills following Option 2 or 3 above. This, however, could adversely impact the impartiality of the LRTI Co-ordinator, since the LRIT Co-ordinator audits the various components of the LRIT system and may be called upon to mediate billing disputes. In order to maintain its impartiality, the LRIT Co-ordinator should therefore never directly issue any bills, with the exception of bills related to reimbursement of costs associated with the LRIT Co-ordinator.

2.7.1.5 Agreements on billing and costing between / among DCs regarding invoicing processes shall take precedence over the following default process. These agreements should be included within the audit process of the Co-ordinator.

2.7.1.6 Without agreements on Billing and Costing the following process should be employed. This process should be included within the audit process of the Co-ordinator

.1 Billed after the fact (in arrears).

.2 Billed within 30 days of the initial charge.

2.7.2 Technical Considerations due to the billing options

2.7.2.1 If a DC wanted the journal of all its transactions, then that would be sent offline rather than via the network.

2.8 Archiving of Data and Associated Costing and Billing

2.8.1 General

2.8.1.1 The data archiving function has been mandated within the Performance standards, however, the access rights to the data have not been fully discussed. Except for SAR all of the discussions to date have centred around the current (within 6 hours) position reports. For SAR applications the data for the past x reports may be required. Since the access to older data has not been discussed, the Committee needs to make a policy decision related to the access rights for archived data.

2.8.1.2 The Committee could decide to mirror the current (within 6 hours) data access rights. This would have the following implications for the following four cases:

.1 Flag State Access – No Issues

.2 Coast State Access – The receiving DC could either apply the DDP polygon that existed at the time of the position reports, or it could apply the current version of the DDP.

.3 Port State Access – The receiving DC could either assume that the requesting CG received a NOA, or the receiving DC could verify via the archived data itself that the ship indeed went to a port within the requesting CG.

.4 SAR Access – No Issues.

2.8.1.3 As described above for the costs between DC, the cost for archived data should also be published within the IDE so that all CGs know the cost of the data before requesting it. There could be a separate field for archived data prices or to make it simpler, the archived data should be the same price as the real time data. It is left to each DC to decide the costing scheme for archived data.

2.8.1.4 The other technical specifications will have to be modified to reflect the final policy decision of the Committee regarding the access rights to the archived data.

2.9 Upfront Payments

2.9.1 Overview

2.9.1.1 Whether there is any need for a portion of the LRIT Co-ordinator, IDC, or IDE costs to be paid up front by each DC, will depend on the submission by the LRIT Co-ordinator and the proposals chosen by the Committee for the IDC and the IDE. As was stated earlier CGs often can only pay after a service has been completed or product has been delivered, thus paying 100% up front may be problematic for the CGs. A combination of an upfront yearly fee combined with variable in-year fees may be a viable hybrid solution. This issue will have to be discussed in more detail once the documents have been submitted to the Committee.

2.9.1.2 It is assumed that costs would be apportioned both as up-front charges and as pay-for-use payments. There are different billing implications for each. Technically some entity has to pay; it comes down to whether that payment is in advance or in arrears.

2.9.1.3 There are no technical issues related to advance payments for overhead of the LRIT Co-ordinator.

2.10 Non payment

2.10.1 Overview

2.10.1.1 The issue of non payment is a policy issue that must be addressed by the Committee to ensure a sustainable LRIT system. Procedures and functions related to non payment are currently not addressed within the Performance standard. A situation in which LRIT Data Users are requesting and receiving but not paying for data places an undue burden on the entity providing the data, as well as on the sustainability of the system as a whole, and thus cannot reasonably be expected to continue unabated. The *Ad Hoc* Working Group supports the efforts of the LRIT Co-ordinator to develop a proposal that effectively addresses this issue.

2.10.1.2 If the Committee decides to add a barring function into the IDE, the IDE technical specifications can be modified to bar requests from DCs for non-payment on direction from the LRIT Co-ordinator. SAR requests will always go through and data requests to the barred DC will always go through. The *Ad Hoc* Working Group supports the efforts of the LRIT Co-ordinator to develop a proposal that effectively addresses this issue.

2.11 DC Backup systems

2.11.1 General

2.11.1.1 The issue of backup systems to ensure integrity of the LRIT system were raised and as there are associated costing and billing implications, the Group explored the issue and provides the following input.

2.11.1.2 The Group recommends that the Committee forward the following guidance related to DC backups to all CGs.

2.11.1.3 All CGs operating a DC should have a disaster recovery plan for the CSP(s), ASP(s), and DC being utilized. CGs are encouraged to review the IDC specification, which could serve as a model for their DC.

2.11.1.4 In addition to employing equipment and site redundancy for their DC, a CG could also make arrangements within another CG's DC to serve as its backup. This would be a bilateral / multilateral agreement between the CGs involved with the two DCs.

2.11.1.5 Although the IDC was never envisioned to be a backup for other DCs, the Committee could decide to formally give that IDC that function. If this policy decision were made, then there would be a number of technical and policy issues that would have to be addressed:

.1 What happens to the archived data?

.2 What happens if the ASP connecting to the original DC is not able to connect with the IDC?

.3 Depending on the number of ships reporting to the original DC, what happens if the IDC does not have sufficient capacity to accommodate all of the new ships?

.4 How should the costs be handled, since this may only be an interim solution as the original DC is being repaired? Should the CG(s) now connecting with the IDC be treated like all of the other CGs connecting to the IDC?

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ANNEX 5

Draft Protocols for the Development Testing of the LRIT System and for Testing the Integration of New LRIT Data Centres into the System

Prepared by: *Ad Hoc* Working Group on Engineering Aspects of LRIT
Date of issue of this Draft: July 3, 2007

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DRAFT PROTOCOLS FOR THE DEVELOPMENT TESTING OF THE LRIT SYSTEM AND FOR TESTING THE INTEGRATION NEW LRIT DATA CENTRES IN THE SYSTEM

1 General Provisions

1.1 Scope and Background

1.1.1 Scope

1.1.1.1 The intent of this document is to provide draft protocols for the development testing of the international Long-Range Identification and Tracking (LRIT) system and for testing the integration of new LRIT Data Centres into the system.

1.1.1.2 This document has been prepared by the *Ad Hoc* Working Group on Engineering Aspects of Long-Range Identification and Tracking of Ships.

1.1.1.3 In preparing the document, the *Ad Hoc* Working Group has taken into account the provisions of SOLAS regulation V/19-1 and resolution MSC.210(81), "Performance Standards and Functional Requirements for the Long Range Identification and Tracking of Ships."

1.1.1.4 The document describes the testing protocol to ensure the successful implementation of the International LRIT system and the sustainability of the system.

1.1.1.5 Detailed tests shall be identified in the relevant developmental contract and in consultation with the LRIT Co-ordinator.

1.1.2 Background

1.1.2.1 The Maritime Safety Committee, at its eighty-first session in May 2006, adopted amendments to chapter V of the SOLAS convention in relation of LRIT. These amendments will enter into force on 1 January 2008 provided that acceptance criteria have been fulfilled by 1 July 2007.

1.1.2.2 The LRIT system provides for the global identification and tracking of ships.

1.1.2.3 In operating the LRIT system, recognition shall be given to international conventions, agreements, rules or standards that provide for the protection of navigational information.

1.1.2.4 The draft Protocols for the Development Testing of the LRIT System and for Testing the Integration into the System of New LRIT Data Centres for the international LRIT System as outlined in this document shall be established and recognized by the Committee.

1.2 General Description of the System and Definitions

1.2.1 LRIT System Description

1.2.1.1 As described in resolution MSC.210(81), sub-section 1.2, the LRIT system consists of the following components:

.1 shipborne LRIT information transmitting equipment;
.2 Communication Service Provider(s);
.3 Application Service Provider(s);
.4 LRIT Data Centre(s), including any related Vessel Monitoring System(s);
.5 LRIT Data Distribution Plan;
.6 International LRIT Data Exchange; and
.7 LRIT Data Users.

1.2.1.2 As described in resolution MSC.210(81), sub-section 1.2, certain aspects of the performance of the LRIT system are reviewed or audited by an LRIT Co-ordinator acting on behalf of all Contracting Governments.

1.2.2 LRIT System Operation

1.2.2.1 Articles 1.2.2.1 to 1.2.2.11 provide a high-level overview of the LRIT system architecture. The LRIT system Performance standards, resolution MSC.210(81), provide further details on the functions associated with each component of the system.

1.2.2.2 Tracking of any applicable ship begins with LRIT positional data being transmitted from the shipborne equipment. The LRIT information transmitted includes the ship's GNSS position (based on the WGS84 datum), time and identification, as described in resolution MSC.210(81), Table 1.

1.2.2.3 The Communication Service Provider (CSP) provides the communication infrastructure and services that are necessary for establishing a communication path between the ship and the Application Service Provider (ASP). The LRIT information transmitted from the ship will travel across the communication path set up by the CSP to the ASP.

