Beacon Manufacturers Workshop
May 1, 2014
Annapolis, Maryland

MINUTES

NOTE: This document covers Workshop highlights. Presentations and other information are posted on the NOAA SARSAT website (www.sarsat.noaa.gov) under 'SARSAT Meetings' tab.

1. Welcome and Opening Remarks

Mr. Chris O'Connors (NOAA SARSAT Program Manager) welcomed the participants to the 2015 Beacon Manufacturer's Workshop (BMW) and thanked RTCM for hosting the meeting. He commented on the importance of SARSAT collaboration with beacon manufacturers. Concurrent development of the Medium Earth Orbiting Search and Rescue System (MEOSAR) and second generation beacons (SGBs) had caused heavy workloads for all concerned, but represented a critical phase for Cospas-Sarsat (C-S).

The Chair, Mr. Mickey Fitzmaurice (NOAA/SARSAT), convened the meeting. After thanking Ms. Lisa Hessler (NOAA/CSC) for administratively supporting the Workshop, he invited the participants to introduce themselves. Enclosure (1) lists the participants.

2. Review of Prior Action Items

The sole action item from the 2014 BMW related to adding a test to C-S document T.007 (Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard) to identify beacons that could transmit with rapid repetitions; this action remained pending.

3. Cospas-Sarsat

Mr. Dany St-Pierre (C-S Secretariat) discussed the C-S Program status and evolution.

Program Status

C-S Participants operate a satellite system to detect and locate signals worldwide from distress beacons and provide accurate, timely and reliable distress alert and location data to help SAR authorities assist persons in distress and increase the probability of their survival. Besides the Parties (Canada, France, Russia and the USA), 26 nations contribute to the ground segment and ten User States and two Organizations participate in the C-S Program.

C-S operates a low Earth orbiting SAR system (LEOSAR) and a geostationary Earth orbiting SAR system (GEOSAR). By 2019, C-S plans to have eight LEOSAR and 14 GEOSAR satellites. 76 ground stations (LUTs) and 31 mission control centers (MCCs) support LEOSAR and GEOSAR. The global 406 MHz beacon population was steadily growing.

C-S had contributed to rescues of more than 37,000 persons in more than 10,000 SAR events since becoming operational in 1982, and the rescue rate had grown to an average of five to six daily.

The Secretariat operates the International Beacon Registration Database (IBRD) for registering beacons; the IBRD contains about 49,000 records from 126 national administrations, with about 8,000 new beacons being registered annually. SAR personnel typically use the IBRD more than 300 times per month.

Program Evolution

Cospas-Sarsat will use the developing medium Earth orbiting system (MEOSAR) in the future. By the end of 2015, MEOSAR is expected to have 31 satellite payloads that operate on either S or L-band downlinks, with a growing number of supporting ground stations (MEOLUTs) and MEOSAR-ready MCCs. The operational system will need about 24 L-band satellites (8 already available).

MEOSAR will be able to detect and locate the initial signal burst from beacons and subsequently calculate more accurate beacon locations as the beacon continues to transmit. The number of satellites will provide robust detection and location of stationary and moving beacons. With a return-link-service (RLS) beacon, the user would be able to be notified that the system detected and processed the distress alert.

While MEOSAR will offer performance superior to the current system, it is also be a more complex system, with satellites provided by the European Galileo system, the Russian GLONASS system, and the USA GPS system. Most of the initial L-band satellites would be provided by Galileo.

MEOSAR’s development would continue through an early operational capability (EOC) phase planned to begin in January 2016, and was expected to reach initial operational capability (IOC) in January 2017 and full operational capability (FOC) in early 2018.

Second generation beacons (SGBs) compatible with the current C-S system were being developed to take fuller advantage of MEOSAR and further improve system performance. SGBs are intended to be available in 2019. Meanwhile, C-S must complete its SGB specifications (T.018) and type approval requirements (T.007); RTCM, RTCA, ICAO, IMO and other organizations must complete their respective related documents; test labs must be prepared to handle SGBs, and manufacturers much ready their products. C-S and other organizations are striving to complete all of this work.

