



National Aeronautics and
Space Administration



*NASA Search and Rescue
COSPAS-SARSAT Second Generation Beacons
Proof of Concept Test Plan
Specification/Type Approval*

May 8, 2015

Dr. Lisa Mazzuca, Mission Manager
Tony Foster, Deputy
NASA Search and Rescue Office
Goddard Space Flight Center





SGB POC Overview

- SGB Proof of Concept (POC) Test Plan
 - test compliance of MEOSAR system performance using SGB signals compliant with the SGB specification, C/S T.018, with the operational requirements contained in the Operational Requirements for Cospas-Sarsat Second Generation 406 MHz Beacons, C/S G.008.
 - Under development at NASA
 - Preliminary draft presented during C/S meeting on SGB Development (TG-1/2015)

- Multiple methods to generate SGB signal
 - Laboratory equipment
 - Beacon Simulator
 - Programmable, portable beacon
 - Prototype SGB beacon
- SGB Capable MEOLUT Processing
 - 6 channel Software Defined Receivers
 - MEOLUT location processing





SGB POC Test Verification Matrix



Second Generation Beacon Proof of Concepts Test Verification Matrix							
G.008 Req. ID	Requirement Description	POC Verification Method					Verific. Rational
		Test ID	Test	Design	Analysis	Inspection	
3.1	Compatibility with Cospas-Sarsat System	POC-4	X				
3.2	Independent Location Capability	POC-3	X				
3.3	Independent Location Accuracy	POC-3	X				
3.4	First Burst Transmission Timeliness			X			
3.5	Increased Performance in First Thirty Seconds of Distress Alert Transmission	POC-1,	X				
		POC-2					
3.6	Beacon Unique Identification	POC-2	X				
3.7	Beacon Message Content	POC-2	X				
3.8	Operating Life Time				X		
3.9	Temperature Range of Operation			X			
3.10	Self-Test Function	POC-2	X				
3.11	Cancellation Function of False Alert By User	POC-3	X				
3.12	Indicator of Beacon Activation						Not Verified
3.13	Verification of Beacon Registration						Not Verified
3.14	Homing and On-Scene Locating	POC-5	X				
4.1	Encoded Location Data	POC-2	X				
4.2	Encoded Location Accuracy			X			
4.3	Message Content	POC-2	X				
4.4	ELT Activated in Flight						Not Verified
4.5	Return Link Capability			X			
4.6	Battery Status Indicator					X	



SGB POC Test Cases

POC Test Case Title	POC Test ID	Definition
Processing Threshold and System Margin	POC-1	Determine the minimum value of the beacon output power for valid messages.
Valid and Complete Message Acquisition	POC-2	Determine the Valid and Complete Message Probability. Also, perform a Self-Test function.
Independent Location Capability	POC-3	Characterize the 2D independent Location Capability for the MEOSAR System using SGBs. Also, perform a false alert cancellation function.
System Capacity and Compatibility	POC-4	Verify the max number of SGBs that can be simultaneously active and properly processed with some active FGBs.
Homing and On-Scene Locating	POC-5	Measure the ability to meet the C/S G.008 requirement for the 406MHz homing signal per characteristics described in T.018.
Field Tests	POC-6	Repeat POC-1, 2,3,4,5 for portable SGBs deployed in various static and mobile scenarios in air, on land, and at sea. From a TBD distance from the Maryland MEOLUT.



Questions / Comments



- Basecamp project has been set up to facilitate exchange of information and status
 - <https://basecamp.com/2659188/projects/8497849>



SGB Spec/Type Approval

- SGB Specification (C/S-T.018) Update
 - Preliminary Issue B (Draft) currently in work following Task Group 1 in February 2015.
 - Planned for submission to Joint Committee 29 in September 2015.
 - Areas of revision include:
 - Spreading codes and sequences
 - Message length and bit rate tolerances
 - Frequency stability
 - Use of CRC/Checksum to improve performance of User Cancellation Function
 - Possible use of rotating fields to expand on operational requirements
- SGB Type Approval (C/S-T.X07) Development
 - Currently working first draft of document, beginning with a verification compliance matrix that defines testing for T.018 requirements.
 - Desire participation by beacon manufacturers and test facilities to help define test methodologies, and maintain awareness of progress.