



ICAO

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WORKING PAPER

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**NAM/CAR Search and Rescue (SAR) Implementation and Civil-military Coordination Meeting
(SAR/CM)**

Mexico City, Mexico, 5 – 7 November 2018

- Agenda Item: 1 Global and Regional Search and Rescue (SAR) Matters**
1.2 Global and Regional Status of COSPAS-SARSAT Coordination

REPORT ON THE UNITED STATES SARSAT SYSTEM STATUS AND SAR CONTROLLERS WORKSHOP

(Presented by United States)

EXECUTIVE SUMMARY	
This document provides information on the status of the United States SARSAT system as at 15 August 2018 and the annual workshop conducted on Cospas-Sarsat matters.	
Action:	The suggested actions are presented in Section 4
<i>Strategic Objectives:</i>	<ul style="list-style-type: none">• Safety

1. Introduction

1.1 The United States supports the SARSAT system and its mission control center (MCC) provides service to North and South America and the Caribbean. In addition, the U.S. SARSAT system conducts an annual SAR Controllers Workshop on Cospas-Sarsat matters.

2. SARSAT System Status

2.1 The U.S. SARSAT system provided information on its status to the 17-21 September 2018 session of the ICAO/International Maritime Organization (IMO) Joint Working Group on SAR. The Appendix to this paper contains the information presented to the ICAO/IMO JWG. This meeting may want to discuss the value of such status reports.

3. SARSAT SAR Controllers Workshop

3.1 The U.S. SARSAT System conducts an annual SAR Controllers Workshop on Cospas-Sarsat matters. U.S. and international SAR professionals participate in this annual 3-day workshop that is tentatively scheduled for 12 March 2019 near Washington D.C. In recent years international participation included Dominican Republic, Guyana, Haiti, COCESNA/Honduras, Nicaragua and Trinidad

and Tobago, and others. The U.S. encourages participation by all States in the region and will send out notifications if requested.

4. Suggested Actions

4.1 The meeting is invited to:

- a) note the information provided in the Appendix to this paper on the status of the U.S. SARSAT system;
- b) discuss if this type of status report would be helpful for future meetings; and
- c) encourage participation in the annual SAR Controllers Workshop on Cospas-Sarsat matters conducted by the U.S. SARSAT system.

APPENDIX

Extract of Report on U.S. SARSAT System Status provided to the September 2018 session of the ICAO/IMO Joint Working Group on SAR

1 SECOND-GENERATION BEACON DEVELOPMENT

1.1 The United States (NASA) continues its work on development and type approval of the first Second-Generation Beacon (SGB). NASA has completed the majority of its proof of concept work for SGBs, including development and testing of the SGB prototype and compatible ground system (i.e. SGB-compatible MEOLUT). This work has covered all aspects of SGB processing, including single-burst throughput and valid message acquisition, overall independent location capability of the MEOLUT and MEOSAR SGB system capacity, and first generation beacon (FGB) compatibility. A series of field tests using both simulated signals and various SGB prototypes has demonstrated the excellent MEOSAR system performance attainable with SGBs. The performance is a significant improvement compared to that currently attainable with FGBs. More importantly, with minor exception, the performance also meets the expectations expressed in the Operational Requirements for Cospas-Sarsat Second-Generation 406-MHz Beacons (document C/S G.008) and the MEOLUT Performance Specification (document C/S T.019).

1.2 Following this proof of concept testing, the United States SARSAT Program is focusing on preparing the necessary testing facilities for type approval of SGBs. Using test data, SGB prototypes, and the combined knowledge and experience of various Cospas-Sarsat participants, type approval facilities are preparing for re-certification to type approve SGBs in the coming months.

2 UNITED STATES GROUND SYSTEM MODERNIZATION

2.1 The United States procured its current LEOLUT and GEOLUT segments in 2002–2003 with a design life of 8 years. There have been several updates/upgrades made to the Local User Terminals (LUTs) since then to extend their life expectancy. However, there have been various issues that have occurred over the last couple years due to the age or obsolescence of hardware. Because of these issues it was decided to replace our current LEOLUTs with new equipment.

2.2 The United States program analyzed options for the future of the LEO/GEO ground segment and determined a course of action to maintain LEOSAR support, while also adding MEOSAR capabilities. Additionally, the United States SARSAT program has planned for second-generation beacon (SGB) capabilities in both the GEOLUT segment as well as within the MEOLUT capabilities that the new LEOLUTs will add.

2.3 The United States has chosen not to replace the GEOLUTs entirely but to upgrade the hardware components that may have degraded over time. The United States has also required that the GEOLUTs be upgraded to process SGB signals once the applicable Cospas-Sarsat specifications have been approved by the Council.

2.4 Upgrading, rather than replacing, was decided to minimize impact to the operational GEOLUTs while adding additional capabilities. The GEOLUT antennas also have fewer moving parts than the LEOLUTs and therefore have deteriorated less since their installation. This decision also minimizes

resources expended on this effort in order to maximize time and money spent on replacing the LEOLUT segment.

