



Beacon Manufacturers Workshop

Summary of Discussion

May 9, 2008

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2008 Beacon Manufacturers Workshop

May 9, 2008

San Diego, CA

MINUTES

I. Introduction and Opening Remarks

Mr. Chris O'Connors (NOAA) opened the meeting as chair for the 2008 Beacon Manufacturers Workshop and welcomed all of the participants. Mr. O'Connors then introduced Mr. Dann Karlson (NOAA) who provided administrative announcements and indicated that Rakon would be providing a courtesy lunch for the meeting. The participants then introduced themselves and the workshop commenced with a review of the Agenda. The Agenda is provided as Attachment 1 and the list of attendees as Attachment 2.

II. Cospas-Sarsat System Update

NOAA

Mr. Karlson reported for NOAA, reviewing the U.S. SARSAT operations including the U.S. space segment status and planned launches. This and other information is included in Attachment 3. Among the highlights reported, all ground stations were fully operational, and acquisition of the first Medium Earth Orbit Local User Terminal (MEOLUT) had begun. System availability had been 99.933% for 2007. The U.S. Mission Control Center (USMCC) backup capability relocation to Wallops Island, VA was imminent, with Canadian and Australian backups still active. The breakdown of 2007 alerts was reviewed with a record number of lives (353) saved; 2008 saves are running at about the same rate. Beacon population figures that will be reported to Cospas-Sarsat were reviewed. 268 days remained until processing of 121.5 MHz alerts would be terminated on 1 February 2009.

Mr. O'Connors was also introduced as the new Branch Chief of NOAA Direct Services and SARSAT Program Manager.

Coast Guard

LCDR Kathy Niles (USCG) provided a Coast Guard update (see Attachment 4). After highlighting a few significant SAR cases with saves, she reviewed the Coast Guard SAR Program organization and staff. Recent activities were noted, including an RCC Controllers Conference at the USMCC, 121.5 MHz phase-out and beacon registration outreach activities to the boating and aviation communities, and installation of 406 MHz direction finding (DF) capabilities aboard SAR facilities and ashore. The Power Squadron and Coast Guard Auxiliary had been quite helpful with outreach to boaters. Arrangements had been made for the Dominican Republic to receive SARSAT alerts directly from the USMCC. Cooperation with NOAA is preceding to better capture

SARSAT performance indicators so that informed steps can be taken to improve the System. About 20-25% of 406 MHz beacons seem to remain unregistered.

NASA

Mr. Jim Christo (NASA) provided a NASA update (Attachment 5). The new SARLAB houses the Distress Alerting Satellite System (DASS) proof-of-concept ground station. A new beacon simulator and new spectrum analyzer are also in use. A very accurate beacon emulator is being delivered that will serve as a reference beacon for system and spacecraft measurements. Nine Global Positioning System (GPS) satellites are now DASS equipped. Work is ongoing to get DASS accepted as a requirement with the Air Force for a future GPS block of satellites. The proof-of-concept MEOLUT ground station is undergoing acceptance testing. NASA has been supporting RTCM's work on new PLB and Emergency Position-indicating Radio Beacon (EPIRB) standards, and RTCA's rewrite of its 406 MHz Emergency Locator Transmitter (ELT) standard. NASA has been testing Personal Locator Beacons (PLBs) to support the RTCM work. Finally, Mr. Christo covered NASA's work on bit rate tolerance testing in relation to the ability to detect beacons.

After a short break, LCDR Niles shared a video of the S/V Sean Seymour distress case from 2007. The dramatic footage demonstrated that this distress case was quite an ordeal involving an extreme sea state, and that captured how dangerous rescues at sea can be.

Cospas-Sarsat

Mr. Dany St-Pierre and Mr. Andryey Zhitenev of the Cospas-Sarsat Secretariat provided an update (Attachment 6) on the International Cospas-Sarsat Program. Mr. St-Pierre reviewed the Program's mission statement. There are currently 25 ground segment providers and 9 user states. The space segment status for a combined LEO/GEO (low Earth orbit/geostationary) arrangement was reviewed, and two Russian LEO satellites were expected to be added beginning in late 2008. There were four operational GEO satellites with a fifth Russian GEO satellite expected. There are 45 LEOLUTs in 30 countries that provide excellent coverage. Most lives are being saved with 406 MHz than 121.5 MHz beacons, and the numbers are increasing along with the beacon population.

The future MEOSAR system will be compatible with current beacons. DASS equipment is expected to be installed aboard the U.S. GPS Block III constellation beginning around 2017. Galileo, the European MEOSAR system, is expected to be fully operational by 2013. These systems are expected to provide an improved capability and highly-reliable coverage in near-real time. MEOSAR should also enable the cost and size of beacons to be reduced and to potentially increase their functionality. For instance, Galileo may offer a return link capability for acknowledgment of receipt of alerts; so far, DASS and GLONASS (planned Russian system) have not announced intent to provide a return link.

