FUNCTIONAL REQUIREMENTS FOR THE COSPAS-SARSAT INTERNATIONAL 406 MHz BEACON REGISTRATION DATABASE

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1. INTRODUCTION

1.1 Overview

The Cospas-Sarsat 406 MHz system provides search and rescue (SAR) services with distress alerts that include the unique 15-character hexadecimal identification of the transmitting beacon. This identification is decoded to obtain detailed information such as the type of beacon, i.e. aircraft Emergency Locator Transmitter (ELT), vessel Emergency Position Indicating Radio Beacon (EPIRB) or Personal Locator Beacon (PLB), the country code associated with the unique beacon identification, the type of auxiliary radio locating (homing) device, etc.

However, to assist SAR services additional information is required, such as the aircraft or vessel identification, the type of aircraft or vessel in distress, communications equipment on the vessel or aircraft, number of persons in distress, etc. Such information can be made available to SAR services only if the 406 MHz distress beacon has been properly registered and the required information provided to the registration authority by the beacon owner/operator.

Therefore, a number of countries have made 406 MHz beacon registration mandatory and maintain a national 406 MHz beacon registration database. Registration of 406 MHz beacons is also required pursuant to international regulations on SAR established by the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO). In addition, registration information must be made available to SAR services on a 24-hour basis in case of an emergency.

Despite the clear advantage of registration, a large number of 406 MHz beacons are not properly registered due to a lack of registration facilities in a number of countries. Furthermore, a number of beacon registers do not have 24-hour points of contact easily accessible by SAR services. Therefore, the Cospas-Sarsat Council has decided to prepare for the establishment of an International 406 MHz Beacon Registration Database (IBRD) available to users when no national registration facilities have been implemented, and to Administrations who wish to avail themselves of the facility to make their national beacon registration data available to SAR services.

The proposed IBRD is an Internet (or Web-based) system that maintains and provides various levels of access by beacon owners who wish to register their beacons, Administration who wish to make registration data available to international SAR services, and SAR services that need to access beacon registration data to efficiently process distress alerts.

The responsibilities of the IBRD include maintenance of the database, providing the means to view, enter, modify and query records in the database, ensuring that these records are available, providing automated monitoring of the registration process and generating various reports as required to manage the database. This document specifies the functional requirements to support these responsibilities.

1.2 Document Organisation

Section 2 of the document provides definitions for some of the terms used, when these terms carry a specific meaning in the context of the IBRD functional requirements, and the IBRD general requirements.

Section 3 defines the rules and functionality associated with the IBRD access by various categories of users.

Section 4 addresses security aspects and section 5 defines logging requirements for the administration of the IBRD.

The user interface requirements, including password management, are addressed in section 6, and data validation requirements are defined in section 7. Functionalities associated with the provision of reports on operations statistics, for use by the Database Administrator, and queries of database information, for use by SAR services and other authorised public bodies, are detailed in section 8.

Performance requirements and functionality in respect of the IBRD maintenance are provided in sections 9 and 10, respectively.

1.3 Reference Documents / Materials

The following documents are a valuable source of information on 406 MHz emergency beacons and registration, and contain specific details on the requirements contained in this document. The documents whose identification begins with “C/S” can be obtained from the Cospas-Sarsat web site (www.cospas-sarsat.org).

a) C/S T.001, Specification for Cospas-Sarsat 406 MHz Distress Beacons

b) C/S A.001, Cospas-Sarsat Data Distribution Plan

c) C/S G.005, Cospas-Sarsat Guidelines on 406 MHz Beacon Coding, Registration and Type Approval

1.4 Source of Requirements

The IBRD requirements are based on the following international requirements:

a) International Maritime Organization (IMO) Assembly Resolution A.887(21);

b) Annex 10 to the Convention on International Civil Aviation (ICAO)

- END OF SECTION 1 -

2. DEFINITIONS AND GENERAL REQUIREMENTS

2.1 Definitions

15 hexadecimal character identification (15 Hex ID):

The representation in hexadecimal characters of the content of bits 26 to 85 in the beacon message, as defined in document C/S T.001, which should be permanently marked on the exterior of the beacon.

beacon identification code:

The content of bits 26 to 85 in the beacon message that uniquely identifies a beacon in accordance with document C/S T.001.

confirmation:

The process used to verify the accuracy of beacon registration information.

Database Administrator:

The Officer designated by the Cospas-Sarsat Council to manage and administer the IBRD in accordance with policy guidance and directions given by the Council. The Database Administrator may direct the database operator on actions required to maintain the appropriate level of service to IBRD users.

Data Provider:

An individual beacon owner, an organisation that owns/operates beacons, or an organisation that acts on behalf of a beacon owner, who submits registration data on-line for one or several 406 MHz beacons.

