2009 Beacon Manufacturers Workshop

May 8, 2009
St. Pete Beach, FL

REPORT

I. Introduction & Opening Remarks

Mr. Mickey Fitzmaurice (NOAA) moderated the Beacon Manufacturers Workshop (BMW); he:

- Began by welcoming all attendees, who then introduced themselves;
- Thanked RTCM for again hosting the BMW; and
- Acknowledged with appreciation the generosity of Rakon Limited for sponsoring lunch for the BMW.

Enclosure (1) lists the attendees.

Copies of the presentations made during the BMW would be made available on the NOAA SARSAT website (www.sarsat.noaa.gov); these are listed at the end of this report and provide supplemental information to the information contained in this report.

II. COSPAS-SARSAT System Update

A) U.S. Agency Reports

NOAA

LT Shawn Maddock (NOAA) introduced himself as the NOAA SARSAT Operations Officer who had relieved LT Jeff Shoup. He reviewed the status of the Low Earth Orbiting (LEO) and Geostationary Earth Orbiting (GEO) satellites, including recent and upcoming launches. All of the U.S. ground stations (local user terminals (LUTs)) were operational. System availability had been 99.998% during 2008.

A LUT was under development for the Medium Earth Orbiting (MEO) system, which would be installed in Hawaii. The backup USMCC at Wallops Island, Va. was also now fully operational.

Processing of 121.5 MHz alerts terminated on schedule on February 1, 2009.

The beacon activation statistics by beacon type were reviewed, including some discussion of false alert causes.

With a growing beacon population, 282 lives had been saved in the U.S. in 2008, with the highest numbers being in Alaska and New Jersey. 52 lives had been saved to date in 2009, a lower number than during the same period in 2008.

USAF

Mr. Dave Fuhrmann, Air Force Rescue Coordination Center (AFRCC), reviewed incident and lives-saved statistics through 2008, these statistics had remained fairly constant over a ten year period. In 2008, the AFRCC had 7595 incidents (mostly involving beacons), 2344 of which went to missions and 190 lives had been saved.

The Department of Defense (DOD) beacon program is part of its Combat Survivor Evader Locator (CSEL) system. The AFRCC receives all the military beacon alerts.

Lt. Col Chuck Tomko will be relieving Lt. Col Jed Hudson as the AFRCC Commander in June 2009, and the AFRCC will be transferred from the Air Combat Command to the U.S. Northern Command (USNORTHCOM), the newly designated federal SAR Coordinator for the continental United States.

Mr. Fuhrmann emphasized the need for a highly accurate distress location to help with detecting person in distress, and showed pictures of downed aircraft that had been hard to detect visually.

USCG

LCDR Kathy Niles (USCG) mentioned a recent Black Pearl case off Costa Rica involving two persons who had abandoned a flooded pleasure craft into a raft with survival gear and two EPIRBs. Costa Rica had deferred to the Coast Guard to handle the case. An Amver ship was diverted, but could not locate the raft, and two military P3 aircraft also could not locate the raft. A Coast Guard C-130 aircraft was able to home on the 406 MHz signal from 60 miles out and easily located the persons in distress so that a Coast Guard cutter could perform the rescue.

The current Chief, Coast Guard search and rescue (SAR) CAPT David McBride. LCDR Niles reviewed the organization and responsibilities of the SAR Program Office; she works for Mr. Rick Button and serves as the SARSAT Liaison Officer. Her office also handles national and international coordination work, Amver, and mass rescue operations (MROs).

The National Search and Rescue Committee (NSARC), which has seven federal member agencies, coordinates SAR at the national level, and oversees the *National SAR Plan* (NSP) and the *National SAR Supplement* (NSS) to the *International Aeronautical and Maritime Search and Rescue Manual* (IAMSAR Manual).

NSARC had a Working Group that handled the U.S. 121.5 MHz phase-out efforts, and will have a group to handle Satellite Emergency Notification Devices (SEND) issues; SENDs are non-406 MHz devices that have distress notification capabilities. SPOT is an example of a non-406 MHz system that can be used for alerting.

Amver ships of over 140 flags participate voluntarily to assist with SAR; there are about 3300 ships on plot daily. More information on Amver is available at www.amver.com.