The number of 406 MHz beacons has been growing at a rate of over 40% annually, and several additional manufacturers are now producing beacons. Only one manufacturer is producing all three types of beacons – EPIRBs, PLBs and ELTs.

The International Beacon Registration Database (IBRD) has nearly 7,000 beacons registered, and the growth in 2007 registrations was 77%.

Mr. St-Pierre also reviewed recent activities of Cospas-Sarsat in the areas of quality management, MEOSAR proof-of-concept and strategic planning.

Mr. Zhitenev reviewed the results of a 2007 survey of beacon manufacturers. 127,000 beacons were manufactured in 2007, an increase of 50% over 2006; 72,000 of these used the location protocol. About 600,000 406 MHz beacons are in service. Most were EPIRBs and PLBs, with the number of PLBs growing the fastest. The predicted increase in the number of beacons to be produced in 2008 is 66%.

There are now five facilities that test beacons for type approval, with one additional laboratory expected to be commissioned. Mr. Zhitenev reviewed the beacon type approval process.

III. Update on Working Groups and Sub-committees

121.5 MHz Phase-out Working Group

Mr. Karlson discussed the work of the 121.5 MHz Phase-out Working Group which was recently re-energized. Some issues include comprehensive educational and outreach activities, as well as policy and regulatory activities. The Aviation Owners and Pilots Association (AOPA) has indicated that roughly 90% of new aircraft are being delivered with 406 MHz ELTs, which opens the possibility of requiring such installations on all newly manufactured aircraft in the future. A potential Canadian ELT mandate may impact U.S. aircraft flying into Canada. AOPA is also currently running a survey on their website to assess the relative understanding of the public and their membership on the 121.5 MHz termination. Mr. Karlson also reported that NOAA will be conducting a mass postcard mailing campaign later this summer to ensure all registered pilots in the U.S. (estimated at over 200,000) will have received information about the termination.

The Group's next meeting will be held sometime in July; anyone interested in participating was invited to let Mr. Karlson know.

RTCM Special Committee 110

Mr. Chris Hoffman (Procon) provided an update (Attachment 7) on the work of RTCM's Special Committee (SC) 110. RTCM is involved in both national and international standards development. SC-110 works on EPIRB, PLB and Ship Security Alerting System (SSAS) standards, and considers new concepts such as EPIRBs with Automatic Identification System (AIS). RTCM is also active in the work of Cospas-Sarsat, especially in contributing papers to the Joint Committee (JC). Future work will involve

multi-environment beacons (MEBs) and the use of PLBs for aircraft. Work on the MEB standard was nearly complete. GPS simulator work was being conducted to examine the reliability of signal acquisition in various radio equipment and environmental conditions. Revisions to the PLB standard were noted; these include technical changes (such as a required test for 121.5 MHz off-ground plane radiated power) as well as labeling and documentation provisions.

IV. Beacon Trends

Mr. Apurve Mathur (NOAA) covered NOAA's national 406 MHz beacon registration database (RGDB) (Attachment 8). More than half of new registrations are being done online now, with an increase in registration rate of about 12% so far in 2008. Approx. 30,000 beacons are being registered annually. ELT registrations are growing rapidly. Rescue coordination centers (RCCs) use the RGDB 88% of the time for real distress cases and 96.6% of the time for false alerts. The accuracy of the data seems to be about 88%. 94% of registrations have U.S. mailing addresses, with most other addresses being Canadian. About 39% of registered beacons have GPS capability. ELTs are the most problematic beacon type for false alerts. Various comments were made about the difficulty of registering beacons obtained outside the country where the beacons will be used. An appeal was once again made to manufactures to help improve registration in any ways they can.

After some discussion about the potential to account for activations in forecasting beacons, Mr. Chris Hoffman (Procon) raised an issue with possible conflicting information between the numbers reported by the Secretariat and NOAA.

NOAA took an action to work with the Cospas-Sarsat Secretariat to ensure beacon population numbers by type were consistent between the two reports.

V. Cospas-Sarsat Strategic Planning

Mr. St-Pierre reported on Cospas-Sarsat's work in developing a Strategic Plan (Attachment 9). The new MEOSAR space segment was a factor in starting this work. System growth, increasing numbers of users, and higher performance expectations were also factors. The Plan will address System evolution, Program priorities, and goals to be used by the Program and to inform customers about Program plans. More specifically, the Plan has five primary goals:

- Continuous and effective system operation;
- A Comprehensive management structure;
- Worldwide support for the Program;
- Use of the System to its full potential; and
- A robust industrial base to support System operations.

