



SARSAT Beacon Manufacturers Workshop

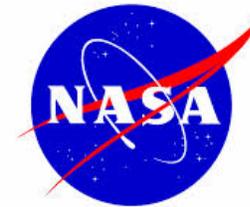
May 1, 2014

Homing and Direction Finding Update

Presented by:

Mr. Al Knox, US Air Force

Mr. Ed Thiedeman, US Coast Guard



Homing and DF Requirement History



- EWG 2/2010 Experts Working Group on Next Gen Beacon Requirements
 - US presented data on DF and locating technology and brought forth DF and Homing requirements
 - Codified in C/S G.008 section 3.14 as minimum requirement applying to all beacons
 - First time this issue was considered at C/S Level
 - Historically been left to National Administration



Homing and DF Requirement History

- EWG 2/2012 Experts Working Group on Next Gen Beacon Requirements
 - As part of Wide Band beacon development suggestion to have the beacons transmit an auxiliary 406 MHz signal at lower power but greater duty cycle for homing purposes and the suggestion to reduce or eliminate the 121.5 MHz homing signal from the beacon were applicable to any second-generation approach
 - EWG requested additional performance clarifications



Homing and DF Requirement History

- USA convened National level Homing CWG
 - DF manufactures to discuss possible way forward
- 26th Joint Committee
 - USA SAR responders provided clarification by providing:
 - Altitude and distance performance
 - Local location performance
 - Accuracy Performance
 - Pushing for 406 MHz DF solution
 - JC-26 Recommended update to G.008 section 3.14
 - CSC-49 approved recommendation

Homing and DF Requirement History



- 27th Joint Committee
 - Re-introduced the concept of Intelligent transmission scheduling (EWG 1/2013)
 - Varying TX pulses to allow for energy saving while still meeting SAR Responder needs
 - Could introduce additional issues with Homing and DF issue –especially with legacy equipment



Homing and DF Requirement History

- TG 1/2014 Task Group on Beacon Specs
 - Convened CWG to clarify document C/S G.008 operational requirements for homing and on-scene locating and submit proposals for consideration at JC-28
- ICAO-IMO JWG – taking a wait and see approach
- Mr. Al Knox and Mr. Ed Thiedeman – Co-Chairs
 - Two meeting conducted
 - Next meeting 2 May - RTCM



Homing Correspondence Group

- Clarify G.008 requirements
- Investigating 406 MHz signal characteristics
- Looking into signal tone to support and enhance the 406 MHz signal for homing
- Seeking input from manufactures for design, testing and analysis of homing equipment
- Exploring 406 MHz low power carrier tone signal for homing in second generation beacon



Current Status and way forward

- RHOTHETA paper on General DF Requirements
- RTCM paper on 406 Homing – Battery considerations
- JC-28 Paper clarifying requirements – Performance based, no specific solution
- Sync work with Intelligent TX CWG
- National Level requirements
- Wide band homing solution



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- QUESTIONS?



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- Back up slides

3.14 Homing and on-Scene Locating



3.14.1 Requirement

- Beacon design shall provide for homing and on scene locating. Compliance with other Cospas-Sarsat requirements shall not prevent compliance of the beacon with international and/or national requirements for on-scene locating, homing, or signal transmission(s) for direction finding (i.e., 406/121.5/243.0 MHz, AIS, etc.).

3.14.1.1 Altitude and distance performance



- Beacon design shall be inherently suitable for detection and homing on 406 MHz line-of-sight from an altitude of 10,000 feet (3048 meters) at a distance of 125 nautical miles (231 km).

3.14.1.2 Local location performance



- Beacon design shall allow suitably equipped SAR units, airports and certain other fixed and mobile facilities to receive and decode beacon identities and GNSS data sent via 406 MHz.



3.14.1.3 Accuracy Performance

- Beacon design shall allow SAR Units travelling at speeds between 90 kts (166 km/hr) and 270 kts (500 km/hr), (inclusive), to be able to locate beacon to within 500 feet (152 meters).



3.14.2 Rationale

- Geographic and environmental conditions may require the use of local locating, homing or direction finding to complete the rescue. Locating, homing and direction finding functions allow for non Cospas-Sarsat systems and organizations to provide notification and support for SAR response.



3.14.3 Dependencies

- Further clarification is required to confirm that 406 MHz burst takes precedence over homing and location.
- The goal is to implement these requirements with a minimum possible impact to currently fielded aircraft and ground 406 MHz direction finding/homing/local location equipment.
- Optimisation of antenna beam patterns for MEOSAR may impact DF performance



Homing Correspondence Group

- Feb 2014: Cospas Sarsat Task Group 1 established a correspondence group on Second Generation Beacon Homing and On-Scene Locating
- Tasked to clarify document C/S G.008 operational requirements for homing and on-scene locating and submit proposals for consideration at JC-28.