1.2.2.4 The ASP, after receiving the LRIT information from the ship, will add additional information to the LRIT message and pass along the expanded message to its associated LRIT Data Centre. Functionality required for the programming and communicating of commands to the shipborne equipment is provided by the ASP.

1.2.2.5 The LRIT data, along with all the parameters added by the various LRIT components, is described in the messaging section of the "Draft Technical Specifications for Communication within the LRIT System."

1.2.2.6 LRIT Data Centres will store all incoming LRIT information from ships instructed by their Administrations to transmit LRIT information to that Data Centre. LRIT Data Centres will disseminate LRIT information to LRIT Data Users according to the Data Distribution Plan (DDP).

1.2.2.7 The LRIT DDP will contain the information required by the Data Centres for determining how LRIT information will be distributed to the various Contracting Governments. The DDP will contain information such as Standing Orders from Contracting Governments and geographical polygons relating to Contracting Governments' coastal waters and ports and port facilities.

1.2.2.8 The Data Centres will process all LRIT messages to and from the International LRIT Data Exchange (IDE). The IDE will process all LRIT messages between LRIT Data Centres. The IDE will route the message to the appropriate Data Centre based upon the information contained within the DDP. The IDE will neither process nor store the positional data contained within LRIT messages.

1.2.2.9 LRIT Data Users may be entitled to receive or request LRIT information in their capacity as a Flag State, Port State, Coastal State or Search and Rescue (SAR) service.

1.2.2.10 The LRIT Co-ordinator assists in the establishment of the international components of the LRIT system, performs administrative functions, and reviews and audits certain components of the LRIT system.

1.2.2.11 Figure 1 provides an illustration of the LRIT system architecture. The various components and interfaces shall be tested as follows:

.1 functionality of the IDE and all its interfaces;

.2 functionality of the IDC and all its interfaces;

.3 functionality of the DDP and all its interfaces;

.4 interface to all National Data Centres (NDCs) and Regional Co-operative Data Centres (R/CDCs); and

.5 End-to-end testing of system (as indicated in Figure 2)

FIGURE 1

TYPICAL LRIT SYSTEM ARCHITECTURE

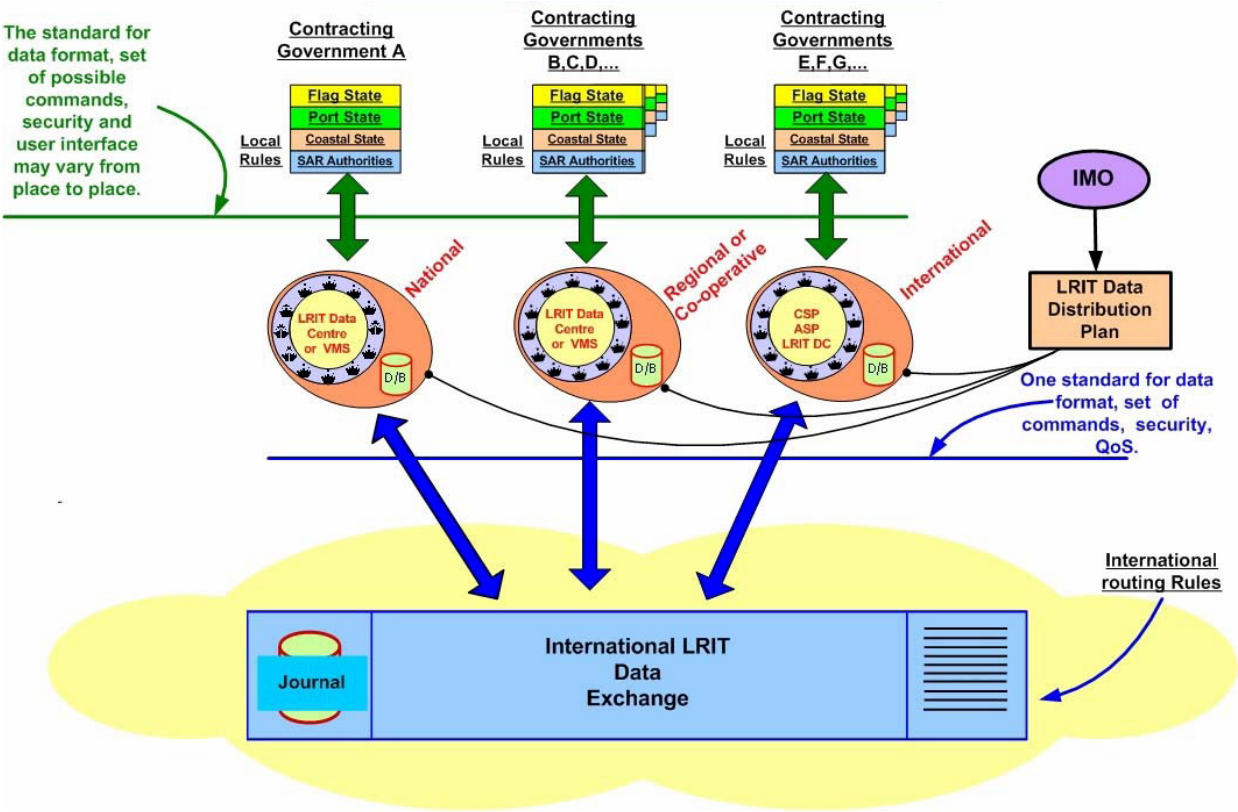
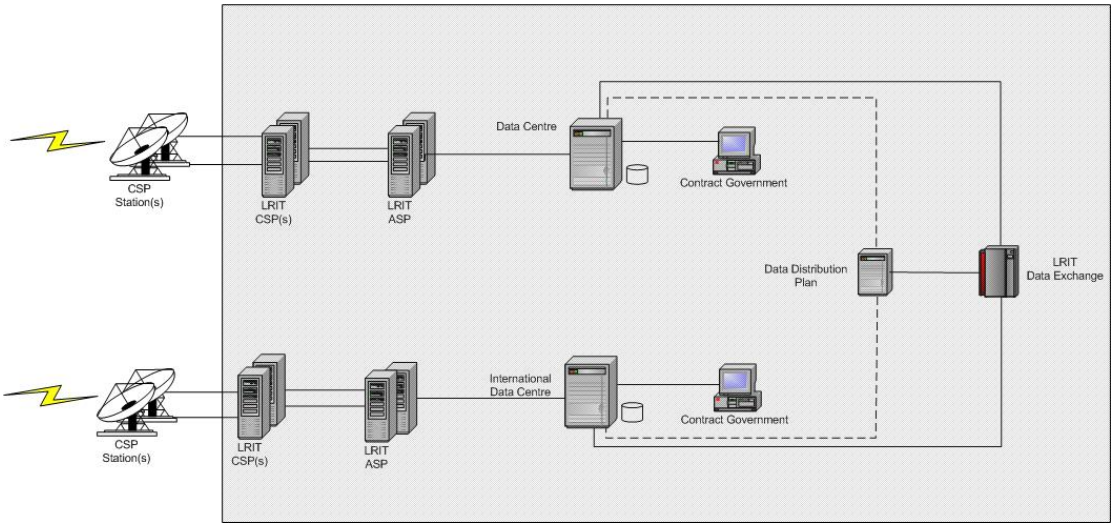


FIGURE 2

ELEMENTS OF LRIT SYSTEM INCLUDED IN THIS TESTING PROTOCOL DOCUMENT



1.2.3 Definitions

1.2.3.1 Unless expressly provided otherwise:

.1 *Convention* means the International Convention for the Safety of Life at Sea, 1974, as amended.

.2 *Regulation* means a regulation of the Convention.

.3 *Chapter* means a chapter of the Convention.

.4 *LRIT Data User* means a Contracting Government or a Search and rescue service that opts to receive the LRIT information it is entitled to.

.5 *Committee* means the Maritime Safety Committee.

.6 *High-speed craft* means a craft as defined in regulation X/1.3.

.7 *Mobile offshore drilling unit* means a mobile offshore drilling unit as defined in regulation XI-2/1.1.5.

.8 *Organization* means the International Maritime Organization.

.9 *Vessel Monitoring System* means a system established by a Contracting Government or a group of Contracting Governments to monitor the movements of the ships entitled to fly its or their flag. A Vessel Monitoring System may also collect from the ships information specified by the Contracting Government(s) that has established it.

.10 *LRIT information* means the information specified in SOLAS regulation V/19-1.5.

.11 *IDC operator* means the individual responsible for the daily operation and maintenance of the International LRIT Data Centre.

.12 *International Routing Rules* means a list of all data centres with their associated IP addresses as identified in the DDP.

.13 *Ship*, when used in the present Performance standards and functional requirements for long-range identification and tracking of ships, includes mobile offshore drilling units and high-speed craft as specified in SOLAS regulation V/19-1.4.1 and means a ship that is required to transmit LRIT information.