IBRD database:

The hardware/software device that contains the beacon registration records.

IBRD user interface:

The screens and supporting software that provide for IBRD input and output via the Internet.

National Data Provider:

A national administration that has informed Cospas-Sarsat of their decision to make use of the IBRD to allow 24-hour access to 406 MHz beacon registration data under their country code(s), while retaining full responsibility for the collection, control and updates of all registration data associated with their country code(s). Acceptance of a National Data

Provider is subject to the completion of appropriate procedure and agreement, as may be required by the Cospas-Sarsat Council.

SAR service:

A recognised Search and Rescue (SAR) organization that has been assigned a specific user identification and password for accessing the IBRD, as provided for in section 3. In the context of this document, SAR services also include Cospas-Sarsat MCCs, ship surveyors, and other authorised public bodies that have been assigned a user identification and password to access the IBRD.

user identification:

The user name assigned by the Database Administrator to a SAR service or a National Data Provider, or the 15 Hex ID that identifies a specific Data Provider record.

2.2 Beacon Types

The document C/S T.001 "Specification for Cospas-Sarsat 406 MHz Distress Beacons" contains a full description of all 406 MHz beacon types and coding protocols.

2.2.1 The International 406 MHz Beacon Registration Database (IBRD) shall have the capability to accommodate all types of 406 MHz beacons, i.e.:

a) Emergency Position Indicating Radio Beacons (EPIRB) carried onboard vessels;

b) Emergency Locator Transmitters (ELT) carried onboard aircraft; and

c) Personal Locator Beacons (PLB) for use by individual persons in any environment.

2.2.2 The type of a beacon registered in the IBRD shall be determined by the content of bits 26 to 85 of the beacon message, which is presented as the 15 Hex ID of the beacon.

2.3 Data Retrieval

2.3.1 All information shall be retrievable for any beacon in the database.

2.3.2 Data shall be retrievable by:

a) the IBRD User Interface running on all supported platforms (see Req. 6.5).

b) the IBRD software responsible for the automatic generation of Confirmation Requests (see Req. 2.6).

2.4 Supported Country Codes

2.4.1 The IBRD shall decode bits 27-36 of the 406 MHz beacon identification code to determine the country code.

2.4.2 The IBRD shall accept on-line beacon registration only for those beacons encoded with one of the country codes provided in the list of supported country codes. However, on-line registration may not be provided when the responsible Administration has informed Cospas-Sarsat that they wished to control themselves the registration of beacons with their country codes in the IBRD (see definition of National Data Providers).

2.4.3 The list of supported country codes shall be determined by Cospas-Sarsat in accordance with national requirements known to Cospas-Sarsat.

2.4.4 Changes to the list of supported country codes shall be possible under the control of the Database Administrator.

2.4.5 Registration of beacons with unsupported country codes shall be possible via an override sequence under the control of the Database Administrator.

2.5 Database Fields

Beacon registration information shall include the 15 Hex ID of the beacon and additional vital information such as owner name, emergency points of contact, vessel name, etc. Annex B to this document provides the complete list of the name of the fields that shall be defined in the database. Annex B includes all the fields required for compliance with International Maritime Organization (IMO) Resolution A.887(21) and Annex 10 to the Convention of the International Civil Aviation Organization (ICAO).

2.6 Acknowledgement of Registration and Requests for Confirmation

2.6.1 The IBRD shall provide an automatic acknowledgement of the initial registration and of each registration modification to the Data Provider. This acknowledgement shall be provided through the IBRD user interface via the Internet, and via an e-mail sent to the Data Provider's e-mail address.

2.6.2 The acknowledgement shall include:

a) all data provided in the initial registration or as modified by the Data Provider; and

b) a statement reminding the Data Provider that it is his/her responsibility to submit in due time any required modification to the registered data, or to confirm the registered data within two years of the last entry/modification.

2.6.3 The database shall have a designated field to store the date of the original registration (see Annex B).

2.6.4 The database shall have a designated field to store date of the last modification or confirmation of the registered data (see Annex B).

2.6.5 The database shall automatically prepare Confirmation Requests two years after the date of the last modification or confirmation of the registered data, send the Confirmation Request to the e-mail address of the Data Provider, and track the status of the Confirmation Request.

2.6.6 The automatic generation of Confirmation Requests shall be suppressed on the basis of known national requirements associated with the country code.

2.7 Beacon Status

2.7.1 The IBRD shall have a designated field and the capability to record the status of each beacon as reported by the Data Provider (e.g. lost, destroyed or stolen beacons, see Annex B).

2.7.2 The IBRD shall have the capability to record the previous status of a beacon.

2.8 Ease of Installation

The IBRD shall be designed such that the installation of all required software components on new hardware is a simple process. Specifically, installation of the IBRD software shall:

a) require a minimum of separate software components and/or configuration files;

b) be possible by any person with minimal computer expertise; and

c) not require in depth knowledge of the IBRD or other hardware and software.