LEOSAR would be maintained until MEOSAR FOC and probably for at least 2025; three new LEO spacecraft launches were planned and several healthy LEO satellites were in orbit. Discontinuation of the robust LEOSAR system was not expected to be considered until after MEOSAR was proven.

The EOC was planned because several countries wanted to use MEOSAR data as soon possible. Most MEOLUTs during EOC would be located in North America and Europe, but other areas like Australia, New Zealand and Brazil would also be able to receive EOC data. Merging MEOSAR data with data from the existing system should improve EOC detections and location accuracy.

4. RTCA SC-229

Purpose and Structure

Mr. Tom Pack (ACR Electronics and Co-chair of RTCA Special Committee on 406 MHz Emergency Locator Transmitters (SC-229)) reported on the combined work of SC-229 and

EUROCAE's Aircraft Emergency Locator Transmitter working group (WG-98). RTCA and EUROCAE planned to develop common standard for ELTs that both organizations could publish. RTCA would update its DO-204A minimum operational performance standard (MOPS) for 406 MHz current and second generation ELTs with the intent that the Federal Aviation Administration (FAA) would adopt the revised MOPS as a new technical standard order (TSO C126x).

SC-229 and WG-98 had met jointly four times, most recently in April 2015, in a plenary session with the following working groups:

- WG-1: Triggered Flight
- WG-2: Crash Survivability
- WG-3: Homing and Intelligent Transmit Scheduling (HITS)
- WG-4: GNSS, RLS, Power, Etc.
- WG-5: DO-204 Standard Development

WG-1 was working on a minimum aircraft system performance specification (MASPS) that would provide ICAO scenarios and criteria for triggering inflight distress alerting and tracking. The MASPS were expected to be completed and published in ICAO's Annex 6 (Operation of Aircraft) by November 2016. The MASPS would not address what technology would be triggered, but ELTs might be used. The resulting distress data was envisioned to be provided to C-S, the aircraft operator, and air traffic control.

WG-2, led by NASA, was focused on making ELTs more reliable and survivable in accidents and was trying to finish its work during 2015. The Group had recommendations related to safety and fire and would be working on recommendations related to vibrations. NASA was conducting crash tests of actual general aviation aircraft with ELTs onboard at its Langley Research Center, and was hoping for more support from manufacturers of general aviation aircraft and helicopters. A key concern is that ELTs often have not activated in actual crashes.

[WG-3 efforts were reported on separately; see below.]

WG-4 was just beginning its work.

WG-5 would be producing the actual ELT standards document for 1st and 2nd generation ELTs for RTCA and EUROCAE using EUROCAE ED-62A as the template.

Implementation

ICAO would be sending a letter to its Contracting States about its Global Aeronautical Distress and Safety System (GADSS) outlining requirements for normal and distress tracking. ICAO was considering allowing GADSS to eliminate one of the ELTs aircraft are required to carry; however, a 2nd generation ELT might be used to meet the GADSS requirement.

RTCA was seeking to coordinate its work with C-S so that 2nd generation ELTs could be certified by 2019 in time for MEOSAR, and for ICAO's GADSS mandate that would be effective from 2021. New ELTs would meet SGB requirements, but requirements for current ELTs would be strengthened to improve survivability.

Five more WG-98/SC-229 meetings had been scheduled during 2015 and 2016 to finish work on DO-204.

Mr. O'Connors emphasized that ELTs had been valuable in spite of issues with the current beacons. He commented on 16 lives that had been saved with 406 MHz ELTs during and after 2013.

5. Global Aeronautical Distress and Safety System

Mr. Mike Barton (ICAO) discussed development of distress tracking as part of ICAO's GADSS. The concept would involve normal tracking at 15 minute intervals, abnormal tracking at one minute intervals, autonomous distress tracking at one minute intervals, and retrieval of cockpit voice recorder (CVR) and flight data recorder (FDR) data. GADSS components would account for 1) aircraft systems; 2) air traffic services (ATS) and the aircraft operator; 3) SAR; and 4) system wide information management.

Normal tracking would be implemented from November 2016. Performance-based Standards and Recommended Practices (SARPs) for distress flight tracking would be applicable from January 2021 for new aircraft with an incentive (no second ELT required) for early adoption. GADSS is intended to enable finding an accident site within 6 NM. Triggers would be automatic, manual, and from ground, with triggers for automatic activation based on aircraft behavior.