1.2.3.2 Terms not otherwise defined shall have the same meaning as the meaning attributed to them in the Convention.

1.2.4 Acronyms Used Within This Document

1.2.4.1 The acronyms that appear within this document shall have the meanings assigned to them in this article:

.1	ASP	Application Service Provider
.2	BIST	Built In Self Test
.3	CSP	Communication Service Provider
.4	DC	LRIT Data Centre
.5	DDP	LRIT Data Distribution Plan
.6	FAT	Factory Acceptance Test
.7	IDC	International LRIT Data Centre
.8	IDE	International LRIT Data Exchange
.9	NDC	National LRIT Data Centre
.10	R/CDC	Regional/Co-operative LRIT Data Centre
.11	SAR	Search and rescue
.12	SOLAS	International Convention for the Safety of Life at Sea
.13	VMS	Vessel Monitoring System

2 Testing Protocol

2.1 General

2.1.1 The testing protocol for the international LRIT system is critical to ensure a successful system. In order for the LRIT system to be commissioned and operating as per IMO Performance standards there are three distinctive phases to the testing, namely:

.1 development testing, which occurs prior to the International LRIT system being commissioned (Part 3);

.2 commissioning testing (Part 4); and

.3 integration and modification testing, which occurs when components of the International LRIT system are added or modified (Part 5).

2.1.2 Once the system has been commissioned, diagnostic in-service test tools shall also be available to the administrators of the IDC and the IDE.

2.1.3 As problems are identified in the testing process, it will be imperative to determine if the cause is due to the implementation of the Performance standard or relevant Technical Specifications. If it is identified that the Performance standard or Technical Specifications are in need of correction, the requirement for amendment, and the proposed changes, shall be brought to the attention of the IMO as per the procedure outlined in Part 6.

2.1.4 The basic integrity and data communication aspects of the LRIT system shall be tested from a security perspective. The system's ability to prevent an external entity from tampering with the system or stealing data shall be exercised.

2.1.5 The LRIT Co-ordinator should participate in the developmental and in-service testing of the international LRIT system.

2.1.6 The LRIT Co-ordinator should provide overall co-ordination of the testing and submit its recommendations in this respect for consideration by the Committee.

2.1.7 The testing of the LRIT system shall validate the elements of the system in sequence, commencing once the IDE and DDP are developed. Testing should commence not later than 1 July 2008 (MSC.211(81) refers).

2.1.8 Testing shall validate the functionality of the IDE and DDP prior to the integration and testing of Data Centres.

2.1.9 Testing of Data Centres shall be carried out sequentially to validate the integration of each Data Centre into the LRIT system. The LRIT Co-ordinator should participate in the testing and provide relevant information to the Committee.

2.2 User Test Cases

2.2.1 User test cases shall be developed from the Performance standards. A user test case defines a goal-oriented set of interactions between the elements of the system. The elements in the LRIT system are the parties that interact with the system and may include Contracting Governments, Data Centres, the LRIT Co-ordinator or the DDP provider.

2.2.2 The user test cases shall support the following objectives:

.1 Identify the functional and non-functional requirements as targets for testing;

.2 Recommend and describe the testing strategies to be employed;

.3 Identify the required resources;

.4 Recommend and describe the test organization; and

.5 Provide an approach to test and bug reporting.

2.2.3 Each section from the Performance standards shall have a corresponding test that confirms the functionality. The details of the tests shall cover each element identified in the respective technical specifications:

.1 "Draft Technical Specifications for Communication in the LRIT System."

.2 "Draft Technical Specifications for the International LRIT Data Exchange."

.3 "Draft Technical Specifications for the International LRIT Data Centre."

.4 "Draft Technical Specifications for the Data Distribution Plan."

.5 "Draft Technical Specifications for Costing and Billing."

2.2.4 The draft technical specifications have been developed to respond to the Performance standards (resolution MSC.210(81)).

2.2.5 Although the IDC specification only applies to the IDC, it should also be used as an aid in developing the test cases for all of the other Data Centres.

2.2.6 At the highest level of user cases:

.1 All functional tests shall be included and repeated several times to document consistency under various conditions. This shall include all operator and user commands, changes, requests, actions and the change of transceiver status, various transceiver modes (e.g. change of flag, commissioning, de-commissioning, transceivers in use for other accepted services if any);

.2 Multiple Data Centres shall be used in order for LRIT messages to be passed from a Data Centre to the IDE to a Data Centre;

.3 Each type of LRIT Data User shall be tested, i.e. Flag State, Port State, Coastal State, and SAR service;

.4 For each LRIT Data User, LRIT information shall be provided using a request message as well as using Standing Orders;

.5 Polling and rate change commands shall be tested for each combination of LRIT Data Users and types of requests (i.e. requests and standing orders);

.6 Both real time and archive queries from the Data Centres shall be used;

.7 Several possible error situations and erroneous messages shall be simulated to verify error handling and that users can only receive the information they are authorized to receive; and

.8 In addition to testing the normal range of values and commands, invalid commands shall be used to ensure that all functionality is being correctly performed.

3 Initial Developmental Testing

3.1 General

3.1.1 Overview

3.1.1.1 Initial developmental testing protocol is defined for the international aspects of the LRIT System:

.1 IDE (Section 3.2 refers);

.2 IDC (Section 3.3 refers); and

.3 DDP (Section 3.4 refers).

3.2 International LRIT Data Exchange Development Testing

3.2.1 General

3.2.1.1 A number of Administrations already have Vessel Monitoring Systems (VMS), which they have indicated may become either NDCs or R/CDCs. Since these systems are already in place, the assumption is made that once the international components of the International LRIT system have been developed, there will likely be several NDCs and/or R/CDCs available for testing purposes.

3.2.1.2 The developmental contract for the IDE shall contain developmental testing. The developer shall propose testing parameters and shall be responsible to deliver an IDE that meets the requirements of the Performance standards. Prior to the commencement of testing of the IDE, the LRIT Co-ordinator shall approve the testing parameters.

3.2.1.3 Developmental testing of the IDE shall include three stages:

.1 laboratory testing using a Data Centre simulator;

.2 off-line testing using a parallel data feed from voluntary Data Centres; and

.3 operational testing using the volunteer Data Centres.

3.2.1.4 Testing shall be carried out sequentially. Each test shall be accepted prior to moving to the next test. (i.e. Prior to off-line testing, the IDE shall satisfactorily complete the laboratory testing; Prior to operational testing, the system shall prove the ability to integrate parallel data feeds from volunteer Data Centres.)

3.2.2 Laboratory Testing Using a Data Centre Simulator

3.2.2.1 The user test cases described in Subsection 2.1.9 shall be carried out using the Data Centre simulator. Since both the Data Centre simulator and the IDE are being developed by the same entity, the developer shall provide evidence that there are no common mode errors.

3.2.2.2 The developer shall propose a set of tests to verify the functionality and performance of the system. The tests and test plans shall include, as a minimum, the following:

.1 data storage facility/databases shall be populated with data equal to at least one full year of records (i.e. 50,000 vessels at 4 reports per day for 365 days);

.2 data Centre simulator shall generate LRIT reports at both normal and worst-case levels during the tests; and

.3 user accounts (with secure access) shall be defined and used during the test periods. The number of user accounts shall include at least 10 each of Flag States, Coastal States, Port States and SAR services.

3.2.2.3 During the tests a representative DDP shall be developed. The DDP shall also be modified during the tests to represent all user case applications as indicated in the Performance specifications.

3.2.2.4 The developer's tests shall be grouped as follows:

.1 software module tests (i.e. development tests);

.2 system tests;

.3 factory acceptance tests (FAT); and

.4 in-service verification tests, to be performed in the subsequent testing phases.

3.2.2.5 All tests and test plans shall be approved by the LRIT Co-ordinator.

3.2.2.6 All test results shall be fully documented in a requirements traceability matrix with printouts and/or electronic data files, including all relevant results and status information.

3.2.3 Parallel Operational Test

3.2.3.1 The parallel operational test assumes that Administrations have volunteered to make their NDCs and/or R /CDCs available for the developmental testing of the LRIT system. Administrations shall ensure their system complies with the "Draft Technical Specifications for Communication in the LRIT System."

3.2.3.2 While the IDE is under development, a parallel feed from the voluntary Data Centres shall be provided to the IDE. This will ensure that existing Data Centres will continue to operate normally throughout the testing of the IDE.

3.2.3.3 During the Parallel Operational Tests, the user test cases described in Subsection 2.1.9 shall be carried out.

3.2.3.4 If the DDP is not available for these tests, the developer shall ensure that each volunteer Data Centre provides the Standing Orders that will be used by that Data Centre to output LRIT information to other Data Centres. The developer shall enter these Standing Orders manually.

3.2.3.5 The Data Centre Simulator may be used to simulate user test cases (Subsection 3.2.2 refers).

3.2.3.6 Bi-directional communications shall be employed to the greatest extent possible to verify the communications protocols and the functional performance of the IDE, as well as the volunteer Data Centres.

3.2.4 Operational Testing

3.2.4.1 Interface issues shall be resolved through the parallel operational test prior to commencing operational testing.