2.9 Bulk Record Uploads

2.9.1 The IBRD shall provide to National Data Providers a means for uploading multiple beacon registration records in a single operation.

2.9.2 The IBRD software shall:

a) support one format [TBD] for bulk record uploads;

b) insert all valid records into the IBRD database; and

c) prepare an upload status message to the National Data Provider.

2.9.3 The upload status message shall include the registered data for each valid record inserted in the IBRD and a list of all invalid records that were rejected with an indication of the cause of rejection.

2.9.4 An interface document describing the required format for bulk uploads and the possible causes for record rejection shall be developed.

2.10 Storage of Changed Fields Only

The IBRD user interface shall be designed such that changes to individual fields of beacon records are tracked separately. Specifically, when a user selects the "record update" option, only those fields that have been modified, shall be updated within the beacon registration record in the IBRD database.

- END OF SECTION 2 -

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3. USER ACCESS

3.1 Internet Access

The IBRD user interface shall be available via the Internet (World Wide Web).

3.2 Classes of Users

The IBRD user interface shall only be accessible to the following users (see definition in section 2.1):

a) Data Providers;

b) National Data Providers;

c) SAR services (to include also Cospas-Sarsat MCCs, ship surveyors and other authorised public bodies); and

d) Database Administrator.

3.3 Access to the IBRD Capabilities

3.3.1 The IBRD shall provide the following capabilities to the various classes of users:

a) View record: display existing registration records;

b) New record: create new registration records;

c) Modify record: change existing registration information in a record;

d) Beacon Status: modifies existing registration records by entering an appropriate “beacon status code” (see Annex B); and

e) Query: display information for multiple records using search indexes (e.g., by owner name, vessel name, etc.).

3.3.2 Access to IBRD capabilities shall be provided to each class of users only as specified in Table 3.1.

Table 3.1: Types of Access for User Classes

CLASS OF USER:	TYPE OF USER ACCESS				
	View Record	New Record	Modify Record	Change Beacon Status	Query
Data Provider	Yes	Yes	Yes	Yes	No
National Data Prov.	Yes	Yes	Yes	Yes	Yes*
SAR Services **	Yes	No	No	No	Yes
Inspectors and Maintenance Providers	No	No	No	No	Yes***
Database Admin.	Yes	Yes	Yes	Yes	Yes

Notes: * Only country codes associated with the National Data Provider can be queried.

** In the context of this document, SAR services also include Cospas-Sarsat MCCs, and other authorised public bodies.

*** Ship surveyors and authorised shore-based maintenance (SBM) providers are allowed to access records and view beacon data and vehicle information, but excluding beacon owner information.

- END OF SECTION 3 -

4. SECURITY

4.1 Unauthorized Changes

The IBRD database shall be secure from unauthorized changes. Prevention of unauthorized changes is a function of the user interface, as well the general IBRD environment. This is accomplished specifically by controlling user access (section 3) and by implementing a secure Internet environment.

4.2 User Validation

4.2.1 Access to the IBRD database shall be validated for each user, depending on the user class, as follows (see Req. 3.2):

a) Data Provider : "15 Hex ID" AND "password";

b) National Data Provider: "user identification" AND "password";

c) SAR services: "user identification" AND "password"; and

d) Database Administrator: "user identification" AND "password".

4.2.2 User accounts shall be deactivated upon 10 successive failed logon attempts.

4.2.3 Provision of a forgotten password to Data Providers, and/or the reactivation of their account, shall be possible via a password "challenge" question/answer process. Upon successful completion of the challenge question/answer process, the account shall be reactivated and/or the assigned password shall be automatically sent to the Data Provider using the e-mail address recorded by that Data Provider in the IBRD.

4.2.4 Provision of a forgotten password to a SAR service or a National Data Provider, or reactivation of the deactivated account of the SAR service or National Data Provider shall be made by the Database Administrator in accordance with the procedure agreed by the Cospas-Sarsat Council.

4.3 Access by Data Providers

Specific limitations shall apply for Data Providers access to registered information. Data Providers shall only be permitted to:

a) view and/or modify registration records for their own beacons.

b) view and/or modify one beacon registration record at a time.

4.4 Database Isolation

4.4.1 While a user enters, modifies, or views registration data and/or query results, the IBRD user interface shall not be physically connected to the IBRD database.

4.4.2 The link to the IBRD database shall be opened to perform an operation and closed as soon as that operation is complete. As a minimum, the following operations require opening (and subsequent closing) of the IBRD database:

a) retrieve an existing record;

b) store a new record (after all error checking is complete);

c) store a modified record (after all error checking is complete); and

d) execute a query and obtain the result.

