



Second Generation Beacon (SGB) Update

SARSAT Beacon Manufacturers Workshop 2021

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Agenda

- NASA's Role in SAR
- Second-Gen Beacon (SGB) Testing Status
 - EPG Status
 - International Test Facilities
 - SGB Testing Status
- Space Segment Involvement:
 - SAR/GPS Status
- Advanced Projects
 - Slow Moving Beacons



NASA's Role in Search and Rescue

- Innovate and develop new technologies to improve search and rescue hardware for national/international use in emergencies
 - Emergency beacons for use in distress
 - Ground stations that monitor and distribute data to rescue forces
 - Space payloads that detect the emergency signal and relay to Earth
- Technical arm for United States satellite-aided SAR Program (SARSAT)
 - Work with US Coast Guard, Air Force, and National Oceanic and Atmospheric Administration (NOAA)
- Agencies form a delegation and represent USA on international level
 - COSPAS-SARSAT Program
 - 42+ countries work together to obtain full Earth coverage of beacon detections and rescues



SGB Testing Status

Testing the Emerging Beacon Segment



EPG Status

EPG Application Review Status:

- The panel requested data from SGB unique tests, which EPG provided in August 2021.
- The panel completed its review of the data at the end of September 2021. Clarifications are being exchanged through worksheets. No significant technical hurdles identified.
- EPG also provided ANGEL beacon burst files for analysis by the CNES and NASA test benches. These will be used to verify the accuracy of the signal analysis software used at EPG.
- NASA and CNES results are expected around the time of the BMW. The risk of a discrepancy is considered low.

EPG Application Approval Next Steps: Interim Approval Expected Q42021

- EGP/ETF Panel to resolve the open worksheet items
- EPG to submit the full ANGEL test report
- ETF Panel to complete analysis for SGB ELT(DT) extension, given limited test data
- ETF panel to submit a Report and Recommendation to the Parties and to a future JC (Parallel Path)
 - The Parties can grant an Interim Approval on their own timeline.
 - The Final Approval will come from the Council.



International Test Facilities

- The TUV extension of capabilities to include FGB ELT(DT)s is in process
- The ETF Panel completed the review of TUV's updated procedures March 2020
- The ETF Panel requested TUV perform a subset of tests, that are new or modified for ELT(DT)s, as part of the review
- TUV has been performing the requested tests, between April 2020 to the present, using a prototype FGB ELT(DT), with the most recent data provided mid-September 2021.
- The ETF Panel's Report and Recommendation is anticipated to be submitted to the Parties in Q4 2021 for their consideration of an interim approval to test FGB ELT(DT)s.



SGB Testing Status

- FGB/SGB ELT(DT) and SGB System Test performed, with JC paper written summarizing results
- SGB Capacity Test being developed, to be performed in near-term
- The commissioning of SGB compatible ground system capabilities is underway
- LADR interface developed and tested with the LADR prototype for implementation into the US MCC in 2022
- Advanced Next Generation Emergency Locator (ANGEL) is nearing type approval completion at EPG, expected to be in early 2022
- Commercial vendors beginning development of SGBs and investigating Type Approval following EPG certification



SAR/GPS Status

Fielding the Future Space Segment



SAR/GPS

- Contracts were awarded in 2019:
 - USAF to LM for 22 GPS III SVs
 - Canadian DND to MDA for the SAR repeater payload
- NASA is providing engineering expertise for mission assurance across all phases
- Design and engineering is underway
 - Simulators delivered to LM Sept 2021
 - Repeater CDR scheduled for Feb 2022
 - Ground Test Equipment scheduled to be delivered March 2022
 - Repeater Engineering Model scheduled to be delivered March 2022
 - Repeater Flight Unit Deliveries scheduled to begin Q4 2023
- Launches are planned to start in 2026, replacing the existing DASS constellation

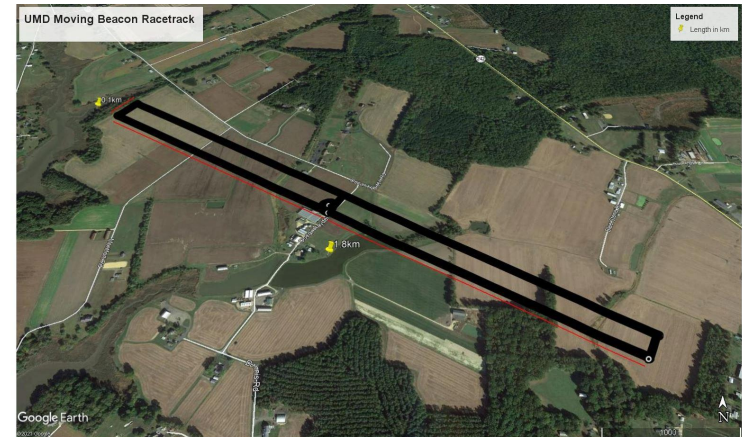




Advanced Projects / Development

Slow Moving Beacons

- Testing performed with Univ. of Maryland (UMD) to validate testing procedures related to slow-moving beacons and MEOLUT commissioning
- Moving beacon testing performed using a beacon mounted to a DJI M600 sUAS Unmanned Aircraft System (UAS)
 - The advantage of this method is that the motion can be accurately controlled and, even more importantly, very accurately logged as a function of time during the flight
- Slow-moving beacon errors specific to FGBs, still a large element of the beacon market
- Testing performed to develop methods to test moving beacon performance and USA MEOLUT commissioning plans for moving beacon performance metrics for both First and Second Generation beacons.





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