3.2.4.2 During operational testing all of the system components shall operate according to the relevant Performance standards and the Technical Specifications. To ensure a full test of the system, the volunteer Data Centres shall be required load test the system by making requests as described in Subsection 2.1.9.

3.2.4.3 If the DDP web server is not available for these tests, each of the volunteer Data Centres shall mimic the distribution mechanisms to ensure that all of the information from the DDP is available to the Data Centres.

3.2.4.4 The performance of the volunteer Data Centres to its users is outside the scope of this test protocol.

3.2.4.5 Once the three testing phases have been successfully completed, the system shall be deemed ready to accept new Data Centres. Each new Data Centre shall be added according to the Integration Test Process described in Part 4.

3.3 International LRIT Data Centre Development Testing

3.3.1 General

3.3.1.1 The developmental contract for the IDC shall contain developmental testing. The developer shall propose testing parameters and shall be responsible to deliver an IDC that meets the requirements of the Performance standards and technical specifications. The LRIT Co-ordinator shall approve the testing parameters for the IDE prior to commencement of testing.

3.3.1.2 The developer shall propose a set of tests to verify the functionality and performance of the system. User test cases described in Subsection 2.1.9 shall be covered. The tests and test plans shall, as a minimum, include the following:

.1 An IDE simulator or a copy of the operational IDE. The simulator shall generate realistic LRIT reports at a realistic traffic level during the tests.

.2 Data Centre simulations to replicate the operational system.

.3 Data storage facility/databases, populated with representative data equal to at least one full year of records through the IDC.

.4 The simulator shall generate LRIT reports at a representative traffic level during the tests.

.5 User accounts (with secure access), which shall be defined and used during the test periods. The number of user accounts shall include at least 10 each of Flag States, Coastal States, Port States and SAR services.

3.3.1.3 During the tests a representative DDP shall be developed. The DDP shall also be modified during the tests to represent all user case applications as indicated in the Performance specifications.

3.3.1.4 The developer's tests shall be grouped as follows:

.1 Software Module Tests (i.e. development tests);

.2 System Tests;

.3 Factory Acceptance Tests (FAT); and

.4 In-service Verification Tests.

3.3.1.5 Each software module shall be tested to prove proper operation and consistency under various conditions.

3.3.1.6 System tests shall include the full set of tests applicable for the complete system.

3.3.1.7 Factory acceptance tests shall include sub-sets of the system tests.

3.3.1.8 In-service verification tests shall only occur after the successful completion of the factory acceptance tests and shall cover the integration of the International LRIT Data Centre into the LRIT system.

3.3.1.9 As a minimum, the following test cases shall be conducted:

.1 Flag State request for LRIT information;

.2 Port State Request for LRIT information with Port Parameters and referring to a Standing Order;

.3 Coastal State request for LRIT information;

.4 SAR service request for LRIT information.

3.3.1.10 All tests and test plans shall be accepted by the LRIT Co-ordinator.

3.3.1.11 All test results shall be properly documented with printouts and/or electronic data files including all relevant results and status information.

3.4 Data Distribution Plan Development Testing

3.4.1 General

3.4.1.1 The DDP will be developed in-house by IMO, to standards established by the IMO Secretariat. The IMO Secretariat accepts full responsibility for the delivery of the DDP to the required operational capability within the required time scale. Only the interfaces between the DDP and the other elements of the LRIT system shall be tested. The IMO Secretariat shall propose the testing parameters and the LRIT Co-ordinator shall approve the testing document. The IMO Secretariat shall develop and deliver a DDP that meets the Performance standards and the draft "Guidance on Setting up and Maintaining the LRIT Data Distribution Plan."

3.4.1.2 All of the interfaces with the DDP shall be tested, including interfaces to:

.1 Contracting Governments via a secure web interface;

.2 The IDC and all other Data Centres, using the communications protocol defined within the "Draft Technical Specifications for Communication in the LRIT System"; and

.3 The IDE, using the communications protocol defined within the "Draft Technical Specifications for Communication in the LRIT System."

3.4.1.3 The IMO Secretariat shall propose a set of tests to verify the functionality and performance of the DDP within the International LRIT system. The tests and test plans shall include the following as a minimum:

.1 all possible functional tests shall be included and repeated several times to document consistency under various conditions, including at least all possible operator and user commands, changes, and requests;

.2 the data storage facility shall be populated with realistic data;

.3 a sufficient number of user accounts (with secure access) shall be defined and used during the test periods; and

.4 several possible error situations and erroneous messages shall be simulated to verify error handling.

3.4.1.4 Similar to the previous tests on the international components of the system the IMO Secretariat's tests shall be grouped as follows:

.1 Software Module Tests (i.e. development tests) – Each software module shall be sufficiently tested to prove proper operation and consistency under various conditions.

.2 System Tests – The system tests shall include the full set of tests applicable for the complete system.

.3 Factory Acceptance Tests – The factory acceptance tests shall include sub-sets of the system tests.

.4 In-service Verification Tests – The in-service verification tests will only occur after the successful completion of the factory acceptance tests and shall cover the integration of the DDP into the LRIT System.

3.4.1.5 All tests and test plans are to be accepted by the IMO Secretariat.

3.4.1.6 All test results shall be properly documented with printouts and/or electronic data files including all relevant results and status information.

4 Commissioning Test Process

4.1 General

4.1.1 Overview

4.1.1.1 The commissioning test process occurs to provide end-to-end testing of all elements within the LRIT system. This test shall be carried out after all development testing has been completed. When commissioning tests have been successfully completed the LRIT system can be declared operational and further tests will follow Part 5, Integration and Modification Test Process.

4.1.1.2 The commissioning test process requires, as a minimum, participation from two data centres and shall address all elements and interfaces within the LRIT system. All other elements for end-to-end operation of the system, including the IDE, IDC, ASP, CSP and the DDP shall be available for these tests.

4.1.1.3 Ship messages may be simulated; however the active participation of ships is desirable.

4.1.1.4 The tests shall follow a process similar to that set out in Section 3.2.4, Operational Testing of the IDE.

4.2 Successful Completion of Test

4.2.1 General

4.2.1.1 For the test to be successful, all of the system components shall operate according to the LRIT Performance Standards and the Technical Specifications. To ensure a full test of the system, the volunteer Data Centres shall be required to stress the system by making requests as described in Subsection 2.1.9.

4.2.1.2 Once the commissioning testing has been successfully completed, the system shall be declared operational and ready to accept the integration of new Data Centres. Each new Data Centre shall be added according to the Integration Test Process described in Section 5.2.

5 Integration and Modification Test Process

5.1 General

5.1.1 Overview

5.1.1.1 The integration test process occurs when components of the International LRIT System are added or modified in a way that may affect the required performance of the system.

5.1.1.2 The integration test process shall address the interfaces between the new component, and each of the other components in the system.

5.2 Integration Test Process for New Components

5.2.1 General

5.2.1.1 Once the system has completed development testing, and is commissioned, as ‘operational’ new components may be added. All components added to the system must complete testing to ensure the continued operation of the system.

5.2.2 Integration of New Data Centres

5.2.2.1 A new Data Centre may only be integrated once it has successfully passed system tests, in a similar fashion to the process of testing for the IDC (section 3.3) including:

.1 Software Module Tests (i.e. development tests); and

.2 System Tests.

5.2.2.2 The integration test process shall address the interfaces between the new Data Centre and the following components:

.1 DDP, in accordance with the "Draft Guidance on Setting up and Maintaining the LRIT Data Distribution Plan";

.2 IDE, in accordance with the "Draft Technical Specifications for the International LRIT Data Exchange";

.3 LRIT Communications interfaces, in accordance with the "Draft Technical Specifications for Communication in the LRIT System";

5.2.2.3 The Administration commissioning the Data Centre shall be responsible for performing software module testing.

5.2.2.4 The new Data Centre shall be tested using the development environment prepared for the development testing of IDE and the IDC. The system tests shall include the full set of tests applicable for the complete system.

5.2.2.5 The in-service verification tests shall only occur after the successful completion of the system tests and shall cover the integration of the Data Centre into the LRIT System.

5.2.2.6 All tests shall be monitored and accepted by the LRIT Co-ordinator.

5.2.2.7 All test results shall be properly documented with printouts and/or electronic data files including all relevant results and status information.

5.3 Modification of LRIT System Components

5.3.1 General

5.3.1.1 When so required to ensure continued operation of the system, modification of LRIT system components shall be tested prior to being declared 'operational' and integrated into the existing system. Tests shall be developed, based on the testing protocol set out for the development testing of each element.

5.3.1.2 All tests shall be monitored and accepted by the LRIT Co-ordinator.

5.3.1.3 All test results shall be properly documented with printouts and/or electronic data files including all relevant results and status information.

6 Procedure for Reporting on Testing to MSC

6.1 General

6.1.1 Overview

6.1.1.1 As indicated in MSC.210(81) section 4, the LRIT Co-ordinator shall report on the status of testing to the Maritime Safety Committee for consideration. As indicated in Subsection 2.1.6 of this document, the LRIT Co-ordinator shall participate in all testing within the system.