The concept would alert SAR authorities, the aircraft operator and air traffic control via communications protocols to be determined.

The ICAO letter to States would propose amendments to the ICAO Annexes for distress tracking for aircraft with take-off mass in excess of 27,000 kg and more than 19 seats. After State comments are received, ICAO would likely schedule a workshop to finalize the amendments.

Mr. Chris Hoffman (ACR) recommended using C-S for distribution of data to the SAR system.

6. ELT Survivability

Mr. Tony Foster (NASA SAR Program Deputy Manager) added to the comments Mr. Pack had made on RTCA SC-229 WG-2. The Group intended to provide empirically-based recommendations for adoption in DO-204 to improve ELT performance for 1st and 2nd generation ELTs, particularly for crash safety, automatic activation, flame/fire survivability, vibration and installations.

Support of SC-229 WG-2

WG-2's work would involve research on historic and current ELT performance, laboratory and full-scale crash experiments, analysis of severe but survivable crash scenarios, and delivering recommendations to SC-229 for the ELT MOPS. NASA was coordinating this work with the U.S. National Transportation Safety Board (NTSB).

Tests

Lab testing would address issues such as disconnected antennas, effects of vibration on g-switches and effects of fire on ELTs and cables.

G-switch tests would include environmental tests based on DO-160G (Environmental Conditions and Test Procedures for Airborne Equipment), checks of g-switches before, during and after crashes with pulses above and below the DO-204 threshold, and assessing the ability of current systems to endure vibrations and still function as expected.

NASA had already conducted a full-scale crash test with a CH-46E fuselage, and would be testing ELTs during three crashes of Cessna 172 aircraft (four ELTs installed in various ways aboard each aircraft) during the summer of 2015.

Findings would show why ELTs have failed 40-50% of the time even though they meet specifications. Lab testing has included drop tests with different ELT orientations, separation of ELTs from their antennas, fire/flame tests, vibration (as typical aboard aircraft, especially effects on g-switches), and antenna cable strength (including pull tests, flame environments, etc.).

Mr. Foster invited the Workshop attendees to participate in the Group as it moved forward with crash tests and other survivability efforts.

7. RTCM

Mr. Hoffman (SC-110 and SC-128 Chair) provided general background on RTCM, the main role of which is to develop standards, support relevant work of other U.S. and international organizations, and disseminate information and advice to its members.

RTCM had supported every C-S Joint Committee meeting since 2005 and had particularly supported development of C-S documents T.001 and T.007 on SGB specs and beacon type approval testing, respectively.

SC-110

RTCM's Sub-committee on emergency beacons (EPIRBs and PLBs) (SC-110) develops and maintains beacon standards, reviews relevant new technologies, processes information on other matters of interest (such as MEOSAR), supports C-S, and was developing a new standard for SGBs.

The EPIRB standard (RTCM 11000.3) addresses differences from IEC's standard (61097-2, Part 2) including homing options. RTCM would publish a new version (11000.4) in June to include options for automatic identification system (AIS) homing signals interwoven with 406 MHz and 121.5 MHz signals. The AIS message includes the EPIRB's 15 hex ID. The Federal Communications Commission (FCC) has proposed rules to adopt the standard.

RTCM's PLB standard (11010.2), also proposed by the FCC for adoption, was published in 2008 and had been amended to mandate internal global navigation satellite system (GNSS) capability, an altitude test and a wet self-test, GNSS timing requirements, and NOAA's beacon coding requirements.

SC-128

SC-128 is responsible for a standard for satellite emergency notification devices (SENDs). This standard (12800.0) had been amended twice since its publication in 2011 to include a patent annex and handle other minor edits. RTCM had asked the FCC authorize use of SENDs by adopting the standard in 47 CFR Part 95.

SC-119

SC-119 is responsible for a standard for open and closed loop Maritime Survivor Locator Devices (MSLDs) that transmit on 121.5 MHz, VHF DSC Channel 70 (digital selective calling) and VHF AIS frequencies; this standard (11901.1) was also expected to be adopted into FCC rules.