4.5 Web Based Access

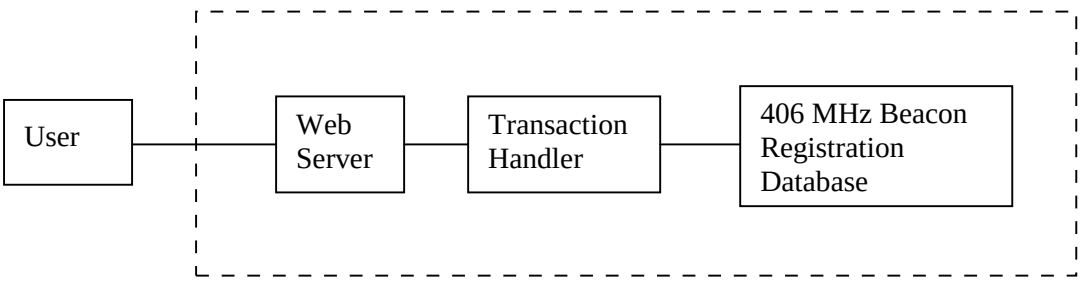
The IBRD shall be implemented such that the database is not directly linked to users on the Internet at any time. The Web based access system may be defined in terms of three main components as illustrated in Figure 4.1:

a) the Web Server, which predominantly provides the user interface;

b) the Transaction Handler, which is software that applies user actions to the IBRD database providing a critical "buffer" layer between the Internet and the database; and

c) the 406 MHz Beacon Registration Database.

Figure 4.1: Relationship Between Main IBRD Components



4.6 Denial of Service Protection

The IBRD shall provide protection from malicious attempts to interfere with normal operation and authorized access (e.g. high volume repetitive access). Means of monitoring and analysing all accesses, attempted as well as successful entries, shall be implemented in order to detect, as a minimum, and if possible prevent, this type of hostile action.

4.7 Computer Virus Protection

The IBRD shall be designed to minimize the threat posed by computer viruses. The IBRD virus protection shall include:

a) installation of industry standard virus detection and correction tools on all computers that use or support the IBRD subsystems; and

b) if incoming e-mail from IBRD Data Providers (i.e. beacon owners) is supported, acceptance shall be limited to text only formats with no attachments.

4.8 Intrusion Detection

A capability to detect and report on intrusions shall be implemented. Intrusion attempts shall be:

a) successfully detected;

b) reported in such a way that database operator personnel are immediately alerted; and

c) terminated whenever possible.

4.9 Password Encryption

Password information received or transmitted by the IBRD over the Internet shall be protected using standard Internet encryption technology.

4.10 New Registration Validation

4.10.1 Data Providers entering a new beacon registration shall be required to provide the beacon identification code (15 Hex ID) as the first input. The beacon identification code shall then be:

a) validated as per Requirement 7.1; and

b) checked for duplicate records as per Requirement 7.2.

4.10.2 Failure to pass either test successfully will terminate the new registration process and a warning message indicating the cause of the failure shall be sent on-line to the Data Provider.

- END OF SECTION 4 -

5. LOGGING

5.1 Changes To Database Records

All changes to the database records shall be logged such that it would possible to fully reconstruct the complete contents of any record in the database at any point in its revision history. Logging of individual changes to the database include the following minimum information:

a) beacon identification code (15 Hex ID);

b) date/time of transaction;

c) user name (note: same as 15 Hex ID for Data Providers);

d) authentication and/or password of Data Provider, National Data Provider or Database Administrator;

e) IP address of source;

f) old value for each changed field; and

g) new value for each changed field.

5.2 User Access

The following minimum information shall be logged for all user access, both successful and failed access attempts:

a) user name (note: 15 Hex ID for Data Providers);

b) authentication and/or password of user;

c) IP address of source;

d) date/time of start of session; and

e) date/time of end of session.

5.3 Queries

All query operations shall be logged. Query logging shall include as a minimum:

a) user name;

b) authentication and/or password of user;

c) IP address of source;

d) number of records returned; and

e) time for execution (in seconds).

- END OF SECTION 5 -

6. USER INTERFACE

6.1 On-line Help

Guidance (or "Help") on how to use the software data shall be available via the IBRD user interface and shall:

a) appear on every screen layout as an option, in approximately the same location;

b) be context sensitive (e.g., different classes of users have different access capabilities and the on-line help should likewise only refer to the capabilities that are available to the current user); and

c) provide responses to a series of frequently asked questions (FAQs).

6.2 Assisted User Input

Wherever possible, fields shall provide drop-down menus for user input. When possible, the list of entries shall be limited to the allowable values. In some cases users may be allowed to override the list of possible entries, but such exceptions shall be minimized.

