Second Generation Beacons

SAR Controllers Training 2014

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Overview

- Development Process for Second Generation Beacons (SGBs)
- Operational Requirements
  - Minimum Operational Requirements
  - Objective Operational Requirements
- Location Accuracy
- Dual Path for SGB Requirements
- Beacon Implementation Plan (BIP)
- Conclusion

Development Process for SGBs (1 of 2)

- Identified requirements:
  - SAR Responders
  - RCC Controllers
  - International Civil Aviation Organization (ICAO)
  - International Maritime Organization (IMO)
- Categorized and documented the requirements:
  - Minimum operational requirements
  - Objective operational requirements
  - Operational requirements for Cospas-SARSAT Second Generation 406 MHz Beacons, C/S G.008

Development Process for SGBs (2 of 2)

- SGBs do not have a requirement to be backward compatible with the LEOGEO System
- SGBs must be compatible with the MEOSAR System
- Developed implementation plan, which is still in draft

Operational Requirements (1 of 2)

- Minimum Operational Requirements are applicable to all second generation beacons. They provide for effective and efficient detection and location of a beacon which facilitate the rescue of the persons in distress. Although current technology may not allow meeting some minimum operational requirements in a cost effective fashion, these requirements are targets which will drive future innovation and specifications.

- Objective Operational Requirements may not apply to all beacons operating within the Cospas-Sarsat System. Objective operational requirements provide beacon enhancements and allow for desired additional features that may be required for specific categories of beacons to meet particular needs and enhance performance in specific applications.

Source: G.008, 2.3.2 Minimum and Objective Operational Requirements

Operational Requirements (2 of 2)

- Each requirement lists the requirement, the rationale for the requirement, and its dependencies
- 14 minimum operational requirements
- 6 objective requirements

Minimum Operational Requirements

1. Compatibility with the Cospas-SARSAT System
2. Independent Location Capability
3. Independent Location Accuracy
4. First Burst Transmission Timeliness
5. Increased Performance in the First Thirty Seconds of Distress Alert Transmission
6. Beacon Unique Identification
7. Beacon Message Content
8. Operating Life Time
9. Temperature Range of Operation
10. Self-Test Function
11. Cancellation Function of False Alert by User
12. Indication of Beacon Activation
13. Verification of Beacon Registration
14. Homing and On-Scene Locating

Objective Operational Requirements

1. Encoded Location Data
2. Encoded Location Accuracy
3. Message Content
4. ELT Activated in Flight
5. Return Link Capability
6. Battery Status Indicator

Location Accuracy (1 of 2)

- The operational performance requirement is for 2D independent location accuracy of:
  - 5 km, 95% of the time, within 30 seconds after beacon activation,
  - 1 km, 95% of the time, within 5 minutes after beacon activation, and
  - 100 m, 95% of the time, within 30 minutes after beacon activation.

Location Accuracy (2 of 2)

- The objective operational performance requirement is:
  - Encoded locations shall be provided to an accuracy of 30 m in latitude and longitude, 95% of the time, within 5 minutes of beacon activation.
  - If available, altitude information shall be provided to an accuracy of 50 m, 95% of the time, within 5 minutes of beacon activation.