In response to a question about whether the FCC would allow use of AIS in PLBs, Mr. Hoffman noted that the FCC seemed to support PLBs being marketed in land and maritime varieties, with the maritime version being able to incorporate AIS, but this approach had not be decided.

8. Second Generation Beacons

NASA's SGB Proof-of-concept

Mr. George Theodorakos (NASA/ASRC) highlighted NASA's work on SGBs. NASA had been developing a proof-of-concept (POC) test plan to test MEOSAR performance using beacons compliant with C-S T.018 and the SGB operational requirements in C-S G.008.

The NASA SARLab had been generating beacon signals by various means and had a six-channel MEOLUT capable of processing the signals. The test plan provided for testing threshold and system margin signals, message acquisition, independent locating, system capacity and compatibility, homing and on-scene locating and field tests. These tests were comparable to the MEOSAR D&E technical tests.

The C-S Joint Committee would be reviewing an updated draft SGB specification (T.018) in September. NASA was helping to develop a draft C-S type approval standard (C-S T.X07) that would include tests to verify compliance with T.018. The main goal for the Joint Committee involvement was completion of a verification matrix. Mr. Theodorakos encouraged beacon manufacturers and test facilities to remain aware of progress on T.018 and T.X07 and to assist in developing the test methodologies.

The 406 MHz homing and on-scene locating test would support the HITS working group and would involve field tests using actual beacons distributed worldwide. [See more under item 10 below.]

Threshold tests would be conducted using regular beacon monopole antennas, but other available types of antennas would be used in the tests as well to check antenna performance characteristics. Test parameters would include measuring EIRP at representative ground planes.

Commercial Beacons

NASA was trying to develop a prototype commercial SGB with inexpensive components; various readily available chips could be used. NASA would be consulting with manufacturers on commercial viability.

Some manufacturers emphasized that providing flexibility for future products was complicating completion of the beacon specifications, but that room was needed to innovate to produce the best products.

9. MEOSAR

D&E Tests

The MEOSAR demonstration and evaluation (D&E) was divided into technical and operational tests. Mr. Theodorakos explained that NASA provides data for operational tests, but mainly focuses on the D&E technical tests. He reported that preliminary analysis was being conducted on results of the following Phase II technical tests:

T1 – MEOLUT Single Burst Detection Threshold
T3 – MEOLUT Throughput
T4 – Location Performance
T5 and T5/T7 – Performance with commercial beacons, without and with networking

For T1 the single burst detection threshold was being met about 94% of the time, a favorable result. T1 was conducted with a four antenna MEOLUT; results could be expected to improve with six antennas. T1 signals were produced with using a beacon simulator with a typical monopole antenna.

Action: NASA to distribute to BMW attendees the MEOSAR D&E Phase II T1 test data for various antennas and antenna setups (including elevations) using the Maryland MEOLUT

T3 had been run for 24 hours at 37 and 33 dBm for 24 hours; 100% detection had been achieved within five minutes (seven bursts). 50 beacon IDs were received per hour.

T4 also used two power levels to test location accuracy based on beacon simulator signals, and for the 95th percentile, accuracies varied but were typically slightly over 5 km. After ten minutes, the accuracies remained at about 5 km for low power signals and were slightly better using the higher power.

T5 was used to process signals from an actual beacon activated in the UK for a ten minute window of data. The average locator error using the Maryland stand-alone MEOLUT was 3.22 km. The probability of location was higher when the Maryland MEOLUT was networked with the Florida MEOLUT, but the average error increased to 4.39 km. Phase II results were better than Phase 1 results due to availability of more satellites.

System

Only one L-band satellite was available for Phase II tests; the rest were S-band. L-band provides better gain through the satellite. Phase III tests will only use L-band satellites.

MCCs filter updated locations; the filtering criteria (change in location, time since last update, etc.) would have to be different for MEOSAR than for the current system.

10. Homing and Intelligent Transmit Scheduling

Mr. Thiedeman (USCG) and Mr. Hoffman co-chair the HITS WG.