6.1.1.2 During the start-up phase of LRIT, the development and commissioning, there will be the need to quickly turn around test plans and test results from the entities developing the IDE, IDC and the first DCs being commissioned into the system. The time taken to approve test plans and test results will delay subsequent testing resulting in a slip in the implementation date for LRIT. Therefore it is imperative that the Committee have a streamlined approval process to quickly and effectively approve the above-mentioned plans and results.

6.1.1.3 The Group proposes the following options for consideration by the Committee:

.1 Status quo option, i.e. the Committee requires the LRIT Co-ordinator to report after each aspect of the testing is completed to regularly scheduled meetings. The LRIT Co-ordinator has no authority to approve a test in order to move onto the next test in the process.

.2 The Committee convenes a group of experts that would be responsible for the overall acceptance and approval of each aspect of the testing. The group of experts would report to the Committee with respect to that approval.

.3 The LRIT Co-ordinator, who already participates in the testing, would be responsible for the overall acceptance and approval of each aspect of the testing. The LRIT Co-ordinator would report to the Committee with respect to that approval.

6.1.1.4 Option 1 is not recommended because this would be a time-consuming approach, and would result in years of developmental testing, thus delaying the implementation of the LRIT system. The group felt strongly that some more timely system for test approval and acceptance must be implemented. Due to the tight deadlines for the implementation of LRIT, this function cannot be done at the semi-annual meetings of the Committee, as that would delay the development and implementation of LRIT by several years. It is therefore necessary for the Committee to delegate the approval of the test plans and results to another entity that will report back to the full Committee at its regular meetings. This issue will continue during the integration and operation of LRIT, as new DCs come on line and potential technical issues are uncovered, as is the case for all modern information systems in which problems inevitably occur that require immediate resolution.

6.1.1.5 The group further recognized that both the group of experts referenced in Article 6.1.3.2, and the LRIT Co-ordinator have important roles to play in implementing a timely system for test approval and acceptance on behalf of the Committee. The group therefore recommends some hybrid of Options 2 and 3 that recognizes the contribution of both the expert group and the LRIT Co-ordinator and leaves it to the Committee to determine the optimal respective roles and responsibilities for both groups. Such a hybrid option would be responsive to the time-line required for development testing of the LRIT system, as indicated in MSC.211(81).

6.2 Procedure for Initial Developmental Testing

6.2.1 General

6.2.1.1 Given the recommendation in Subsection 6.1.1.5, the recommended process for coordinating, participating in, analysing and reporting on results of initial developmental testing, and approval is as follows:

.1 The LRIT Co-ordinator and the group of experts review test plans and participate at each level of testing;

.2 The LRIT Co-ordinator and the group of experts collaborate to confirm all aspects of the test have been successfully completed;

.3 The LRIT Co-ordinator or the group of experts accepts each stage of testing before the next stage of testing commences;

.4 The entity that accepted the test on behalf of the Committee provides reports on its decisions to the Committee for consideration.

6.2.1.2 It is inevitable, particularly during the start up phase of LRIT implementation, that technical problems will arise that will require clarification to the LRIT technical specifications. Given the recommendation in Subsection 6.1.1.5, it is further recommended that the process for approval of the technical clarifications be as follows:

.1 The LRIT Co-ordinator/or group of experts shall assess each test report and decide if the test is acceptable, and if any systemic problems are indicated that could require modification of the technical specifications or perhaps even the Performance standards.

.2 The technical specifications and/or Performance standards shall only be modified if necessary to ensure the operation of the LRIT system.

.3 The entity that approved the modifications will give a full report to the Committee at the next session of the Committee.

6.3 Procedure for Integration and modification testing

6.3.1 General

6.3.1.1 Given the recommendation in Subsection 6.1.5, the recommended process for participating, analysing and reporting on results of integration and modification testing and approval is as described in Section 6.2.

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ANNEX 6

Draft Guidance on Setting Up and Maintaining the Data Distribution Plan

Prepared by: *Ad Hoc* Engineering Working Group July 2007
Date of Issue of this Draft: 03 July 2007

Table of Contents

DRAFT GUIDANCE ON SETTING UP AND MAINTAINING THE LRIT DATA DISTRIBUTION PLAN

1 General Provisions

1.1 Scope and Background

1.1.1 Scope

1.1.1.1 The intent of this document is to provide an overview of the Data Distribution Plan (DDP) within the international Long-Range Identification and Tracking (LRIT) system as adapted from the terms of reference of resolution MSC.210(81) and in context of 1.1.1.4.

1.1.1.2 This document has been prepared by the *Ad Hoc* Working Group on Engineering Aspects of Long-Range Identification and Tracking of Ships.

1.1.1.3 Complete responsibility for the (DDP management, including development, operations and maintenance resides with the Organisation.

1.1.1.4 It is the understanding of the *Ad Hoc* Working Group that the Organisation will submit a detailed paper to the eighty-third session of the Maritime Safety Committee (Oct, 2007), detailing specific technical considerations relating to the implementation and operation of the DDP.

1.1.1.5 In preparing the document, the *Ad Hoc* Working Group has taken into account **Error! Reference source not found.** and the provisions of SOLAS regulation V/19-1 and resolution MSC.210(81), "Performance Standards and Functional Requirements for the Long Range Identification and Tracking of Ships" to produce in this document a high-level guidance relating only to external interfaces and clarification of DDP operations as pertaining to Contracting Government usage.

1.1.2 Background

1.1.2.1 The Maritime Safety Committee, at its eighty-first session in May 2006, adopted amendments to chapter V of the SOLAS convention in relation of LRIT. These amendments will enter into force on 1 January 2008 provided that acceptance criteria have been fulfilled by 1 July 2007.

1.1.2.2 The LRIT system provides for the global identification and tracking of ships.

1.1.2.3 In operating the LRIT system, recognition shall be given to international conventions, agreements, rules or standards that provide for the protection of navigational information.

1.1.2.4 The specifications for the International LRIT Data Exchange (IDE) within the international LRIT system will detail the routing of LRIT positional data, LRIT request messages and system messages between LRIT Data Centres.

1.1.2.5 The specifications for data security throughout the network and protocols required for transporting data from one network point to another are described in the document entitled "Draft Technical Specifications for Communications within the LRIT System Network."

1.2 General Description of the System and Definitions

1.2.1 LRIT System Description

1.2.1.1 As described in resolution MSC.210(81), sub-section 1.2, the LRIT system consists of the following components:

.1 the shipborne LRIT information transmitting equipment;

.2 the Communication Service Provider(s);

.3 the Application Service Provider(s);

.4 the LRIT Data Centre(s), including any related Vessel Monitoring System(s);

.5 the LRIT Data Distribution Plan;

.6 the International LRIT Data Exchange, and

.7 LRIT Data Users.

1.2.1.2 As described in resolution MSC.210(81), sub-section 1.2, certain aspects of the performance of the LRIT system are reviewed or audited by an LRIT Co-ordinator acting on behalf of all Contracting Governments.

1.2.2 LRIT System Operation

1.2.2.1 Sub-sections 1.2.2.1 to 1.2.2.11 provide a high-level overview of the LRIT system architecture. The LRIT system performance standards, resolution MSC.210(81), provide further details on the functions associated with each component of the system.

1.2.2.2 Tracking of any applicable ship begins with LRIT positional data being transmitted from the shipborne equipment. The LRIT information transmitted includes the ship's GNSS position (based on the WGS 84 datum), time and identification, as described in resolution MSC.210(81), Table 1.

1.2.2.3 The Communication Service Provider (CSP) provides the communication infrastructure and services that are necessary for establishing a communication path between the ship and the Application Service Provider (ASP). The LRIT information transmitted from the ship will travel across the communication path set up by the CSP to the ASP.

1.2.2.4 The ASP, after receiving the LRIT information from the ship, will add additional information to the LRIT message and pass along the expanded message to its associated LRIT Data Centre. Functionality required for the programming and communicating of commands to the shipborne equipment is provided by the ASP.

1.2.2.5 The LRIT data, along with all the parameters added by the various LRIT components, is described in the messaging section of the document entitled "Draft Technical Specifications for Communication within the LRIT System."

1.2.2.6 LRIT Data Centres will store all incoming LRIT information from ships instructed by their Administrations to transmit LRIT information to that Data Centre. LRIT Data Centres will disseminate LRIT information to LRIT Data Users according to the Data Distribution Plan (DDP).

1.2.2.7 The LRIT DDP will contain the information required by the Data Centres for determining how LRIT information will be distributed to the various Contracting Governments. The DDP will contain information such as standing orders from Contracting Governments and geographical polygons relating to Contracting Governments' coastal waters and ports and port facilities.