LCDR Niles mentioned that the Coast Guard's *On-Scene* magazine that will be published in the future via a blog site rather than in paper form.

An average day in the Coast Guard involves 109 SAR cases, 10 lives saved, and 192 persons in distress assisted, with an average of about 5,000 lives saved annually. 283 persons rescued by the Coast Guard in 2008 based on beacon alerts.

LCDR Niles reviewed some of the outreach efforts that the Coast Guard sponsored or supported to help educate the public about beacons and Cospas-Sarsat; much of this was focused on the 121.5 MHz phase-out.

During 2009-2010, Coast Guard activities will include: sponsorship of a SARSAT Conference for Coast Guard and international RCC staff; continued equipping of Coast Guard facilities with 406 MHz direction finders; and efforts to create interest in use of Automatic Dependent Surveillance (AIS) in lieu of 121.5 MHz for EPIRB homing.

The Coast Guard is using five portable 406 MHz direction finders.

NASA

Mr. Jim Christo, NASA Goddard Space Flight Center (GSFC) SARLab, reported that NASA has new maintenance contracts for its MEOLUT, GEOLUT and GPS and beacon

simulators. LUT software has been upgraded. New antenna capabilities allow satellite calibrations. NASA is finishing the post launch testing of the latest NOAA satellite launches.

There are nine DASS equipped satellites in orbit that have been used to complete a successful DASS proof of concept (POC).

NASA is simulating beacon coding to evaluate alternative schemes that might be used in the future.

NASA supported the work of RTCM Special Committee SC-110 on PLBs and EPIRBs, and is working with Cospas-Sarsat on updates to its documents T001 and T007 that deal with beacon specifications and beacon type approval, respectively.

NASA has begun testing beacon bit-rate tolerance to assess whether restricting the bit-rate will improve detection; this work includes review of bit rate variations within a signal burst.

B) Cospas-Sarsat

Mr. Dany St-Pierre (Cospas-Sarsat) reviewed the mission of Cospas-Sarsat, i.e., to provide accurate and timely alerts from beacons to SAR authorities. Cospas-Sarsat participating countries (35+) cover over 70% of the globe. The Cospas-Sarsat system is expected to have five LEO satellites for the next few years; U.S. and Russian launches were reviewed. 45 LEOLUTs are operational in 30 countries.

Two GOES satellites are operational with spares in orbit; two more GOES satellites are scheduled to be launched by the end of 2009.

During 2008, 508 SAR events with 1,984 rescues occurred.

A strong international effort is underway to convert remaining 121.5 MHz beacon users to 406 MHz beacons. 406 MHz events are growing fast and 121.5 MHz alerts are falling.

GEOSAR coverage is limited, and LEOSAR has delays due to waiting times; these and other limitations are why MEOSAR is being developed. With MEOSAR, four satellites will always be in view to detect a beacon, which will improve accuracy and timeliness. MEOSAR offers the chance to reduce beacon cost and to improve beacon coding protocols.

The United States Distress Alerting Satellite System (DASS), Russian GLONASS and European Galileo SAR systems are under development, and will be compatible with existing beacons. The first U.S. operational MEOSAR satellites may be operational by 2017. Russia is expecting its first satellites by the end of 2010. Galileo may have initial operational satellites by 2014. By 2016, some satellites may be able to be used for SAR. A number of countries that have committed to installing MEOSAR LUTs.

1544.9 MHz will be used for the MEOSAR satellite downlinks.

Galileo is expected to process return links to beacons via the French MCC. Message protocols are being developed for uplink and return link coding protocols; downlink protocols are available for manufactures from a Galileo Signal in Space Interface Control Document (SIS-ICD) document.

The number of beacon type approvals have reduced to about 20-25 per year.

The International Beacon Registration Database (IBRD) has been a great success, with more than 10,500 beacons now registered from 80 countries, and data access demand also growing.

Mr. Andryey Zhitenev (Cospas-Sarsat) reviewed of a 2009 Beacon Manufacturer's Survey that estimated the number of manufactured beacons and forecasts. In 2008, there were 186,000 beacons produced, which represented about 45% growth over 2007.