6.3 Error Handling

Wherever possible, user input shall be checked for errors, and warnings shall be provided on-line to Data Providers. Error checking shall:

a) be applied as much as possible before any attempt to insert data into the database is made; and

b) allow the user to have as many chances as necessary to correct each errant entry, without destroying or losing other information that has been entered elsewhere.

6.4 Cancel Option

Every user interface screen shall:

a) have an option for cancelling the current operation; and

b) have an option for returning to the opening menu (as given after successful login).

6.5 Commonly Available Platforms

6.5.1 The IBRD user interface software shall be designed to run smoothly using only the native capabilities of commonly available commercial software and hardware platforms. Specifically, the user interface software shall run properly when accessed via the Internet from:

a) standard Mac (Macintosh OS) based systems running Netscape and Internet Explorer based browsers (version 3 or later).

b) standard PC (Microsoft Win 95 or later) based systems running Netscape or Internet Explorer based browsers (version 3 or later).

6.5.2 Access to the IBRD user interface shall not require using or downloading any additional applications onto a user's computer.

6.5.3 The IBRD user interface shall not require a display with a resolution greater than 800x600 pixels.

6.6 User Assistance

The IBRD user interface shall provide the following means for problem description and reporting to the database operator personnel:

a) a specific Database Administrator e-mail address; and

b) the postal address of the Database Administrator.

6.7 File/Print Listings

The IBRD user interface software shall provide the user with a capability to direct the current registration information, as displayed on the user computer screen, to:

a) their local computer's printer; and

b) a text only file to be stored on their computer hard drive.

6.8 Registration Practices Reminders

The IBRD user interface shall remind Data Providers about recommended registration practices, including as a minimum, that:

a) beacon registration is required by IMO and ICAO regulations for ships/aircraft under their jurisdiction, facilitates SAR operations, and is, therefore, in the beacon owner's best interest;

b) updates to registered data must be provided by the beacon owner whenever registration information changes; and

c) confirmation of registration information is recommended every 2 years from the date of the last update, or the initial entry of registration data.

6.9 Other 406 MHz Registration Points of Contact

6.9.1 If a Data Provider attempts to register a beacon encoded with a country code that is not supported by the IBRD, the IBRD user interface shall provide on-line, when available, an alternate point of contact (POC) for the registration of beacons with that country code.

6.9.2 If a SAR service attempts to query a beacon identification with a country code that is not supported by the IBRD, the IBRD user interface shall provide on-line, when available, the alternate POC of the register for that country code.

6.9.3 The IBRD shall maintain a reference table of known international POCs for unsupported country codes. The reference to be used for the list of POCs is Annex I Section F (Points of Contact for 406 MHz Beacon Registers) from the Cospas-Sarsat Data Distribution Plan (C/S A.001).

6.9.4 The reference table shall be designed such that POC updates may be performed in an efficient manner. Specifically, although several country codes point to the same POC, updates of POC details should not require multiple redundant entries.

6.10 Disclaimer of Liability and Data Release Statements

6.10.1 The IBRD user interface shall display on the opening screen of the user interface the appropriate disclaimer of liability statement(s), as required by the Cospas-Sarsat Council.

6.10.2 The IBRD user interface shall display on the opening screen of the user interface the appropriate statements, as required by the Cospas-Sarsat Council, authorising the release of the registered data to SAR services, as may be needed for processing Cospas-Sarsat distress alerts, and to the national administration that has jurisdiction for the country code embedded in the 15 Hex ID of the beacon.

6.10.3 The IBRD user interface shall request a positive acknowledgement of the disclaimer of liability and data release statements by the Data Provider prior to proceeding with the processing of any registration data entry.

6.11 Links to Related Web Sites

The IBRD user interface shall provide links to the following related World Wide Web (Internet) sites, as a minimum:

a) Cospas-Sarsat;

b) ITU MARS database;

c) ICAO; and

d) IMO.

6.12 Password Management

6.12.1 Passwords for SAR services, National Data Providers and the Database Administrator shall be assigned by the Database Administrator. Data Providers shall have the capability to select their own password on-line. A password shall have a minimum of 8 characters, and be a combination of letters and figures.

6.12.2 As a minimum, the following password related facilities shall be provided:

a) Change of Password (for Data Providers only): to change an old password, the IBRD user interface shall require entry of the old password, the new password and a repetition of the new password for verification, using a standard mechanism to hide the typed characters.

b) Guidance for forgotten passwords (all classes of users): guidance shall be provided to users who have forgotten their password, and to users whose account has been deactivated, with clear instructions on how to proceed (see Req. 4.2).

c) Password assignment (for SAR services and National Data Providers): a password management tool shall be provided to assist the Database Administrator in assigning new passwords, and recording and retrieving assigned passwords with the user identification.

