



SAR/GPS III & SAR/GLONASS MEOSAR Downlink RF Interference Summary

Dr. Lisa Mazzuca
NASA Search and Rescue Mission Manager
ICG-13, Xi'an China 2018

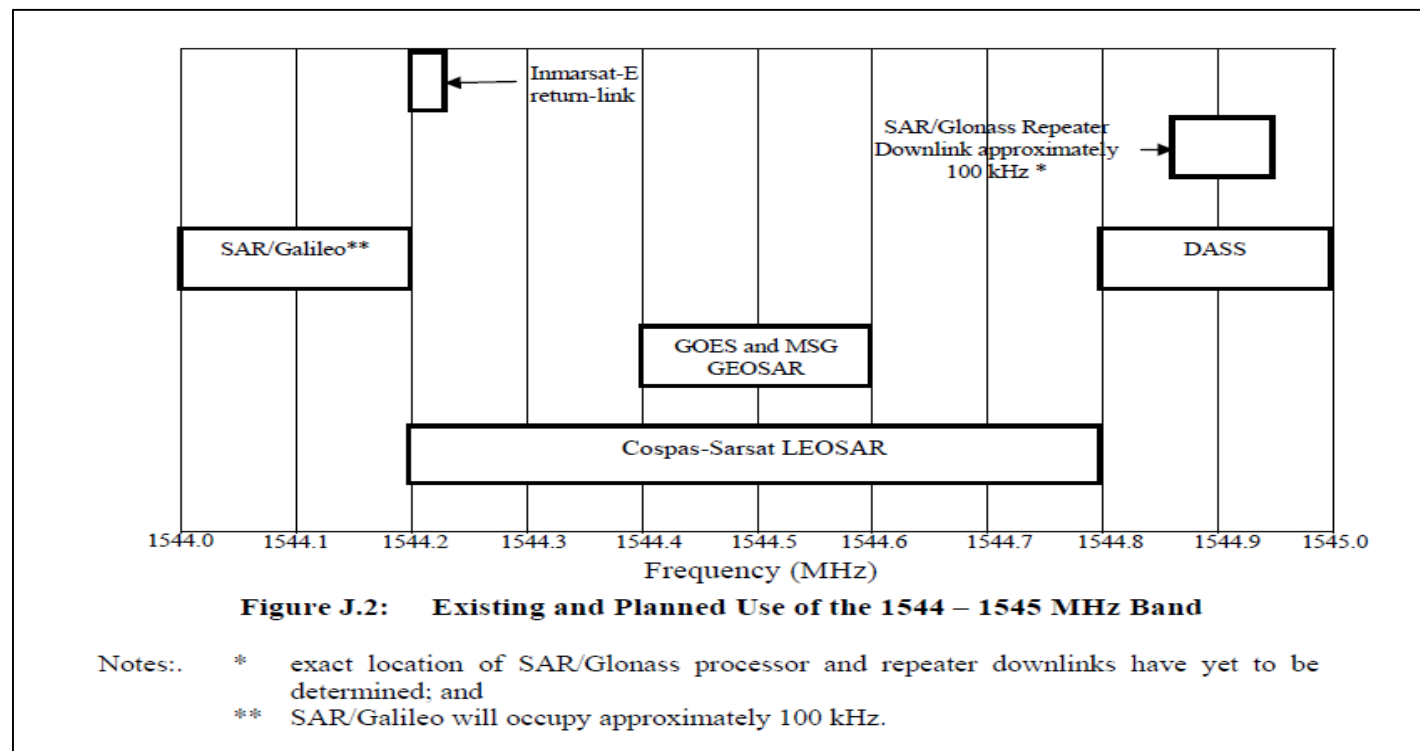


- Action from TG-1 for USA, Canada, and Russia to advance coordination between SAR/GPS and SAR/Glonass
- Proposed steps to resolve possible RF Interference between SAR/GPS III and SAR/Glonass L-Band Downlink (D/L) Frequencies
- Lessons learned from SAR/BDS and SAR/Galileo L-Band interference could provide potential resolution
 - LEOSAR needs to be part of the frequency coordination

C/S T.014 – Cospas-Sarsat Frequency Management

- C/S T.014 is out of date and many SAR payloads have not been included into this document.
 - Need to coordinate with NTIA and ITU the GPS III D/L frequency assignment

C/S T.014 Figure J.2





- China/BDS agreed to change SAR/BDS transponder downlink center frequency to 1544.21 MHz to avoid overlapping downlink frequency with SAR/Galileo
 - Coordination included SAR/Galileo, SAR/BDS and LEOSAR
- Polarization Diversity remained unchanged
 - Galileo: LHCP
 - BDS: RHCP
 - LEOSAR: LHCP

U.S. Preliminary Results



- C/S R.012 – Issue 1- Rev.13, Action Item 6.2 Ad Hoc meeting in Toulouse
 - *MEOSAR providers should study the issue of how many DASS and SAR/Glonass MEOSAR repeaters could be accommodated in the upper portion of the band without generating harmful interference to each other.*
- U.S. generated preliminary link budgets for SAR/GPS and SAR/Glonass to address:
 - Baseline (no interference) with weak C/N & nominal C/N uplink signal
 - Cases model interference with/without polarization isolation & frequency separation
 - SAR/GPS receiver bandpass bandwidth of 150 KHz need to be taken into account in the determination of the SAR/GPS D/L center frequency