All 45 manufacturers participated in the survey; Most of these were located in Europe, Canada and the U.S. In 2008: 49% of the manufacturers produced more than 500 units; 77K EPIRBs, 42k ELTs, and 67k PLBs were produced; and 77k beacons were manufactured with location protocols.

406.037 MHz is being used for new beacons.

Over 273k beacons are expected to be produced in 2009, which would increase the total beacon population to about 990k; over half of these new beacons are expected to use the location protocol.

Experience has shown that forecasts are quite accurate, though the PLB forecasts tended to be too optimistic.

304 beacon models were type approved in 2008, and 145 models were taken out of production.

Manufacturers will receive the results of the survey in July of this year.

C) 121.5 Phase-Out

LCDR Niles recapped the phase-out efforts. No serious problems had resulted from termination of satellite processing of 121.5 MHz alerts. Besides various shows and expos that had been used for outreach on the phase-out, the Aircraft Owners and Pilots Association (AOPA) had conducted a survey that confirmed that aviators were aware of the phase-out before the February 1st termination date. Still, a number of aviators seem reluctant to spend money for a new ELT. There had been a flurry of press releases.

The Federal Aviation Administration (FAA) Safety Team (FAAST) issued a notice recommending that pilots monitor the 121.5 MHz frequency, report any audible alerts, and upgrade to a 406 MHz ELT or PLB. The FAA mailed a post card to over 230,000 pilots about the termination.

The Federal Communications Commission (FCC) issued waivers for sale of some 121.5 MHz beacons, but these are not EPIRB waivers; this is a problem because 121.5 MHz EPIRBs are available for sale online. The FCC does not allow 121.5 MHz EPIRBs, but does allow use of some non-satellite alerting devices that use 121.5 MHz, such as man overboard devices.

Coast Guard and Air Force RCC controllers have been coached in how to handle 121.5 MHz audible alerts, and controllers are working with the FAA on handling such alerts, particularly in helping to obtain more details from pilots about where they first and last hear signals.

LT Maddock indicated that some people incorrectly believe that the U.S. controls the phase-out and that it can be reversed.

Mr. Fuhrmann said that the number of 121.5 MHz ELT alerts received since the termination has reduced by 70%, although the remaining audible alert responses do require more work.

Mr. Fitzmaurice added that when 121.5 MHz was turned off, it could not be turned back on. He also pointed out that 121.5 MHz satellite alerts were mostly (>99%) false alerts, and recommended gathering data on false audible alerts.

Search areas for audible alerts from high flying aircraft are much too large to search unless they can be narrowed down.

The FAA is responding to the National Transportation Safety Board (NTSB) with a report on the cost-benefit of converting to 406 MHz ELTs, but its report will not account for the differential lives saved and SAR cost factors that would make it useful.

Outreach about 121.5 MHz ELTs will continue as long as it seems to be beneficial; there are still a lot of 121.5 MHz ELTs in service.

III. NOAA 406 MHz Beacon Registration Database (A. Mathur, S. Baker, NOAA)

A) Statistical Analysis and Beacon Population

Mr. Apurve Mathur (NOAA) reported that online registrations account for about 72% of all beacon registrations. The goal is to increase online registration to improve database accuracy. 30,184 registrations were entered in 2008, and registrations in 2009 are running about 35% ahead of the same time period in 2008.

The rate of registrations by beacon type is about equal. EPIRB and PLB registrations have peaked, but ELT registrations are rapidly growing, especially since the termination of 121.5 MHz processing.

Many PLB owners indicate that they use their PLBs on aircraft and boats.

NOAA often receives registration forms from other countries.

Feedback from RCCs on use of beacon registration is tracked; about 94% of the time registration data is accessed for alerts. Registration data is reported by RCCs as accurate over 80% of the time.

NOAA would like manufacturers to:

- Provide their arithmetic formulas used for determining serial numbers;
- Provide information about any beacons received from owners that are not returned to the same owners;
- To inform NOAA of any registration issues that could affect beacon owners, including recalls; and
- Remind owners to re-register beacons when the beacons are serviced, or when the beacon owners change.

NOAA is distributing business reply envelopes (BREs) to manufacturers to use for initial registrations.