6.13 Customer Feedback Survey

6.13.1 The IBRD user interface shall provide a means for the Database Administrator to solicit user feedback on the operation of the IBRD.

6.13.2 The IBRD user interface shall have the capability to provide users with the required form, a simple means of filling out the proposed form, and forwarding it on-line to the Database Administrator.

6.14 Languages

6.14.1 The IBRD user interface shall allow beacon registration entries using exclusively English characters.

6.14.2 The IBRD user interface shall support queries using the international standard English vocabulary only.

6.14.3 The IBRD user interface shall allow Data Providers to select beacon registration instruction screens and Help features presented in either the English, French, Russian or Spanish languages.

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7. DATA VALIDATION

7.1 Beacon Identification Code

Beacon identification codes provided for new beacon registrations shall be validated against C/S T.001 coding requirements. The beacon identification code contents shall satisfy the criteria provided in Table 7.1 below (see C/S A.001 "Cospas-Sarsat Data Distribution Plan", Annex III/B, section B.1.1.3).

Table 7.1: Validation Criteria for Beacon Identification Codes

Item to Check	Bits	Fail if:
Country Code	27 – 36	Decimal value < 200 or > 780, or corresponds to non allocated country codes
User Protocol	37 – 39	Bit 26 = 1 and Bits 37 - 39 = 101
Serial User Protocol	40 – 42	Bit 26 = 1 and Bits 40 - 42 = 101 or 111
Maritime User, Radio Call Sign or Aviation User Protocol	82 – 83	Bit 26 = 1 and Bits 37 - 39 = 010, 110 or 001 and Bits 82 - 83 are non-zero
National-Short Location Protocol and National Location Protocol	37 – 40	Bit 26 = 0 and Bits 37 – 40 = 0000, 0001, 1001, 1100 or 1101
Modified Baudot Code	Varies	Unassigned Baudot Character
Binary Coded Decimal	Varies	Decimal Value for Four Bit Group > 10
All National and Standard Location Protocols:	Varies	Location Data Fields content different from C/S T.001 specified default values

7.2 Duplicate Registrations

7.2.1 Registration of duplicate beacon identification codes (15 Hex IDs) shall not be permitted.

7.2.2 During the initial portion for the registration process of a new entry the IBRD user interface software shall:

a) advise the user to wait while the duplicate check is run;

b) compare the entry of the new beacon identification code against the existing records; and

c) terminate the registration process if a duplicate is found, and provide proper guidance to the Data Provider on how to proceed.

7.3 Record Fields Set from Beacon Decode

7.3.1 Where possible, record fields shall be automatically set to the values directly decoded from the beacon identification code. These fields are (see detailed description in Annex B):

a) country code;

b) beacon type (ELT, EPIRB or PLB);

c) coding protocol;

d) activation mode (automatic / manual); and

e) C/S type approval certificate number (when encoded).

7.3.2 If the user attempts to override the content of the fields directly decoded from the beacon identification code, the IBRD user interface shall display the appropriate warning. However, user override of the country code, coding protocol and C/S type approval certificate number shall not be allowed.

7.4 Field Logical Content

Where possible, fields shall be verified for proper logical content and general format, and proper guidance shall be provided on how to proceed if verification fails. The fields to be verified for proper logical content and general format shall include as a minimum:

a) the 15 Hex ID (beacon identification code) - only hexadecimal characters and exactly 15 characters in length (see also Req. 7.1);

b) all phone numbers - only number and dashes allowed; and

c) Vessel/Aircraft capacity (no. of persons on board) - must be numerical.

7.5 Field Relational Content

7.5.1 The following fields to be entered by a user shall be verified for proper relational content:

a) MMSI versus country code; and

b) Radio Call Sign versus country code.

7.5.2 Proper guidance shall be provided on how to proceed if verification fails.

7.6 Field Length/Type/Range

7.6.1 Before the final step of insertion into the IBRD database, all field entries shall be checked for validity, as a minimum with regard to:

a) length in bytes (or characters);

b) data type (e.g., numerical, text, date etc.);

c) range (The "practical range" (e.g. 10 to 1,000) may be provided on a per field basis in Annex B. When no "practical range" is given in Annex B, the range as defined by the field type in the database shall be applied); and

d) any additional specific field criteria or constraint given for each field definition in Annex B.

7.6.2 Proper guidance shall be provided on how to proceed if verification fails.

- END OF SECTION 7 -

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8. REPORTS AND QUERIES

8.1 Monthly/Annual Statistics

8.1.1 The IBRD shall provide tools for use by the Database Administrator to compute and report basic monthly and annual statistics, including:

a) confirmation request status;

b) new registrations entered into the database;

c) modifications to existing registrations; and

d) beacons recorded with special status (e.g., replaced, sold, stolen, lost, out of service, destroyed).