2.5 The United States has recently completed an acquisition process for the next generation of LEOLUTs. Within the United States, the contract and design is referred to as the 4th Generation LEOLUT. The requirements for this 4th Generation LEOLUT are largely identical to the current LEOLUT design, with the exception of future MEOSAR and SGB capabilities. The United States plans to implement MEOSAR capabilities in the LEOLUTs located in Florida, Hawaii, Guam, and the test LEOLUT in Maryland. These LEOLUTs are to be designed to track MEOSAR satellites when there are no LEOSAR satellites in view. This will provide additional TOA/FOA data to the United States MEOLUTs, thereby increasing coverage and location accuracy. We expect that approximately 80% of the day these LEO/MEO LUTs will be able to track MEOSAR satellites rather than be idle LEOLUTs, thus increasing our MEOSAR performance. It is anticipated that these LEOLUTs with MEOLUT capabilities will be commissioned as a LEOLUT after installation and will function first and foremost as a LEOLUT. The MEOLUT capabilities at these LUT sites will be treated as additional channels to the MEOLUTs that are located at the same location. For the LEOLUTs located in Guam, it will be treated as two additional channels of the Hawaii MEOLUT. The MEOSAR functionality of these LUTs will meet all of the requirements of document C/S T.019 with some modifications and exceptions as these will act as channels of other MEOLUTs. These MEOLUT channels will meet the modified requirements in document C/S T.019 during the time they are not tracking LEOSAR satellites. The United States currently plans to recommission the Hawaii and Florida MEOLUTs with the additional MEOLUT channels after they are installed.



Figure 1: Installation of the antenna for Maryland Test LEOLUT (MEO channel)

3 UNITED STATES SOUTHWEST MEOLUT PROCUREMENT

3.1 In December 2016, the Cospas-Sarsat Council declared the MEOSAR system at early operational capability. One of the entrance criteria for the MEOSAR system to attain full operational capability, currently planned for 2020 is that the system provide global coverage. The United States has conducted several rounds of simulations based on published plans for MEOLUT around the world and these simulations show that based on current plans we have coverage gap in the south Pacific region.

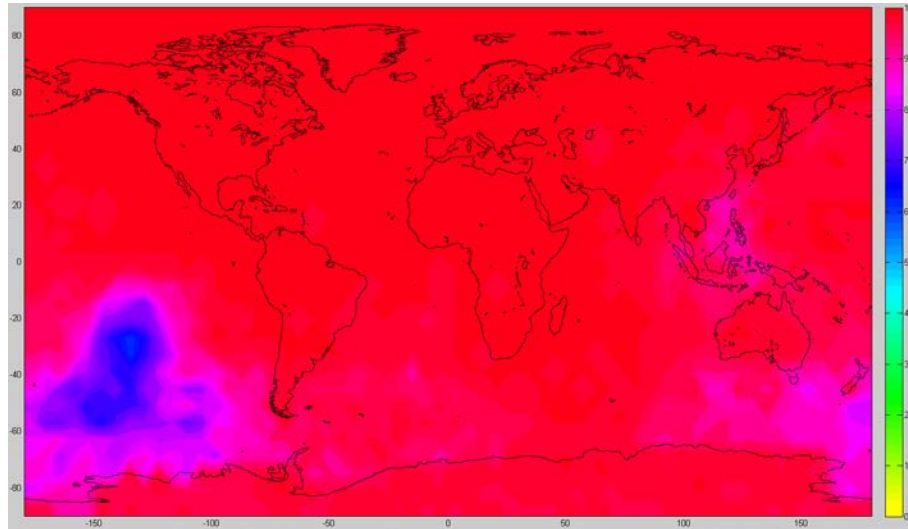


Figure 2: MEOSAR simulations coverage gaps without SW MEOLUT

3.2 In order to help reach the FOC target, the United States is placing a new MEOLUT in New Mexico, with a configuration that can be optimized to improve coverage of the South Pacific in addition to adding to global coverage. This additional asset also provides a very robust backup capability with respect to the existing MEOLUTS in Hawaii and Florida, maintaining coverage for the United States area of responsibility should the core elements of these systems be unavailable

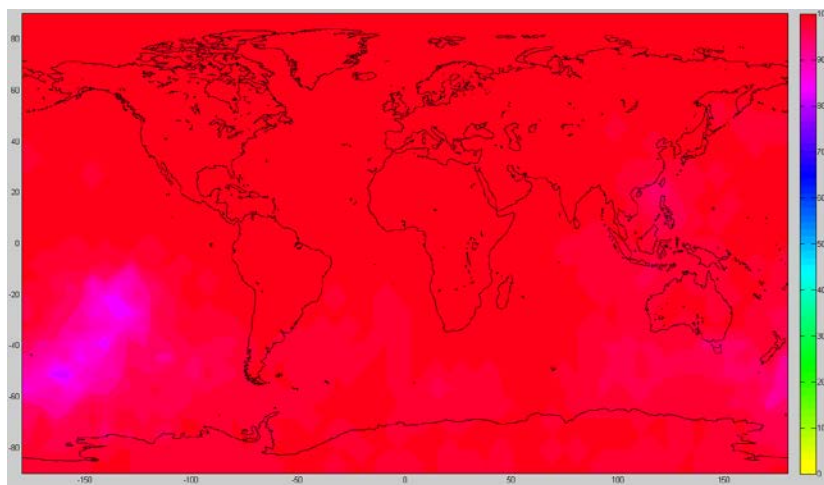


Figure 3: MEOSAR simulations coverage gaps with SW MEOLUT