B) Beacon Registration Issues

Mr. Sam Baker (NOAA) commented on a case involving a duplicate beacon ID, and another involving a mistake in entering a beacon ID into the registration database (RGDB) from a handwritten form.

Data entry procedures have been reviewed at NOAA to check whether a registration is actually a new beacon or a transfer of ownership. Most apparent duplicate IDs are due to change of ownership or errors in data entry by the owner. Reading handwriting can be a problem too.

Actions NOAA is taking to reduce such problems with paper/fax registrations, and online registrations, include the following:

- Ask owners to validate the beacon ID entry;
- A second person validates entries into the RGDB;
- Calls are made to confirm change of ownership;

- Manufacturer serial number formulas will be used when available to help validate IDs;
- All data on a form will be reviewed, not just what is alleged to have been changed;
- Owners will be asked to check the ID on a form against the ID on the beacon itself;
- Serial numbers, not just IDs, will be collected and compared the serial numbers and IDs based on manufacturer guidance; and
- Type approval numbers will be used to help validate IDs.

NOAA will notify each manufacturer by email or letter that all owners would be contacted by email or letter to validate that the ID registered with NOAA is identical to the ID on the beacon.

NOAA would like the beacon manufacturers to consider the following ideas to promote beacon registration and reduce registration errors.

- Develop a CHECKSUM for the Unique Identifier Number (UIN);
- Portray the UIN as a series of three five digit strings;
- Use manufacturer barcoding of the beacon coding;
- Check UINs against ones actually used by manufacturers;
- Have manufacturers provide a card in packaging that the seller would send to NOAA to advise that a beacon with a specified ID had been sold; and
- Have something physically attached to the beacon that will prompt the owner to do the registration.

Some comments from BMW participants included:

- Discuss the process with retailers;
- Get model, serial number and ID from manufacturers;
- Use consistent and larger fonts;
- Use big block letters that could be put on the form to eliminate the need for handwriting;
- Online registration may have worsened the transcription problem, since the value of pre-printing numbers on forms is lost; a way is needed to reduce transcription errors for online registrations;
- This is an international problem, not just for the United States; the problem could be referred to RTCM/SC-110 to confer with international partners;
- Errors are mainly by owners, not by data entry personnel;
- Use the group of five characters on the beacon itself too;
- Attach a label to the form rather than providing for manual data entry onto the form;
- Barcodes do not work as well on faxed papers unless very large barcodes are used;
- Beacons that are not serialized may be re-programmed in the field;

- Decals for forms could be enlarged, but the decals are used in a number of places, including on the beacons; and
- There are various ways to do checksums.

ELT standards are handled by RTCA rather than RTCM, so ELT actions would either have to be based on recommendations from RTCM to RTCA or on joint efforts of theses organizations.

NOAA invited the beacon manufacturers to evaluate pertinent ideas discussed in the Workshop to identify the best solutions for reducing registration errors.

The RTCM/SC-110 Chairperson agreed to place this topic (Ways to Improve Beacon Registration and Reduce Registration Errors) on the Agenda for the SC-110 Meeting.

IV. Beacon Use

A) False Alert Rate

Mr. Baker reviewed 2008 false alert statistics. EPIRBs accounted for the largest number of false alerts. ELT false alerts are increasing, and had the highest rate of false alerts based on both beacon populations and on the number of ELTs registered. ELTs are the main problem.

ELT maintenance is a problem area because those involved do not seem to understand how Cospas-Sarsat works and the need to cancel a test within a few seconds; better education is needed. A similar need exists within the military.

Mr. Fuhrmann advised that many ELT false alerts occur during installations.

Other false alerts occur in flight due to either due to switch problems or inadvertent activations. Often the cause cannot be determined. Self tests cannot be routed to RCCs.

ELT problems seem to be mainly an educational issues with installers and testers. Most people at airports do not know how the system works. Education is also a need for military personnel, who also cause false alerts.

Mr. Jim King (Canada) suggested plotting tests during an hour to see if most are actually occurring during the first five minutes of the hour.

Mr. St-Pierre added that false alerts could be assessed by operational time; EPIRBs are on the ship all the time, but PLBs are only in use occasionally.