C/S T.016 L-Band RF Frequencies & Polarization



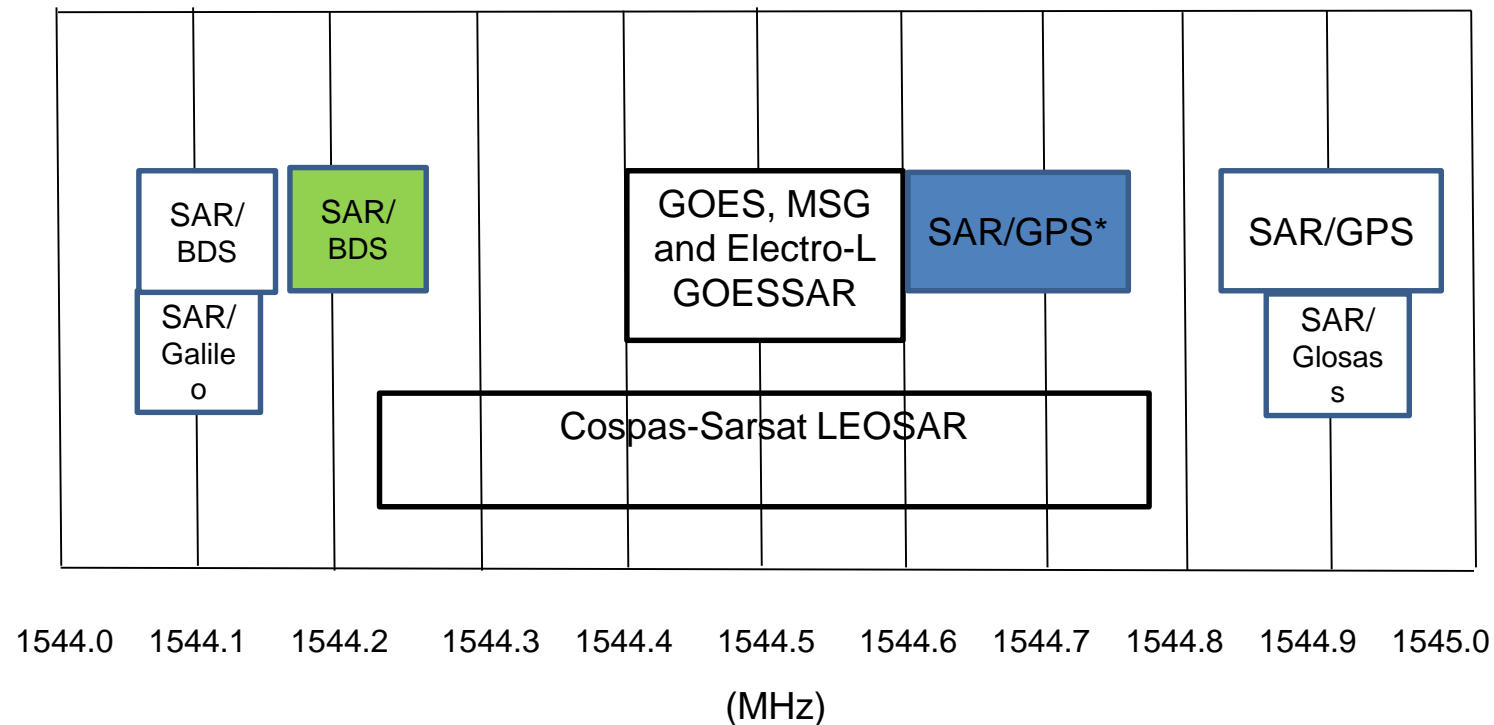
| <i>MEOSAR Space to Earth Downlink</i> | Units | Galileo | BDS | LEOSAR | GPS III | Glonass |
|---------------------------------------|-------|---------|--------|--------|---------|---------|
| Polarization | | LHCP | RHCP | LHCP | RHCP | LHCP |
| Frequency | MHz | 1544.1 | 1544.2 | 1544.5 | 1544.9 | 1544.9 |

Note : C/S T.014 J.7 Glonass frequency to be determined, Annex H budget shows 1544.8 MHz

| <i>Proposed MEOSAR Space to Earth Downlink</i> | Units | Galileo | BDS | LEOSAR | GPS III | Glonass |
|--|-------|---------|--------|--------|-----------|---------|
| Polarization | | LHCP | RHCP | LHCP | RHCP | LHCP |
| Frequency | MHz | 1544.1 | 1544.2 | 1544.5 | 1544.675* | 1544.9 |

*TBR based on TG-1 ESA Proposal for Update to the Interoperability Requirements for MEOSAR Transponder
28 June, 2018

Proposal for Update to the Interoperability Requirements for MEOSAR Transponders



*TBR based on TG-1 ESA Proposal for Update to the Interoperability Requirements for MEOSAR Transponder 28 June, 2018



- Path Forward:
 - Finalize analysis (orbit conjunction, link budgets)
 - Similar approach taken with Galileo/BDS D/L concern
 - Ad-hoc meeting required to discuss results
 - Present paper to C/S jointly (Canada-US)
 - Propose update to C/S documents at the appropriate JC meeting
 - Request amendment to NTIA and ITU filing