1.2.2.8 LRIT Data Centres will process all LRIT messages to and from the International LRIT Data Exchange (IDE). The IDE will process all LRIT messages between LRIT Data Centres. The IDE will route the message to the appropriate Data Centre based upon the address in the message and the IP addresses in the DDP. The IDE will neither process nor store the positional data contained within LRIT messages.

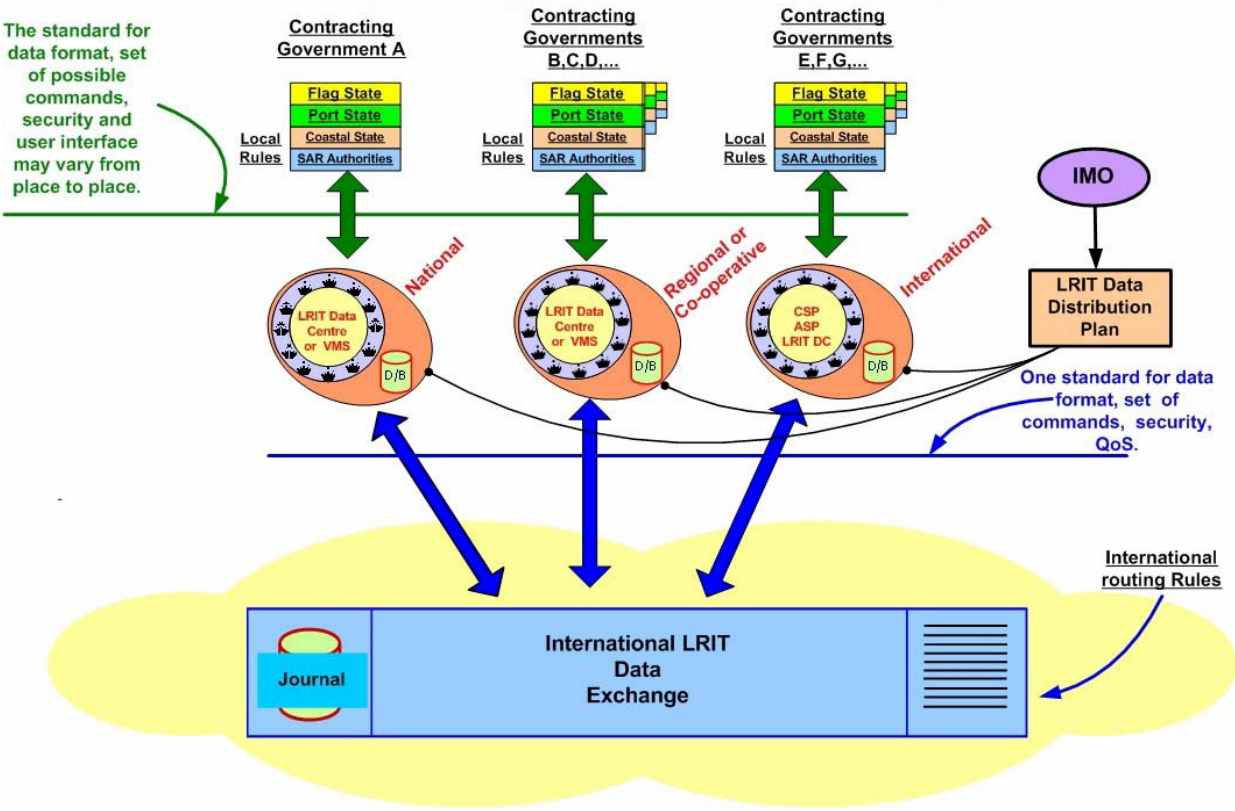
1.2.2.9 LRIT Data Users may be entitled to receive or request LRIT information in their capacity as a flag State, port State, coastal State or Search and Rescue (SAR) service.

1.2.2.10 The LRIT Co-ordinator will assist in the establishment of the international components of the LRIT system, perform administrative functions, and review and audit certain components of the LRIT system.

1.2.2.11 Figure 1 provides a high-level illustration of the basic LRIT system architecture.

FIGURE 1

TYPICAL LRIT SYSTEM ARCHITECTURE



1.2.3 Definitions

1.2.3.1 Unless expressly provided otherwise:

.1 *Convention* means the International Convention for the Safety of Life at Sea, 1974, as amended.

.2 *Regulation* means a regulation of the Convention.

.3 *Chapter* means a chapter of the Convention.

.4 *LRIT Data User* means a Contracting Government or a Search and rescue service that opts to receive the LRIT information it is entitled to.

.5 *Committee* means the Maritime Safety Committee.

.6 *High-speed craft* means a craft as defined in regulation X/1.3.

.7 *Mobile offshore drilling unit* means a mobile offshore drilling unit as defined in regulation XI-2/1.1.5.

.8 *Organization* means the International Maritime Organization.

.9 *Vessel Monitoring System* means a system established by a Contracting Government or a group of Contracting Governments to monitor the movements of the ships entitled to fly its or their flag. A Vessel Monitoring System may also collect from the ships information specified by the Contracting Government(s) that has established it.

.10 LRIT information means the information specified in SOLAS regulation V/19-1.5.

.11 *IDC operator* means the individual responsible for the daily operation and maintenance of the International LRIT Data Centre.

1.2.3.2 The term "*ship*," when used in the present Performance standards and functional requirements for long-range identification and tracking of ships, includes mobile offshore drilling units and high-speed craft as specified in SOLAS regulation V/19-1.4.1 and means a ship that is required to transmit LRIT information.

1.2.3.3 Terms not otherwise defined should have the same meaning as the meaning attributed to them in the Convention.

1.2.4 Acronyms Used Within This Document

1.2.4.1 The acronyms that appear within this document shall have the meanings assigned to them in this Article:

.1	ASP	Application Service Provider
.2	CSP	Communication Service Provider
.3	DC	Data Centre
.4	DDP	Data Distribution Plan
.5	IDC	International LRIT Data Centre
.6	IDE	International LRIT Data Exchange
.7	LES	Land Earth Station
.8	MMSI	Maritime Mobile Service Identity
.9	RFP	Request for Proposal
.10	SAR	Search and Rescue
.11	SAR SURPIC	Search and Rescue Surface Picture
.12	SOLAS	International Convention for the Safety of Life at Sea
.13	SSL	Secure Sockets Layer
.14	VPN	Virtual Private Network
.15	VMS	Vessel Monitoring System

2 Role of the Data Distribution Plan

2.1 The DDP is a component of the International LRIT System which, together with the Data Centres (including the International Data Centre) and the International Data Exchange (IDE), will enable the core message-routing functionality of the LRIT system.

2.2 The DDP will be implemented as a module of GISIS. The module will be integrated with other modules in GISIS, in particular for shared lists and codes for Contracting Governments, ports, port facilities, and possibly others as requirements develop.

2.3 The DDP will reside with other IMO databases and servers constituting the hosted environment of the GISIS system as a whole. This integrated implementation will cater for the deployment of the DDP within this environment.

2.4 The DDP data will be treated identically to all information currently held by the Secretariat on behalf of its Member States (within and outside of GISIS). In particular, unless otherwise specified, all data contained in the DDP is to be held indefinitely and with full archiving functionality so that its state at any specified time in the past can be recovered.

2.5 The DDP will be implemented using a versioning mechanism to identify the current and all previous states of the DDP, so that by the version number alone all data contained in the DDP when at that version may be identified.

2.6 The DDP security mechanism for Contracting Governments will be modelled after the mechanism in place for access to the Maritime Security module.

3 Data Distribution Plan Accountability

3.1 The IMO Secretariat will be responsible for the management and release of the master Data Distribution Plan.

3.2 Contracting Governments will be required to submit pertinent information regarding LRIT into the Data Distribution Plan and are accountable for the validity of that information. It is anticipated that a web-based user interface will be provided to enable data entry (note: submission of polygonal information relating to dynamic zones may be handled differently due to their inherent complexity i.e. LRIT port-state jurisdiction and coastal-state zones).

4 Data Distribution Plan Content

4.1 Pursuant to the Performance Standard, the following information is required by the DDP:

4.2 Housekeeping information consisting of a list of Contracting Governments and associated SAR services entitled to receive LRIT information, Data Centres and associated ASP(s), points-of-contact with details, and free-text supplemental information.

4.3 Information on the polygonal boundaries of a Contracting Governments coastline(s), baseline(s), territorial water(s), LRIT-flag-state areas-of-interest, port-state jurisdictions and LRIT-coastal state(s) within which each Contracting Government is entitled to receive LRIT information about ships in those areas. Note: data on coastline(s), baseline(s) and territorial water(s) is largely static and available from published sources while LRIT- flag-state areas-of-interest, port-state jurisdictions and coastal-state(s) will need to be specified.

4.4 Information on standing orders relating to Flag State tracking, including,

.1 The Position Report Interval at which tracking should be implemented, and

.2 The flag-state area-of-interest polygon(s) referred to in 4.3. Note: this function is applicable only to Contracting Governments using the IDC.