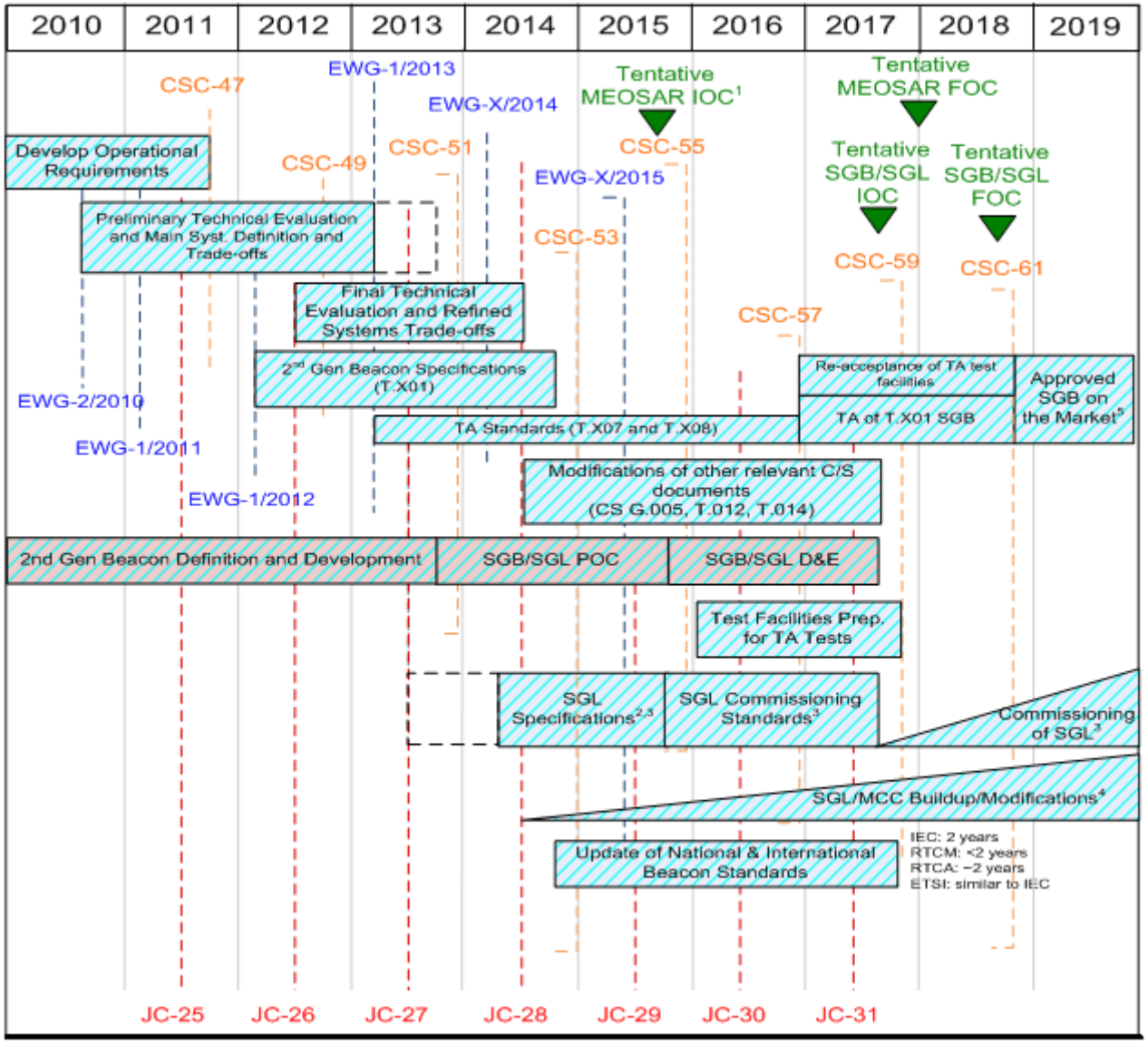
Dual Path for SGB Requirements

- Narrow band, like today's 406 MHz beacon
  - Will be backward compatible with today's Search and Rescue Processor (SARP) and ground system
  - May not need the SGB specifications
  - Will be able to code more information into beacon message by using rotating fields
- Spread Spectrum – Code Division Multiple Access (CDMA)
  - Increased Interference tolerance
  - Better independent locations
  - Will be able to code more information into beacon due to having more bits available

Beacon Implementation Plan (BIP)

NOTES

1. The MEOSAR D&E phase is scheduled to occur between January 2013 and October 2015.
2. Development of MEOLUT specifications for T.001 beacons will likely begin at JC-27. Consideration and preliminary development of SGL specifications can begin at this time as well.
3. SGL refers to MEOLUTs, GEOLUTs, and LEOLUTS that are capable of processing T.X01 and T.001 beacons.
4. Modifications to MCCs will also be needed during this phase.
5. SGBs require global coverage before introduction into the marketplace.



Conclusion

Questions?