Mr. Larry Yarbrough (USCG) said that 96% of alerts received by the Coast Guard are false, but 85% can be resolved by RCC investigations without launching SAR facilities. Increased numbers of EPIRBs exacerbate the false alert problem, while real SAR cases are not increasing. During 2008, over $4 million in aircraft costs were wasted on false alerts, not to mention putting Coast Guard personnel at risk, and harming availability of facilities for real SAR cases.

The Coast Guard can now direction find on 406 MHz; this reduces search cost for actual distress situations, but does not resolve the false alert problem. About 70% of false alerts cease before a launch can occur; however, the beacon still needs to be found or the alert needs to be resolved by other means to determine whether the alert was false or real.

Ten percent of false alerts are due to not following proper test procedures; and six percent due to wet EPIRBs removed from brackets. False alerts from EPIRBs in brackets are due to wet beacons, bumped or displaced beacons, icing, heavy weather, or washing. Internal aging may contribute to false alerts.

69% of false alerts relate to the bracket coupling function due to lose straps, pads are not holding the beacon in place; missing or corroded magnets, etc.; these are age problems, which raises the question of whether beacons have a useful life limit. Some beacons are not placed in brackets properly, or brackets are not mounted properly. Standards could prevent some of these causes.

The life of beacons seems to be 10-13 years; they could be taken out of service before the second battery change.

Shore-based maintenance does not include meaningful examination of the bracket; maintainers should request that the bracket be submitted for examination with the beacon.

Manufacturers need to look at feedback from NOAA about problems by beacon model, and consider imposing a life cycle limit on the products; NOAA should provide as much detail as it can to the manufacturers. SAR personnel should enter such information into the Incident History Database (IHDB); RCC controllers should try to find out the beacon make and model, as much as possible about the cause of the false alert, and document what is learned. Manufacturers could obtain good feedback from service centers, but many problems cannot be diagnosed without the brackets.

Mr. Baker said that false alert data by manufacturer and model is provided to manufacturers, but not with details about causes.

False alerts are a drain on the health of the alerting system and SAR systems, and there is no single fix.

Canada is seeing the same problems, and would like to know what data to provide to manufacturers.

Batteries should be changed on the specified schedule and if the beacon is used, but this is required only for commercial ships.

Some at the meeting thought that if a beacon were activated and the owner then realized that a false alert had been transmitted; the beacon should be turned off at that time. However, this is contrary to the guidance which is contained in Volume 3 of the *International Aeronautical and Maritime Search and Rescue Manual*, which says that the beacon should be left on, and the owner/operator should, if possible, contact SAR forces by another means to advise that the alert is false. Similar international guidance may exist elsewhere as well. The main concern is not avoiding a launch, but being able to learn by some means (launch if necessary) whether a real distress situation exists and the beacon became unable to continue to transmit, or whether the alert was actually inadvertent. The Coast Guard will review this issue.

Mr. Fitzmaurice added that the MEOSAR could provide a "last" position information at the time a beacon is turned off, which may help.

Mr. Peter Forey (Sartech) noted that owners need to be better informed about disposal of old beacons.

Action: NOAA, with the help of input from RCCs to the IHDB, to provide feedback to manufacturers on causes of false alerts to the extent practicable.

V. RTCM Special Committee Updates

A) RTCM Special Committee 110 (Emergency Beacons)

Mr. Chris Hoffman (PROCON), after reviewing information about RTCM and its roles and affiliates, explained the Special Committee 110 (SC 110) covers standards for EPIRBs and similar devices such as Ship Security Alerting Systems (SSASs) and PLBs.

RTCM supports the U.S. SARSAT Joint Working Group (JWG) and the Cospas-Sarsat Joint Committee (JC).

SC 110 considers matters such as integration of AIS, battery life issues, ergonomic considerations, need for 121.5 MHz homing, updating of PLB standards, and ground plane considerations.

SC 110 is proposing how to improve GPS receiver performance.

For the JC-23 meeting, RTCM will provide input on frequency stability, test scrip encoding methods, coding for aircraft carrying multiple beacons, MEOSAR, GPS simulation and other areas.