Mr. Ed Thiedeman explained that SGBs would alert using spread spectrum rather than narrow band, so the 406 MHz alert signal would not be usable for homing. Optional homing signals would be AIS, DSC or low power 406 or 121.5 MHz signals. SGBs were expected to have a 250 mw 121.5 MHz homing signal to satisfy the requirements of ICAO and IMO.

C-S had established the WG to help define and validate C-S G.008 homing requirements and to define performance requirements for a 406 MHz homing signal. The WG had developed a concept of interweaving the alerting signal (with intelligent transmit scheduling) and various homing signals, was refining the interweaving concept, and would be drafting a related performance specification. The WG hoped to optimize the transmit schedule to maximize battery endurance. The transmit schedule would be different after the initial 30 minutes of beacon operation.

The WG had also developed a plan for testing homing on a 121.5 MHz signal with a 33% duty cycle and was preparing a description of a 406 MHz homing signal. The reduced duty cycle 121.5 MHz homing was being tested to show that the IMO requirement for a continuous signal could be relaxed.

Mr. Thiedeman summarized the WG's plans to work on the following:

- 121.5 MHz Test Plan
- 121.5 MHz Test Activities
- 121.5 MHz Test Results Review, Analysis, and Conclusions
- Assumptions for Interleaved Homing
- Interleaved Homing Implementation Proposal
- Interleaved Homing Specification for T.018
- Intelligent Transmit Schedule for 30 + minutes
- Battery Capacity Endurance Analysis to meet all requirements

Mr. Hoffman urged federal authorities to decide which homing signals they want for SAR purposes, hopefully agreeing on some standardization so the types of DF equipment needed could be minimized.

Action: USA SARSAT Agencies to evaluate implementation strategies for various homing and intelligent scheduling (HITS) with the objective of better standardization among beacon types

The WG had six more meetings scheduled during the period of June-September 2015.

11. Beacon Use, Issues and 406 MHz Beacon Registration Database

Mr. Apurve Mathur (NOAA/ERT), who leads work on the NOAA SARSAT registration database (RGDB), discussed 406 MHz beacon usage, issues and registration.

False Alerts

ELTs had been causing about twice as many false alerts as EPIRBs (ELTs caused 61% of the total); this was confirmed to be a Western Hemisphere problem when NOAA began including data from SAR points of contract (SPOCs) in 2014. Due to the surge in 2014 false alerts with inclusion of SPOC data, 2014 would become a baseline for future statistics. The PLB false alert rate had remained relatively low. Poor installations seemed to be partly responsible for ELT false alerts. A high 4.33% of the ELT population had activated in non-distress situations.

Mr. Mathur asked manufacturers receiving orders from federal agencies to urge the buyer of these 'national use' beacons to contact NOAA to discuss coding, data distribution, false alert mitigation, beacon testing, registration and replacement and disposal of beacons and batteries.

Beacon Registration

Registration data sent via the U.S. postal service must be addressed to SARSAT Beacon Registration, NOAA (NSOF E/SPO53), 1315 East-West Highway, Silver Spring, MD 20910. Registrations sent via FedEx or UPS must be sent to SARSAT Beacon Registration, NOAA (NSOF E/SP043, 4231 Suitland Road, Suitland, MD 20746. Any registrations mailed to NOAA's Suitland, MD address would be returned to the sender.

Mr. Mathur urged manufacturers to use the 5-digit checksum on the registration forms to help verify the 15 digit hex ID; only a few manufacturers had been using the checksum so far. Eventually, use of the checksum would be mandated.

Due to the critical importance of accurate registration data for lifesaving, Mr. Mathur encouraged beacon manufacturers and service centers to:

- Promote online registration
- Ensure that a legible UIN label is attached to the registration form
- Verify NOAA decal currency, and help ensure the beacon registration data is updated, especially if a different beacon is returned to the owner
- Ask owners to recode non-serialized beacons as necessary due to use of the beacon on a different vessel or aircraft
- Provide NOAA with formulas used to correlate beacon IDs and coding protocols
- Provide beacon UINs for beacons taken out of service

Statistics

Mr. Mathur reviewed a number of RGDB user interface improvements that would be implemented by the end of 2015 to simplify registration and reduce errors. Owners register beacons via the website 77% of the time.