The Plan has 22 Objectives and 51 Actions to implement these strategic goals.

Objectives of interest to manufacturers relate to beacon reliability, use of standards, beacon registration, access to the beacon market, lower beacon cost, and improved beacon performance.

The Plan will be presented to the Cospas-Sarsat Joint Committee in June 2008 for review and commenting. The objective is to submit a final version to the Council in October 2008 for adoption.

Mr. O'Connors also added that Cospas-Sarsat will not compete with commercial interests, but will continue to improve the system to meet the requirement of its customers in the search and rescue services.

VI. Beacon Modernization

Mr. Karlson discussed how new requirements might be developed for future beacons and that the MEOSAR development affords a chance to improve beacon capabilities. (See Attachment 10). He also indicated that there may be a potential gap in full operational coverage between the LEOSAR system and a fully operational DASS system; alternative strategies to mitigate the impact of this are being considered.

SAR responder needs will be a key driver in re-assessing beacons. Input from manufacturers and other interested parties will also be sought, keeping in mind the anticipated future space segment capabilities. Current performance metrics that are being considered include reliability, accuracy, timeliness, beacon identification, false alerts, and ancillary functions, such as homing signals. Beacon cost will remain a significant consideration. RTCM could be helpful in considering beacon modernization, and could begin by soliciting manufacturer input, beginning within the U.S. Mr. Hoffmann (RTCM) offered that the next meeting of SC-110 may be an appropriate venue to initiate some of the next generation beacon discussion.

The next Cospas-Sarsat Council meeting may begin considering beacon modernization requirements. Mr. St-Pierre suggested that Cospas-Sarsat may need to eventually establish an expert working group to consider this.

VII. Additional Items

Canadian Update

Mr. Ed Hichcock (Canada) commented about an initiative to require carriage of 406 MHz ELTs in Canada (Attachment 11). Transport Canada has initiated a regulation project to this end, with a view to have all new or re-sold aircraft equipped by February 1, 2009. Requirements for aircraft flying into Canada will be considered. Canada has a strong public awareness outreach regarding the termination of 121.5 MHz processing. It appears that sufficient 406 MHz ELT models will be available. Canada is also seeking to restrict use of non-Canadian coded beacons in Canada. The general aviation community in Canada is, in turn, seeking acceptable alternatives to 406 MHz ELTs.

New Beacon Test Lab

Mr. Toralf Jahn (Eurofins ETS) reported that Eurofins, which provides laboratory support for over 25 countries for a wide variety of radio products including beacons (Attachment 12), had recently been certified by Cospas-Sarsat as an approved beacon test lab facility. Mr. Jahn provided an overview of the equipment and the test site used for testing beacons. Environmental testing is not performed. After testing, certificates are issued.

USCG 406 MHz Direction Finding

LCDR Niles provided an overview of Coast Guard operational and planned 406 MHz DF capabilities. (See Attachment 13). Aircraft, boat, cutter, portable and shore-based DF functions are being developed. The increased power of 406 MHz signals above the 25 mw 121.5 MHz homing signals, which are generally effective within only about 5 NMs, can be used to substantial advantage. All Coast Guard aircraft will be equipped with 406 MHz DF equipment, and some Coast Guard Auxiliary aircraft are being equipped as well.

There had already been a number of successful SAR cases involving use of 406 MHz DF, including one case involving an EPIRB with the antenna broken off in the Gulf of Mexico.

In December 2007, approval was also obtained to add 406 MHz DF to towers of the new Coast Guard shore-side VHF radio system, called Rescue21. Equipment of surface units and use of portable equipment are under review. The intermittent 406 MHz signals do not seem to pose a significant problem to use of the system, in spite of lack of a “needle swing” that the continuous 121.5 MHz signals enable; often the strobe light, visual contact or 121.5 MHz signal helps provide the final location. It seems pre-mature to decide whether the 121.5 MHz homing signal requirement for beacons should be retained.

False Alerts

Mr. Larry Yarbrough (USCG) discussed a seven month study of false alerts (Attachment 14). False alerts make up 95% of beacon alerts received, and a number of these have to be resolved by launching SAR units. The growing beacon population could increase the problem. \$3.6m in aircraft time was expended on false alerts in 2007; this puts crews at risk and diverts resources away from real needs. Only 406 MHz beacons registered in the U.S. were studied. Causes included improper testing, and EPIRBs separated from their brackets. Of the cases with EPIRBs still in their bracket, these beacons were seemingly activated by water or ice exposure or movement of the beacon. Other false alerts (69%) were caused by failure of the beacon-bracket switching linkage (decoupling). These were due to loose straps, corrosion, improper installation, and other causes.