SC 110 is evaluating technical issues related to the AIS function in an EPIRB based on Coast Guard interest and a United States proposal to the next session of the Communications, Search and Rescue Sub-committee (COMSAR) of the International Maritime Organization (IMO), subject to the Maritime Safety Committee (MSC) of IMO adding the topic to COMSAR's work program.

406 MHz EPIRBs with AIS and without 121.5 MHz homing requires less battery power than a beacon with all three capabilities and would cost less. Manufacturers are interested in producing an AIS beacon without 121.5 MHz.

RTCM is updating the EPIRB standards to more closely align it with IEC Standard 61097-2.

B) RTCM Special Committee 128 (Satellite Emergency Notification Devices (SENDs)

Mr. Hoffman reported that this new Special Committee is considering the need for a standard for SENDs that operate through commercial systems and what requirements might be appropriate for them; the SC will address controls, indicators, operation, construction, technical characteristics and tests. The SC will not look at technical features of satellite communications.

VI. Additional Items

A) Canada Update

Mr. Ed Hitchcock (Canadian National SAR Secretariat (NSS)) reported that a Canadian mandate for 406 MHz ELT carriage is still pending, but may be finalized this year.

Canada, which faces beacon registration problems along with the United States, has a renewed focus on trying to improve its registration procedures, reduce the number of false alerts, and increase use of 406 MHz ELTs.

Canada has conducted a comprehensive communication outreach program focused around the phase-out of 121.5 MHz satellite processing with a primary objective of informing the civil aviation community on what to expect when 121.5 is no longer processed by Cospas-Sarsat satellites. Part of the outreach had involved participating in aviation conferences and expositions and mailing information to all Canadian pilots. The outreach is beginning to shift to emphasize registration of any type of 406 MHz beacon.

Canada is rewriting the Canadian Air Regulation (CAR 605.38) to mandate the carriage of 406 MHz ELTs, and intends to implement this requirement in spite of delays that have been experienced.

Canada registered more beacons during the first four months of 2009 than in all of 2008.

Canada is moving it's beacon registry from the NSS in Ottawa to the Canadian MCC in Trenton, Ontario.

Mr. Jim King (CRC Canada) discussed MEOSAR, which seems to occupy an optimum orbit for Cospas-Sarsat. Existing beacons work with the MEOSAR, but MEOSAR will also likely use beacons designed for it. MEO satellites have a larger footprint than LEOSAR satellites, and will provide global coverage. In principle, the MEOSAR system will be similar to the LEOSAR system, but with greater speed and accuracy of alerting. Canada is developing the satellite payload for DASS and looking at networking and coverage issues.

Canada has three MEOSAR antennas at its ground station. Even with five satellites and a single ground station, a very large portion of the earth can be covered, but other stations are being linked providing even greater coverage. Beacons are being routinely detected and decoded. Many of the signals being received are due to beacon self-tests. Results so far have been very promising.

MEOSAR data is not being used for any purpose other monitoring and analyzing system performance; it would be pre-mature to use the data for SAR.

B) American Coded Beacons Sold in Canada

Mr. Hitchcock reported that Canada had appealed to manufacturers to help mitigate the problem of foreign coded beacons being sold by Canadian retailers. This problem had since reduced substantially, for which Mr. Hitchcock was grateful.

Although there still Canadians who purchase foreign coded beacons outside Canada and try to register them in Canada, public education is helping. Canada would like to continue to cooperate with the United States on these problems that exist in both countries.

C) USCG 406 MHz Beacon Direction Finding (CDR J. Deer, USCG)

CDR Joe Deer (USCG) stated that about half of the Coast Guard aircraft are equipped with 406 MHz direction finders (DFs), which have received signals up to 200 miles from beacons. About 55 lives have been saved in cases that involved use of these DFs. Five portable DFs are being used with about 16 mile range, and the new shore-based communications towers of Rescue 21 are being equipped with the 406 MHz DFs.

The 25 mw 121.5 MHz homing signals can typically be detected only out to about five miles.

GPS beacons overall have had about a 30% success rate, although newer beacons work better.