8.1.2 Registration counts shall be broken down according to:

a) country code;

b) beacon manufacturer; and

c) beacon type (ELT, EPIRB, PLB).

8.1.3 Monthly or annual reports shall be the default options. However, the Database Administrator shall have the capability to directly specify the start and end date of any report.

8.2 Queries

8.2.1 The IBRD user interface shall employ appropriate logic to retrieve and display a list (query result) of beacon records that approximately meet a given set of search criteria, allowing for search criteria with "wild card" values (unspecified characters in the search string accepted as a match for any character in the searched field).

8.2.2 The IBRD user interface shall, as a minimum, process queries based upon any combination (logical AND) of the following fields:

a) beacon 15 Hex ID;

b) vessel/aircraft name;

c) owner's name;

d) carrier registration number;

e) Radio Call Sign;

f) MMSI;

g) vessel/aircraft type;

h) last update date; and

i) date of last confirmation request.

8.2.3 The IBRD user interface shall provide access (view and/or modify as allowed on the basis of the user class) to the actual registration information for each record directly from the resulting query list, and a means to return to the query list after viewing a specific record.

8.2.4 The count of records found in the query result shall be provided.

8.2.5 As a minimum the query list shall display the following fields:

a) beacon identification code;

b) country code;

c) beacon type;

d) owner's name;

e) vessel name / aircraft registration marks;

f) vessel Radio Call Sign; and

g) MMSI.

8.2.6 The IBRD user interface shall provide a capability for re-sorting the resulting query list on the basis on the displayed fields in ascending or descending order.

8.2.7 The IBRD user interface shall provide the Database Administrator with a capability to identify individual records from the query list, and send the full listing of the associated record contents either to a text file or a printer.

8.3 Query Export

The IBRD user interface shall provide the following minimum export capabilities for query results:

a) export the displayed query results to a tab-delimited text file;

b) export the displayed query results to a comma-delimited text file; and

c) format and print the displayed query results.

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9. PERFORMANCE

9.1 Database Capacity

The IBRD shall have the capability to accommodate the current and forecast 406 MHz beacon population, for up to 1,000,000 beacon registrations.

9.2 Availability

9.2.1 The IBRD shall be available for operational use 99.5% of the time on an annual basis.

9.2.2 The IBRD shall not remain continuously unavailable for time periods of more than [2] hours.

9.3 Maximum Response Time

9.3.1 The IBRD shall provide a timely response to Data Provider requests and inputs. The IBRD total processing time, including the recording of new or modified data in the IBRD database and the transmission of any response to the Internet entry point, shall not exceed 30 seconds.

9.3.2 The IBRD user interface shall display on the Data Provider's computer screen a "time passage" indicator (such as an "hourglass" or a "progress bar") when the processing time exceeds 2 seconds.

9.3.3 The IBRD shall process bulk record inputs from National Data Providers, including the transmission of the appropriate response at the entry point of the communication network, within a time period that does not exceed 30 seconds per processed record.

9.3.4 The IBRD shall provide a response to a SAR service query within 30 seconds of receipt, at the Internet entry point.

9.4 User Load

The IBRD shall meet the above requirements with up to 100 simultaneous users.

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10. IBRD MAINTENANCE

10.1 Archival

The IBRD shall provide means for the archival of records separately from the IBRD database. The periodic archival operation shall:

a) remove all records from log tables that are older than 180 days and place them in the archival database; and

b) remove all records from the main beacon tables that have not been confirmed / updated for more than 10 years and place them in the archival database.

10.2 Backup

The IBRD shall provide means for back up on a routine schedule. The backup operation shall copy the entire IBRD database to external media (e.g. tape) that can be stored separately from the IBRD system.

10.3 Monitoring

The IBRD shall provide tools and displays that allow routine monitoring of the IBRD status and operation by the Database Administrator, with the objective of ensuring security / availability of proper system operation.

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ANNEX A

LIST OF ABBREVIATIONS AND ACRONYMS

COSPAS	Space system for the rescue of vessels in distress (Russian Federation)
COTS	Commercial off the shelf
C/S	Cospas-Sarsat
ELT	Emergency Locator Transmitter
EPIRB	Emergency Position Indicating Radio Beacon
FAX	Facsimile
FAQ	Frequently asked question
IBRD	International 406 MHz Beacon Registration Database
ICAO	International Civil Aviation Organization
ID	Identification
IMO	International Maritime Organization
IP	Internet protocol
ITU	International Telecommunication Union
MARS	Maritime mobile access and retrieval system (ITU database)
MCC	Cospas-Sarsat Mission Control Centre
MHz	Megahertz
MMSI	Maritime Mobile Station Identity
POC	Point of contact
PLB	Personal Locator Beacon
RCC	Rescue Coordination Centre
SAR	Search and Rescue
SARSAT	Search and Rescue Satellite Aided Tracking system (Canada, France, USA)
SBM	Shore-based maintenance
SQL	Structured query language
TAC	Type approval certificate
15 Hex ID	15 hexadecimal character identification

- END OF ANNEX A -

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ANNEX B

INTERNATIONAL 406 MHZ BEACON REGISTRATION DATABASE DATA ELEMENTS

The following data elements represent the minimum required elements to satisfy the needs of SAR services and database access. Additional data elements may be required for use by the application database software. Mandatory data elements are required for a beacon registration to be entered.