NOAA registers about 44% of the world's population of beacons. About 20,000 PLBs were registered in 2014, about twice the number of ELTs or EPIRBs. The RGDB contained records for about 154,000 PLBs, 80,000 ELTs and 204,000 EPIRBs. Boat owners were the dominant users of PLBs.

RGDB statistics are available on the NOAA SARSAT website under the *Other Resources* tab.

ELT Maintenance

Mr. Barton mentioned that most false alerts in Australia are related to ELT maintenance and installations. Maintainers sometimes activate beacons to test them. Apparently some manufacturers provide instructions to test beacons by turning them on, and the civil aviation authorities require that the manufacturer guidelines be followed.

Mr. Hoffman explained that the FAA apparently requires testing ELTs in the U.S. by turning them on.

> ***Action: USA SARAT Program to review with the FAA whether its guidance for testing beacons could be improved to reduce false alerts occurring during maintenance***

Mr. O'Connors reviewed some initiatives NOAA had been taking to reach out to beacon maintainers to increase awareness of the false alert problem.

12. Beacon Type Approval

Approval Standards and Process

Mr. Jesse Reich (NOAA) stated that national administrations require beacons to be type approved in accordance with C-S T.007. Other C-S documents relevant to type approval included:

- T.001 - Specification for Cospas-Sarsat 406 MHz Distress Beacons
- T.007 - Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard
- T.008 - Cospas-Sarsat Acceptance of 406 MHz Beacon Type Approval Test Facilities
- G.005 - Cospas-Sarsat Guidelines on 406 MHz Beacon Coding, Registration and Type Approval
- P.012 - Cospas-Sarsat Secretariat Management Guide

Mr. Reich reviewed the sequence of events involved in obtaining a C-S type approval certificate for a new beacon. Review of test results and technical data by the C-S Secretariat and Parties was part of this process. RTCM had been sponsoring a type approval workshop that met regularly to try to improve the type approval process, and the Joint Committee had been reviewing the process as well.

Concerns about the Process

Concerns that manufactures had voiced about the process include:

- Length of time to process an approval application
- Requirement for testing, documentation or other justification imposed outside of the current requirements of T.001 and T.007
- Assessments of documentation and marketing claims not required by T.001 and T.007
- No method to resolve disputes or provide comments is prescribed in documentation
- No continuous verification of the test laboratories once they have been approved
- Uncertainty about testing procedures for novel designs

Sometimes questions or requests for more information from the Secretariat had raised additional questions or had resulted in need for additional testing, greatly lengthening the time required to obtain type approval, sometimes to two to six months. The workshop had proposed limiting questions and requested retests to one round; the Secretariat would then forward any remaining questions with information the manufacturer had provided and a summary with its recommendations to the C-S Parties to review.

Mr. Reich advised that the purposes of testing prescribed in Section 2.2 of C-S T.007 were to ensure that:

- Beacon signals are compatible with system receiving and processing equipment
- Beacons to be deployed do not degrade nominal system performance
- Beacon encoded position data is correct
- Beacons comply with T.001 and T.012 (Frequency Management Plan)

Manufacturers had been concerned about some testing being required such as for battery life; they believed some tests were beyond the scope of T.007.

T.007, Section 4.8 provides discretion for the Secretariat to require additional tests including but not limited to tests for novel or non-standard design features or operational configurations not described in current standards.

Absent a clear process for complaining about the type approval process, Mr. Reich invited concerned manufacturers to document their concerns so NOAA could try to help resolve them.

Discussion

The Chair observed that all involved were working hard to make the type approval process effective. Reports to the Parties from the Secretariat seemed to be well prepared, but when beacons failed, the Parties sometimes needed to obtain more information. The Chair urged those involved not to give up working to improve the process, and emphasized that communications is important throughout the process.

Mr. Steve Lett (Secretariat Head) noted that T.007 seeks to ensure beacon signal compatibility with the system and compliance with T.001, either of which could drive a Secretariat request for more testing. The Secretariat could submit type approval results to the Parties at any time, but unresolved issues would still need to be resolved among the manufacturer, the Secretariat and the Parties. The Secretariat had proposed a resolution process that the RTCM workshop had accepted, but that the C-S Participants had subsequently rejected. Mr. Lett said that the Secretariat remained open to any other proposals.