Two lives were saved in an F/V Silver Wings case where the beacon was detected 150 miles out; the 121.5 MHz signal was very weak. Two lives were saved in a S/V Paradox case; the survivors could not have been found without the 406 MHz DF. In a SAR case involving the F/V Extractor, the beacon was detected 80 miles out and those on board were saved. The line of sight capability allows longer detection ranges at higher altitudes.

All Coast Guard fixed-wing aircraft are equipped, and the helicopters are being equipped. Coast Guard Auxiliary and Civil Air Patrol aircraft are also being equipped. These DFs save fuel, reduce risks to crews, reduce hypothermia problems and have other advantages.

Mr. King pointed out that the five watt signal paid off by enabling compatibility with the MEO and GEO systems, and now is doing so with DFs.

D) Testing C-S Beacons at Test Center Omega, Ukraine

Sergey Mikhailov (SEDAM Communications) discussed the test center in Omega, Ukraine, which is certified to ISO 9000, has state-of-the-art testing facilities, and is accredited by Russia and Ukraine authorities. A wide variety of equipment can be tested,

including wireless devices. 23 Cospas-Sarsat beacon models have been tested for 15 manufacturers from six countries. SEDAM-OMEGA lab is ready to test beacons for any manufacturer; the testing requires 3-6 months to complete.

E) Medium Term Frequency Stability - Temp Regulated Oscillators

Mr. Fred Kissel (CSC/NOAA) commented that temperature compensated crystal oscillator (TCXO) medium term stability is of keen interest.

He asked manufacturers to provide stability data on beacons three years old and older and on new beacons, and invited them to loan the tested beacons (preferably test-coded with an extra battery) to NASA for further testing. NASA's goal is to help assess the effects of aging on frequency stability, assuring them that any sensitive information gained will remain confidential. NASA currently has no TCXO beacons to test.

F) Review of Action Items

The BMW reviewed the action items from this and prior meetings; enclosure (2) is the updated list of the action items.

Mr. Hitchcock asked NOAA to coordinate with Canada on the actions from this meeting.

VII. Evaluation

Mr. Fitzmaurice requested that all attendees complete the BMW evaluations.

VIII. Closing Remarks (Mickey Fitzmaurice, NOAA)

Mr. Fitzmaurice advised the Workshop participants that all presentations made during the meeting will be posted on the NOAA SARSAT website.

These presentations include the following:

- NOAA Agency Report
- AFRCC Agency Report
- USCG Agency Report
- NASA Agency Report
- Cospas-Sarsat Secretariat Update
- 121.5 Termination Update
- NOAA Beacon Registration
- 2009 Beacon Registration Issues
- EPIRB False Alerts
- RTCM SC 110 Report
- RTCM SC 128 Report
- Canada MEOSAR Status
- 406 MHz Direction Finding
- Omega SEDAM Presentation

LT Maddock, who was the primary planner for the BMW, thanked everyone for participating and requested copies of all presentations for posting on at www.sarsat.noaa.gov.

Mr. Fitzmaurice adjourned the meeting.

Next Meeting: Bob Markle, RTCM Annual Meeting Coordinator, announced that next year's meeting will be held in San Diego, California on May 21, 2010.

Enclosures:

1. List of Participants
2. Action Items

Enclosure (1)

2009 Beacon Manufacturers Workshop
May 8, 2009
St. Pete Beach, FL
List of Participants

NAME		ORGANIZATION
1.	Allain, Michel	KANNAD
2.	Baker, Samuel	USMCC/SSAI
3.	Bovard, Reese	Concentric Real Time
4.	Burkhart, William	NOAA/NESDIS
5.	Christo, Jim	NASA/GSFC
6.	Deer, CDR Joseph	USCG
7.	Fitzmaurice, Mickey	NOAA
8.	Forey, Peter	Sartech Engineering Ltd
9.	Fuechsel, CAPT Jack	U.S. GMDSS Task Force
10.	Fuhrmann, David	AFRCC
11.	Gamma, Vince	U.S. Coast Guard
12.	Goodman, Joan	Emergency Beacon Corporation
13.	Hampton, Robert	TUV Product Service Ltd
14.	Hardy, Dr. Nigel	Rakon UK Ltd.
15.	Hart, Howard	Cobham
16.	Hessler, Lisa	CSC/NOAA/SARSAT
17.	Hiner, Eric	DME Corporation
18.	Hitchcock, Edward	National Search and Rescue Secretariat
19.	Hoffman, Chris	PROCON Inc., SafeLife Systems Division
20.	Holm, Otto	Jotron AS
21.	Holmes, Kevin	WS Technologies Inc.
22.	Hubert, Daniel	Agence Nationale des Fréquences
23.	Johnson, Greg	USCG Sector Charleston
24.	Jordan, Neil	McMurdo
25.	Kerr, Thomas	Artex
26.	Khalek, Ghassan	FCC
27.	King, Jim	CRC
28.	Kissel, Fred	CSC/NOAA
29.	Lariviere, Edward	Whiffletree Corporation Inc.