4.5 Information on standing orders relating to Port State tracking, including,

.1 The Distance from which tracking should be initiated from each Port and / or Port Facility, or

.2 The port-state jurisdiction polygon(s) referred to in 4.3.

4.6 Information on standing orders relating to Coastal State tracking, including,

.1 Order-type parameter (All / Partial / None),

.2 Flag-parameter (All / Selected), and

.3 The Distance from which tracking should be initiated from its coastline or The coastal-state polygon(s) referred to in 4.3.

4.7 Information on exclusions relating to:

.1 Contracting Governments to which a particular Contracting Government may instruct that no LRIT be provided (note: this applies to coastal-state tracking only).

5 Data Distribution Plan Update and Transfer Method

5.1 The following sequential process will be implemented:

.1 Contracting Governments may modify their entry in the DDP at any time using the dedicated IMO web-based interface.

.2 On each DDP update, the DDP server will transmit a DDP notification message to the IDE for onward propagation to all DC's to inform them that a new version of the DDP is operational and available for download.

.3 Each DC will transmit a DDP request message to the DDP server requesting the latest DDP.

.4 The DDP server will respond with a DDP update message containing the physical DDP.

.5 Each DC will upload the DDP.

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ANNEX 7

KEY POLICY DECISIONS REQUIRED OF THE COMMITTEE

1 Cost recovery and/or profit for Contracting Governments

Policy decision required:

Are Contracting Governments entitled to:

.1 recover costs, and/or

.2 realize profits.

Impact on technical specification:

The technical specification currently addresses both options.

Recommendation to the Committee:

It is recommended to the Committee that a policy decision be made that a Contracting Government associated with specific ship LRIT information (data) be entitled to recover its costs - but not make a profit by means of billing LRIT Data Centres (DCs) requesting that data. This is consistent with the policy direction that Contracting Governments shall bear all costs associated with any LRIT information they request and receive. While cost recovery is recommended, profits for Contracting Governments were seen to be inconsistent with the spirit of the intent to provide an international system to enhance security.

2 Profit for commercial entities

Policy decision required:

Are commercial entities (including DCs and the (International LRIT Data Exchange (IDE) if they are commercial entities) entitled to realize profits?

Impact on technical specification:

As it was not thought feasible to develop a sustainable LRIT system that did not allow for commercial entities to make a reasonable profit, the technical specification currently address only a scenario in which commercial entities can make a profit.

Recommendation to the Committee:

Further to paragraph 2.2.2.9 of the Costing and Billing standard and recommendations made at COMSAR 11, it is therefore recommended to the Committee that a policy decision be made that commercial entities be entitled to make a reasonable profit.

If a Contracting Government(s) uses a third-party commercial entity as its DC, then the DC should be entitled to make a reasonable profit by means of billing DCs requesting that data.

3 Contracting Government(s) establishing National LRIT Data Centres (NDCs) or Regional or Co-operative LRIT Data Centres (R/CDCs) not wishing to pay for regular transmission of LRIT information

Policy decision required:

Can a Contracting Government establishing an NDC, or a group of Contracting Governments establishing a R/CDC, not pay for the 6-hour interval transmissions of LRIT information (regular LRIT transmissions) transmitted by ships entitled to fly its/their flag?

Impact on technical specification:

The technical specification currently addresses both options with the inclusion of scenarios 1A and 2A within the Costing and Billing standard.

Recommendation to the Committee:

For Contracting Governments establishing either a NDC or R/CDC, paragraph 2.3.1.2 of the Costing and Billing standard assumes that:

- NDCs and R/CDCs could be established as / derived from Vessel Monitoring Systems,

- if a Contracting Government establishes a NDC or R/CDC , then that Contracting Government wants the LRIT information for all ships entitled to fly its flag and would thus be requesting, receiving and paying for the regular LRIT information for all ships flying its flag (flag ships data), and

- those Contracting Governments not wanting to receive or pay for their flag ships data would select the option of using the International LRIT Data Centre (IDC).

The assumptions made are a suggested policy direction based on an interpretation of the Performance Standards that provides an option for Contracting Governments not to pay for unrequested flag ship data, while at the same time giving consideration to the long-term viability and sustainability of the LRIT system.

This does not preclude a Contracting Government wishing to establish a NDC or R/CDC from doing so; paying for the regular LRIT transmissions and then cost recovering and or profiting by means of charging requesting DCs.

4 Access to LRIT information/sharing of LRIT information within DCs

Policy decision(s) required:

1. If an R/CDC and/or the IDC receives the same message multiple times in accordance with the LRIT Data Distribution Plan (DDP) entries, then how many times should it pay for it? The possible decisions are:

   .1 once, or

   .2 as many times as it is received.

2. Is an R/CDC and/or the IDC allowed to request a LRIT information once and then route it internally within the R/CDC? If so, how many times must it pay? If it only has received it once, then it is either stopping the other transmissions, or the DDP entries for all Contracting Governments involved have been changed so that the message is only sent once. In order for the message to be internally routed within the R/CDC, the other Contracting Governments must have the access rights to the data in accordance with the SOLAS regulation V/19-1.

3. Are these interactions inside or outside of the LRIT system? If inside, then they will be charged overhead charges that must be audited and logged in a journal.

Impact on technical specification related to R/CDCs:

For the R/CDC: If the Committee decides this arrangement is inside the LRIT system, then the Performance Standard will have to be modified in order to add a journal function into the R/CDC.

If the Committee decides this arrangement is outside the LRIT system, then there is no impact on the technical specification, but the decision will have potential cost ramifications to all other users of the system because source DCs will not be receiving as much revenue from the provision of data to R/CDCs, which will result in higher costs across the board. In addition to this, if all transactions among users of a R/CDC are outside the scope of the LRIT system, the various overhead charges that are identified in this document will necessarily not be shared by those who use a R/CDC and will have to be paid by others that use the system.

Recommendation to the Committee:

While it was noted that financial viability is critical to the viability and sustainability of the LRIT system, there was no consensus from the *Ad Hoc* Working Group on engineering aspects of LRIT (the Group) with respect to this policy decision.

5 Access to LRIT information/ sharing of LRIT information outside DCs

Policy decision(s) required:

Under what circumstances can a Contracting Government share with other entities (i.e. other DCs, other Contracting Governments) outside its DC (NDC, R/CDC, or the IDC) LRIT information the Contracting Government is entitled to, has requested and has received; and are there any cost implications associated with the sharing of information?

Impact on technical specification related to R/CDCs:

There is no impact on the technical specifications.

Recommendation to the Committee:

There was no consensus from the Group with respect to this policy decision.

6 Differentiation of costs

Policy decision required:

How should costs be differentiated/set, i.e. by Requestor, by Application Service Provider (ASP), by Communication Service Provider (CSP), Message Type (regular, poll, rate change), and/or volume?

Impact on technical specifications and standards:

The technical specifications and the Costing and Billing standard currently allow for differentiation of costs based on all of the above criteria.

Recommendation to the Committee:

The LRIT pricing system should be non-discriminatory; therefore the Group recommends that the Committee make the policy decision that all prices should be independent of the requesting Contracting Government or DC.

The Group further recommends that set prices be published in the International LRIT Data Exchange (IDE) to enable requesters of data to know costs associated with request of data prior to purchase in keeping with standard commercial practice and standard government purchasing policies and procedures.

The Group further recommends that for transparency and openness the simplest costing formula should be employed, therefore the Group recommends that each DC publish a price for each message type only. This does not preclude a DC from also giving volume discounts.

7 Charging of overhead

Policy decision required:

1. How is overhead to be apportioned?

2. Should transactions related to flag ship data from a NDC or R/CDC be charged IDE overhead?

3. Should overhead be charged on internal transactions within R/CDCs related to coastal and port requests?

Impact on technical specification:

If the Committee decides this arrangement is outside the LRIT system, then there is no impact on the technical specification, but the decision will have potential cost ramifications to all other users of the system because source DCs will not be receiving as much revenue from the provision of data to R/CDCs, which will result in higher costs across the board. In addition to this, if all transactions among users of a R/CDC are outside the scope of the LRIT system, the various overhead charges that are identified in this document will necessarily not be shared by those who use a R/CDC and will have to be paid by others that use the system.

Recommendation to the Committee:

It is recommended that:

1. Calculation and apportioning of overhead be fair, reasonable, and consistent with the need to ensure financial viability of the system.

2. No IDE overhead be charged on transactions related to flag ship data from an NDC or R/CDC since the NDC is not utilizing the IDE for this transaction

3. There was no consensus recommendation regarding port and/or coastal data. However, the group does recommend that that the same policy be applied to the IDC as is determined for an R/CDC with respect to this costing policy issue.

8 SAR services overhead costs

Policy decision required:

The Committee has already made the policy decision that SAR services shall be entitled to receive, free of any charges, LRIT information. The Group assumed that this applied to all SAR services requests: regular transmission of LRIT information, poll, and rate change. This assumption requires the Committee's confirmation.

Impact on technical specification:

There is no impact on the technical specifications. Since the Communications Message Protocol contains a SAR poll request parameter, the technical specifications can support either policy decision from the Committee.