Mr. Hoffman noted that the RTCM workshop had achieved some success in improving the process; however, confusion still existed, the process still takes a long time, and some clarifications were still needed.

Mr. Neil Jordon (McMurdo) pointed out that editorial issues should not be allowed to slow down the technical review process and that a time constraint on the review process would be appreciated. Mr. Lett replied that once the review package is provided to the Parties, they have 14 days to respond but can request more time. The Secretariat reports to the Parties are usually found acceptable, largely due to the work the Secretariat does before submitting the approval to the Parties.

Mr. Eric Hiner (Astronics) expressed appreciation for NOAA's interest in helping to resolve the type approval issues. Astronics was about ready to submit an ELT with unique features for type approval and wanted to submit the package to both the Secretariat and NOAA to discuss the process and address any concerns as early as possible.
Mr. O'Connors appreciated the idea, but supported following the established process and working with the Secretariat first.

Mr. Lett agreed that T.007 requirements could be refined for better clarity, and noted that type approval reviews for SGBs might be even become more difficult due to special beacon features and allowing room for innovation. Every potential issue cannot be anticipated.
Mr. Lett invited manufacturer discussions with the Secretariat as early in the process as possible, or even ahead of the process, adding that the Secretariat's objectives are to ensure that beacons perform well so the C-S program will do well, and to help the manufacturers to be successful.

13. Manufacturers Survey

Mr. Andryey Zhitenev (Secretariat) discussed preliminary results of the 2015 annual C-S survey of beacon manufacturers and offered assurance that information about particular manufacturers was always treated as confidential by the Secretariat. Statistics and trends drawn from the survey are used to help with forecasts and planning.

Survey Highlights

50 beacon manufacturers had participated in the survey with 44% in Europe, 30% in the USA and Canada, and 26% in Asia and Australia. Worldwide, about 188,500 beacons had been produced in 2014, a 20.7% increase over 2013, with the greatest percentage growth among EPIRBs.

Over 91,000 EPIRBs, about 25,000 ELTs and over 72,000 PLBs had been produced in 2014. Six manufacturers had produced no beacons, 18 had produced less than 500 beacons, and 26 manufacturers had produced 500 or more beacons. 54% of the manufacturers had reported increased production.

The total beacon population at the end of 2014 was estimated at 1,547,000, about 9.5% more than at the end of 2013.

Four new manufacturers had indicated plans to enter the market with new beacon models.

Location Protocol Beacons

126,000 of the beacons produced in 2014 used location protocols, bringing the total estimated location protocol beacons in service to 793,000. Almost all new PLBs are had location protocols, compared with about 36% of ELTs and 51% of EPIRBs.

Forecasts

Manufacturers were projecting a production of 217,000 beacons in 2015, including about 27,000 ELTs with the remainder equally divided among EPIRBs and PLBs. That would bring the global population to about 1.7 million and represent an additional growth of 9.4%.

The survey had led the Secretariat to expect 28 applications for type approval during 2015.

Beacons Removed from Service

Mr. Peter Forey (Sartech Engineering) inquired about how the number of beacons being scrapped was determined. He noted that many owners replace their beacons every five years and wondered how beacons taken out of service were accounted for in the beacon population estimates.

Mr. Zhitenev explained that the Secretariat used a model that assumes beacon lives of ten years. The number of beacons declared withdrawn from service by manufacturers is compared with this model to refine the estimates. Manufacturers are often provided feedback from service centers on how many beacons are being removed from service.

14. Review of Action Items

Enclosure (2) is a list of action items that remain open from this and prior BMW meetings.

15. Closing Remarks

The Chair expressed appreciation to all the presenters and participants for their interest and contributions, thanked RTCM for hosting the meeting, and gratefully acknowledged ACR Electronics for providing lunch for the meeting.

The Chair adjourned the meeting.