The RTCM EPIRB standard seems satisfactory, although the testing may need to be improved. Mr. Yarbrough believed that the bracket coupling function should be included in required inspection, testing and maintenance. Detailed feedback to manufactures is needed about failures of specific models. A variety of causes indicates need for a variety

of solutions. The water activation feature seems appropriate. Care must be exercised that any changes to standards will not decrease the chance of the beacon functioning in an actual emergency. SOLAS ship beacons are more routinely inspected and tested, but the coupling is not a focus of these efforts; this is something IMO could address. However, most EPIRBs are not aboard SOLAS ships. The manual activation option could be eliminated, so that water contact is required. Manufacturers indicated they would welcome specific feedback on false alert causes from their beacons.

In the discussion that followed Mr. Yarbrough's presentation four recommendations were presented to the group for follow on action.

1. Consideration should be given to including brackets in the 5 year maintenance check or USCG inspections to ensure they are properly maintained. This includes whether specific updates to IMO/MSC Circular 1040, et al. are needed.
2. NOAA will investigate with the Rescue Coordination Centers the capture of beacon false alert information in the IHDB. This information could be reported back to the manufacturers annually to help facilitate improvements to beacon design to reduce false alerts.
3. Include Retailers of distress alerting beacon in outreach and education activities to help improve user knowledge of common beacon installation errors and requirements on beacon registration.
4. Issues identified in Mr. Yarbrough's presentation should be considered by the RTCM SC-110 in their upcoming review of EPIRB standards.

AIS-SART Homing

Mr. Russ Levin (USCG) provided discussion on why AIS SARTs (Search and Rescue Radar Transponders) might be suitable to use for homing for EPIRBs. Tests have shown that AIS is superior to radar SARTs due to less interference from waves. It is now difficult for ships to home on EPIRBs due to a lack of direction finding equipment or during limited visibility or at night. AIS displays, however, are much more common and are easier to use. Any vessel equipped with AIS would be able to participate in the response to a distress if AIS-equipped EPIRBs were used. It is expected that the EPIRB cost increase would be about \$35, and the AIS function would not use much power. AIS transmitters are closer to the water than SARTs, so the performance is being further considered, and the results will be reported to the International Maritime Organization's Comsar 13 Sub-committee meeting in January 2009.

VIII. Review of Actions

Mr. O’Connors and Mr. Karlson conducted a review of action items from previous Beacon Manufacturers Workshops. This is provided as Attachment 15.

Action Items from this meeting

1. NOAA will work with the Cospas-Sarsat Secretariat to confirm current 406 MHz beacon population by type.
2. The USCG to review including bracket inspections in the 5 year maintenance check or during USCG inspections to ensure they are properly maintained and operational. The USCG’s review will also include whether specific updates to IMO/MSC Circular 1040, et al. are needed.
3. NOAA will investigate with the Rescue Coordination Centers the capture of beacon false alert information in the IHDB. This information could be reported back to the manufacturers annually to help facilitate improvements to beacon design to reduce false alerts.
4. The SARSAT agencies will improve outreach and educational activities to help improve user knowledge of common beacon false alert problems including installation errors, testing requirements, and beacon registration. This outreach should go beyond just the production of brochures but should also include cooperation with non-governmental organizations (NGOs), web-based material, etc.
5. SC-110 to consider issues identified in Mr. Yarbrough’s presentation in the upcoming review of the EPIRB standard.

IX. Closing Remarks

The Chair thanked everyone for their participation and again expressed appreciation to Rakon for providing lunch for the meeting and to RTCM for once again providing the meeting facilities for NOAA to host the annual Beacon Manufacturers Workshop.

X. List of Attachments

Attachment #	Description
Attachment 1	Agenda of 2008 BMW
Attachment 2	List of Attendees of 2008 BMW
Attachment 3	NOAA Report for 2008 BMW
Attachment 4	USCG Report for 2008 BMW
Attachment 5	NASA Report for 2008 BMW

Attachment #	Description
Attachment 6	Cospas-Sarsat Secretariat Report for 2008 BMW
Attachment 7	RTCM SC-110 Meeting Report
Attachment 8	NOAA Beacon Registration 2008t
Attachment 9	Cospas-Sarsat Secretariat Report o n Strategic Planning
Attachment 10	NOAA Next Generation Beacon Report
Attachment 11	Canadian National Search and Rescue Secretariat Report on Requirement for 406 MHz ELTs in Canada
Attachment 12	Eurofins ETS Product Service
Attachment 13	USCG 406 DF Presentation
Attachment 14	Report on EPIRB False Alert Study
Attachment 15	Action Items from Previous BMWs