Recommendation to the Committee:

All costs associated with the provision of LRIT information to a SAR service become overhead costs to be borne by elements of the system. Initial costs will likely be borne by DCs to which ships in the vicinity of a SAR incident are associated, which would then have the ability to recover costs by means of overhead charges imbedded in prices charged for LRIT information requested.

It is recommended to include the overhead cost due to the provision of LRIT information to SAR services within each DC's pricing regime.

9 Centralized versus decentralized billing

Policy decision:

There is currently no commercial relationship between DCs. Depending on the various policy decisions made by the Committee, there may be binding agreements between various entities within the overall LRIT system.

Impact on technical specifications and standards:

The Costing and Billing standard and technical specifications allow for numerous options.

Recommendation to the Committee:

The simpler the costing and billing framework between DCs; the less complicated and less costly the system. The Group therefore recommends Option 1 as outlined in paragraph 2.7.1.4.1 of the Costing and Billing standard as follows:

> Each DC could produce its own bills at some common frequency. The LRIT Co-ordinator would audit all of the bills during the performance review and audit process. This would require each DC to have a billing / invoicing function. Since the journal is maintained by the IDE, each DC could ask the IDE for its portion of the journal so that it can generate its bill. As highlighted in paragraph 2.2.2.1 of the Costing and Billing standard, sub-contractors may be utilized for various functions as required. Thus DCs can sub-contract their billing functions to a commercial entity that specializes in billing and invoicing. This is simple and fully respects all of the accounting rules.

10 Archiving of LRIT information and associating costing and billing

Policy decision:

The LRIT information archiving function has been stipulated within the Performance Standards, however, the access rights to that data have not been fully discussed. The Committee needs to make a policy decision related to the access rights for archived data.

Impact on technical specifications and standards:

The technical specifications will have to be modified to reflect the final policy decision of the Committee regarding the access rights to archived data.

Recommendation to the Committee:

It is recommended that the Committee decide to set the access rights for archived data the same as the access rights for the regular transmission of LRIT information.

As described above for the costs between DC, the cost for archived data should also be published within the IDE so that all Contracting Governments know the cost of the data before requesting it. There could be a separate field for archived data prices or to make it simpler, the archived data should be the same price as the real time data. It would be left to each DC to decide the costing scheme for archived data

11 Funding of the LRIT Co-ordinator

Policy decision required:

How will the LRIT Co-ordinator be funded?

Impact on technical specifications and standards:

While there is no direct impact on the technical specifications and standards, the Group is of the view that there is a risk for late implementation of LRIT if IMSO does not acquire sufficient funding.

Recommendation to the Committee:

That the issue be addressed and solution to the issue of sufficient funding for IMSO be found and actioned.

12 Non-payment

Policy decision required:

The issue of non payment must be addressed by the Committee to ensure a sustainable LRIT system. Procedures and functions related to non payment are currently not addressed within the Performance Standards. A situation in which LRIT Data Users, other than SAR services, are requesting and receiving but not paying for data places an undue burden on the entity providing the data, as well as on the sustainability of the system as a whole, and thus cannot reasonably be expected to continue unabated. One option may be to add a barring function into the IDE whereby requests for data would not be met, but SAR services requests and data requests to the barred DC would always go through.

Impact on technical specifications and standards:

If the Committee decides to add a barring function into the IDE, the IDE technical specifications can be modified to bar requests from DCs for non-payment on direction from the LRIT Co-ordinator.

Recommendation to the Committee:

The Group supports the efforts of the LRIT Co-ordinator to develop a proposal that effectively addresses this issue.

13 Ship non-transmitting due to outside failure of the LRIT system

Policy decision required:

What happens when LRIT information transmitted by a ship cannot be received by those entitled to receive such information because of a failure outside of its control, for example the CSP, ASP, or DC has failed?

Impact on technical specifications and standards:

While there is no direct impact on the technical specifications and standards, this issue underscores the importance of backup and system integrity.

Recommendation to the Committee:

Since the failure was outside of the ship's control, the Group recommends that Contracting Governments do not impose sanctions on the ship due to circumstances outside of its control. This is a policy decision for the Committee.

14 Ship non-transmitting LRIT information due to change of flag

Policy decision required:

What happens when a ship cannot transmit LRIT information because a change in flag has resulted in a time lag between decommissioning of the ship from the Contracting Government of the State whose flag the ship was entitled to fly hitherto and commissioning of the ship to a different Administration?

Impact on technical specifications and standards:

As part of the transfer process when a ship transfers flag, there is a de-commissioning and commissioning of GMDSS and other satellite communications arrangements, in that order, involving Point of Service Activators and CSPs. Upon completion of the de-commissioning and commissioning process, this is a positive indicator that flag change has been technically accomplished.

The technical specifications provide for all the functionality required for decommissioning and commissioning; however a policy decision is required with respect to what happens in the event of a time lag between the two; when a ship could not be transmitting LRIT information for reasons outside of its control?

Recommendation to the Committee:

The Committee is recommended to note this information.

15 Backup system

Policy decision required:

How is the integrity of the LRIT system maintained with respect to backup to protect data?

Impact on technical specifications and standards:

The IDC specification already accounts for backup and data integrity. While SOLAS regulation V/19-1 and the Performance Standards imply the accountability of Contracting Governments to ensure system integrity of their elements of the system; specifications for DC are outside the scope of the technical specifications.

Recommendation to the Committee:

The Group recommends that the Committee forward guidance related to DC backups to all Contracting Goverments; which includes reference to specifications for the IDC serving as a model for development of other DCs.

16 Port State Notice of Arrival

Policy decision required:

The current functions within the Performance Standards provide for an "opened loop" Port State Notice of Arrival (NOA) function. The technical specifications have been written from this perspective. It is recommended that the Committee note this information.

Impact on technical specifications and standards:

The technical specifications have been written from the Performance Standards perspective of an "opened loop" for this function. This does not preclude Administrations from establishing an NOA verification system outside the LRIT system.

Recommendation to the Committee:

It is recommended that the Committee note this information.

If an Administration wishes to validate the request of a Contracting Government to whose port a ship is proceeding, then it would merely have to request the NOA information from ships entitled to fly its flag, and then forward this information to the NDC or R/CDC that it is using. The validation function would be outside of the formal LRIT system. If the Contracting Government was registered with the IDC, this new function would not be available, unless this function was formally added to the Performance Standards.

17 Co-ordination and acceptance of aspects of testing

Policy decision required:

What are the processes for initial developmental testing as well as for integration and modification testing?

Impact on technical specifications and standards:

While there is no direct impact on the technical specifications and standards, the timely review and approval of test plans and results are critical to the on schedule development and operation of the LRIT system. Similarly to ensure a sustainability LRIT system, the modification and change control process procedure during the in-service phase of the LRIT system must have a timely review and approval process.

Recommendation to the Committee:

That the LRIT Co-ordinator in conjunction with a group of experts identified by the Committee be responsible for the acceptance/approval of each aspect of the testing on behalf of the Committee, and shall report on the status of testing to the Committee for consideration. The Committee must determine the optimal respective roles and responsibilities for the LRIT Co-ordinator and the group of experts. The recommended process is as outlined in section 6 of the Draft Protocols for the Development Testing of the LRIT System and for Testing the Integration New LRIT Data Centres into the System.

18 Do not route messages that are using the incorrect DDP version

Policy decision required:

Should the IDE implement DDP version checking for all messages (excluding those requested by SAR services) that it routes between DCs?

Impact on technical specifications and standards:

The technical specifications currently have text in square brackets that implement this functionality within the IDE. A time delay feature would ensure that the DDP version checking function would give DCs ample time to download the current version of the DDP.

Recommendation to the Committee:

The Group recommends to the Committee to implement this DDP version checking function. This function will help ensure that all DCs within the LRIT system are operating using the latest version of the DDP. It is also recommended that a time delay of 24 hours be used to give DCs ample time to download the current version of the DDP.

19 Remove the port State standing order from the DDP

Policy decision required:

When the Performance Standards were being developed, the port State standing orders (provision of LRIT information pursuant to the provisions of SOLAS regulation V/19-1.8.1.2 on the basis of a standing order as provided for in paragraph 16.1.3 of the Performance Standards) were included within the DDP (paragraph 11.2.3 of the Performance standards). There was also the expectation that in order to start tracking a ship proceeding to a port facility or a place under the jurisdiction of a Contracting Government (port State tracking) a message would have to be sent between DCs. During the development of the Communications Specifications all of the parameters needed to implement port State tracking were included within the LRIT Ship Position Request Message, thus making the standing order within the DDP redundant. Therefore it is recommended that the Port State Standing Order be removed from the DDP. The DDP would still have to contain the coastline, baseline, and territorial sea polygons.

Impact on technical specifications and standards:

The DDP design, the IDC design, and DC design would be simplified.

Recommendation to the Committee:

Remove the Port State Standing Order from the DDP.