Enclosures:

1. List of Participants
2. List of Open Action Items

Enclosure (1)

List of Participants

	NAME	ORGANIZATION
1.	Avidor, Dalia	Astronics DME Corporation
2.	Barton, Mike	ICAO AMO Section
3.	Bastiani, Sergio	Astronics DME Corporation
4.	Bece, Tibor	GME Standard Communications
5.	Blake, Robert	BriarTek, Inc.
6.	Bovard, Reese	NASA/GSFC
7.	Chen, Jizhong	NASA/GSFC
8.	Christo, Jim	NASA/GSFC
9.	Cleveland, Allen	USCG C3CEN
10.	Cornish, Angie	Canadian Beacon Registry – CMCC/ Dept of National Defense
11.	Eggen, Øyvind	JOTRON AS
12.	Fitzmaurice, Mickey	NOAA
13.	Forey, Pete	Sartech
14.	Foster, Anthony W.	NASA/GSFC
15.	Foster, Eric	NOAA/ERT
16.	Fuechsel, CAPT Jack	GMDSS Task Force
17.	Fuhrmann, David	Air Force Rescue Coordination Center
18.	Greenway, Debbie	Rakon
19.	Griffin, Sean	GME
20.	Guigue, Michel	CLS America
21.	Haydon, Richard Anthony	JOTRON AS

22. Hessler, Lisa	NOAA/CSC
23. Hiner, Eric	Astronics DME Corporation
24. Hoffman, Christopher	ACR Electronics, Inc.
25. Holmes, Kevin	WS Technologies Inc.
26. Hunter, Gregory	Ultra Electronics Ocean Systems
27. Jordan, Neil	McMurdo Group (Orolia Ltd)
28. Khalek, Ghassan	FCC
29. Khorrami, Jeff	McMurdo / TSi
30. Lariviere, George E.	Whiffletree Corporation Inc.
31. Lemon, Dan	NOAA/Acentia
32. Lett, Steve	Cospas-Sarsat Secretariat
33. Markle, Bob	RTCM
34. Martin, CAPT Peter	USCG
35. Mathur, Apurve	NOAA/ERT
36. McDermott, Robert J.	USCG
37. McDonald, Mike	Colorado Search and Rescue Board
38. Minichino, Benjamin P.	CLS America
39. Mirza, Naveed	Astronics DME Corporation
40. O'Connors, Chris	NOAA
41. Oladapo, Kehinde	AS&D
42. Ortenzio, LCDR Aaron	USCG
43. Pack, Thomas J.	ACR Electronics, Inc.
44. Pulgarin, Felipe	Rakon
45. Rajasingham, Jey	Transport Canada
46. Reich, Jesse	NOAA

47. Robinson, Michael	Specmat Inc.
48. Smith, Sharon	NOAA/CSC
49. Steir, Kim	NOAA/CSC
50. Steward, Paul	ACR Electronics, Inc.
51. St-Pierre, Dany	Cospas-Sarsat Secretariat
52. Street, Bill	WS Technologies Inc.
53. Strickland, Tim	USCG
54. Takahashi, Masaaki	Icom America Inc
55. Taylor, Stuart	Techtest Ltd
56. Theodorakos, George	NASA/ASRC
57. Thiedeman, Edwin	USCG
58. Zhitenev, Andryey	Cospas-Sarsat Secretariat

Enclosure (2)

SARSAT Beacon Manufacturer's Workshop
Open Action Items from 2015 and Prior Meetings

Action Item #	Description	Status
BMW-2012-AI.1	RTCM and Cospas-Sarsat to investigate the need to add a test to Cospas-Sarsat document T.007 to identify beacons that could transmit with rapid repetitions that prevent proper processing by SARP-3 satellite instruments.	*Still open. RTCM has no update on the status. It will be discussed at the SC-110.*
BMW-2015-AI.1	NASA to distribute to BMW attendees the MEOSAR D&E Phase II T1 test data for various antennas and antenna setups (including elevations) using the Maryland MEOLUT	*Open*
BMW-2015-AI.2	USA SARSAT Agencies to evaluate implementation strategies for various homing and intelligent scheduling (HITS) with the objective of better standardization among beacon types	*Open*
BMW-2015-AI.3	USA SARAT Program to review with the FAA whether its guidance for testing beacons could be improved to reduce false alerts occurring during maintenance	*Open*