Beacon Data

Data Name	Description	Mandatory User Input	Source *
Beacon Hexadecimal ID	Bits 26-85 of 406 MHz beacon message. Expressed as 15 hexadecimal characters. Encoded position bits set to default values.	Yes	data provider
C-S TAC Number	Cospas-Sarsat beacon type approval number		data provider or beacon decode
Beacon Type	Type of beacon, i.e, EPIRB, ELT, PLB.		beacon decode
Beacon Protocol	Protocol used for beacon coding		beacon decode
Activation Mode	Automatic or Manual activation capability of beacon		data provider
Beacon Manufacturer	Name of manufacturer of beacon		data provider
Beacon Model	Model name of beacon		data provider
Beacon Status	Indicates if the beacon is in-use, lost, stolen, sold, adrift, etc. Data should be from drop-down menu		data provider
Previous Beacon Status	Store the previous status of the beacon when provided (see above)		data provider
Beacon Homing Device	Frequency or type of homing device. Drop-down menu should be used for data provider input.		data provider or beacon decode
Additional Data	Any other information on the beacon that may be useful, e.g., manufacturers' serial number.		data provider
Last Update Date	Date data last updated		database
Confirmation Request Date	Date request for confirmation e-mail sent		database
Original Registration Date			database

Note: * Where the source indicates "beacon decode" or "database", the field will be automatically provided by the IBRD, whenever possible.

Beacon Owner Information

Data Name	Description	Mandatory User Input	Source
Owner Name	Full personal name, company name, or government agency name	Yes	data provider
Owner Password	User password	Yes	data provider
Owner Address	Street, city, country, postal code		data provider
Owner e-mail	E-mail address of beacon owner		data provider
Owner phone number and type	Contact numbers for beacon owner including type such as phone, fax, mobile, etc.	Yes	data provider
First Emergency Contact Name	Name of primary emergency point of contact	Yes	data provider
First Emergency Contact Address	Address of primary emergency point of contact		data provider
First Emergency Contact	Phone number and type for primary emergency point of contact	Yes	data provider
Second Emergency Contact Name	Name of second emergency point of contact		data provider
Second Emergency Contact Address	Address of second emergency point of contact		data provider
Second Emergency Contact	Phone number and type for second emergency point of contact		data provider
National Data Provider ID	User identification of National data provider		database
Challenge Question	Challenge question user selected for supporting re-instatement of password	Yes*	data provider
Challenge Response	Challenge response user selected for challenge question for supporting re-instatement of password	Yes*	data provider
Number of Logon Failures	Count of sequential logon failures for record. Used to deactivate account.		database
Additional Notes	Any other information on the beacon owner that may be useful.		data provider

Note * Mandatory for Data Providers (beacon owners) only, not mandatory when registration is controlled by a National Data Provider.

Vehicle Information

Data Name	Description	Mandatory User Input	Source
Vehicle Type	Vehicle code for aircraft, vessel or personal use. Should be selectable from drop-down menu.	Yes	data provider
Vehicle Nationality	MID country code for vessel flag State or aircraft nationality of registration.		data provider
Vehicle Name	Name of vehicle or vessel	Yes*	data provider
MMSI	Maritime Mobile Service Identity	Yes*	data provider or beacon decode
Callsign	Vessel radio call sign or aircraft registration number	Yes*	data provider or beacon decode
Ship Identification Number	IMO number or national registration number	Yes*	data provider
Vehicle Description	Vessel Type, tonnage, superstructure, etc, or Aircraft Manufacturer, Type, colour, etc. Help table or drop-down menus to be provided.		data provider
Aircraft 24-bit Address	24-bit address of the aircraft, expressed as 6 hexadecimal characters		data provider or beacon decode
Capacity	Vehicle capacity in numbers of people		data provider
Vessel Contact Numbers	Radio installations and contact details for ship and survival craft		data provider
Survival Craft	Type and number of survival craft		data provider
Aircraft Operating Agency	Aircraft operating agency designator and operator's serial number.		data provider
Additional data	Any other information on the vehicle or vehicle usage that may be useful. Details of any secondary uses of PLBs may be included.		data provider

Note: * Only one of the marked entries is mandatory. Not required for PLBs.

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