30.	Lariviere, George	Whiffletree Corporation Inc.
31.	Lemon, Dan	CSC
32.	Levin, Russell	USCG
33.	Lindley, Hakan	Swedish Transport Agency
34.	Maddock, LT Shawn	NOAA
35.	Markle, Bob	RTCM
36.	Mathur, Apurve	NOAA/SSAI
37.	Mikhailov, Sergey	SEDAM Communications Limited
38.	Miller, John	Astronics/DME Corp.
39.	Newbold, Graham	National SAR Secretariat
40.	Niles, LCDR Kathy	U.S. Coast Guard
41.	Pearson, Bob	Rakon America LLC
42.	Posluns, Howard	Transport Canada
43.	Pribyl, Fred	DME
44.	Pulgarin, Felipe	Rakon America LLC
45.	Quiring, Duane	ARTEX
46.	Ransom, Dean	Rakon America LLC
47.	Renaud, Russ	Transport Canada
48.	Ritter, Doug	Equipped To Survive Foundation
49.	Robinson, Mike	Specmat
50.	St- Pierre, Dany	Cospas-Sarsat Secretariat
51.	Steir, Kimberly	CSC/NOAA/SARSAT
52.	Steward, Paul	Cobham Tracking & Locating
53.	Street, Bill	WS Technologies Inc.
54.	Takahashi, Masaaki	ICOM America
55.	Taylor, Stuart	Techtest
56.	Thompson, John	Signal Engineering, Inc.
57.	Tong, Chung	ACR Electronics
58.	Whaler, Chris	Cobham (ACR)
59.	Yaker, Mokrane	Artec
60.	Yarbrough, Larry	U.S. Coast Guard
61.	Zhitenev, Andryey	Cospas-Sarsat Secretariat

Enclosure (2)

Action Items from Previous Beacon Manufacturers Workshops

Action Items from the 2005 Beacon Manufacturers Workshop:

2. An action was given to the USAF to work with the existing guidelines and prepare a standardized message to the public concerning the disposal of beacons and circulate the message for comment. **STILL OPEN**

Action Items Generated at the 2007 Beacon Manufacturers Workshop:

2. NOAA accepted an action to engage the user community in discussions to obtain input and requirements for use in completing Phase I of the Beacon Modernization Plan. – **STILL OPEN**. Tentatively to be addressed at next SC-110 meeting in a one-day workshop.

3. USCG & USAF accepted an action to discuss the establishment of a single point of contact for the consumer to contact for false alerts. Closed for PLBs and ELTs. Use the AFRCC number: 800-851-3051 (Official Use Only). Single # for EPIRBs (USCG) still being determined. Will be coordinated thru SC-110 and reported at next BMW. **STILL OPEN for EPIRBs**.

Action Item from 2008 Beacon Manufacturers Workshop:

1. NOAA will work with the Cospas-Sarsat Secretariat to confirm current 406 MHz beacon population by type. **STILL OPEN**.

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. **STILL OPEN**.

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. **STILL OPEN**.

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. **STILL OPEN**.

5. SC-110 to consider issues identified in Mr. Yarbrough's presentation in the upcoming review of the EPIRB standard. **CLOSED**.

Action Items Generated at the 2009 Beacon Manufacturers Workshop:

1. NOAA, with the help of input from RCCs to the IHDB, to provide feedback to manufacturers on causes of false alerts to the extent practicable.