



Cospas-Sarsat Update

(SGB, RLS Beacon Capability, and MEOSAR Schedule)

Beacon Manufacturers Workshop

2016

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Technical Officer

Cospas-Sarsat Update



- **General Cospas-Sarsat Update**
- **Second Generation Beacon Update**
- **Return Link Service Beacon Capability**
- **MEOSAR Schedule**

Cospas-Sarsat Mission



Mission Statement

The International Cospas-Sarsat Programme provides accurate, timely and reliable distress alert and location data to help search and rescue authorities assist persons in distress.

Objective

The objective of the Cospas-Sarsat system is to reduce, as far as possible, delays in the provision of distress alerts to SAR services, and the time required to locate a distress and provide assistance, which have a direct impact on the probability of survival of the person in distress at sea or on land.

Strategy

Cospas-Sarsat Participants implement, maintain, co-ordinate and operate a satellite system capable of detecting distress alert transmission from radiobeacons and of determining their position anywhere on the globe. The distress alert and location data is provided by Cospas-Sarsat Participants to the responsible SAR services.

Services are provided world-wide and free of charge for the user in distress.

Cospas-Sarsat Participants



4 Founders: Canada, France, Russia and the USA
26 Ground Segment Providers
10 User States
2 Organisations

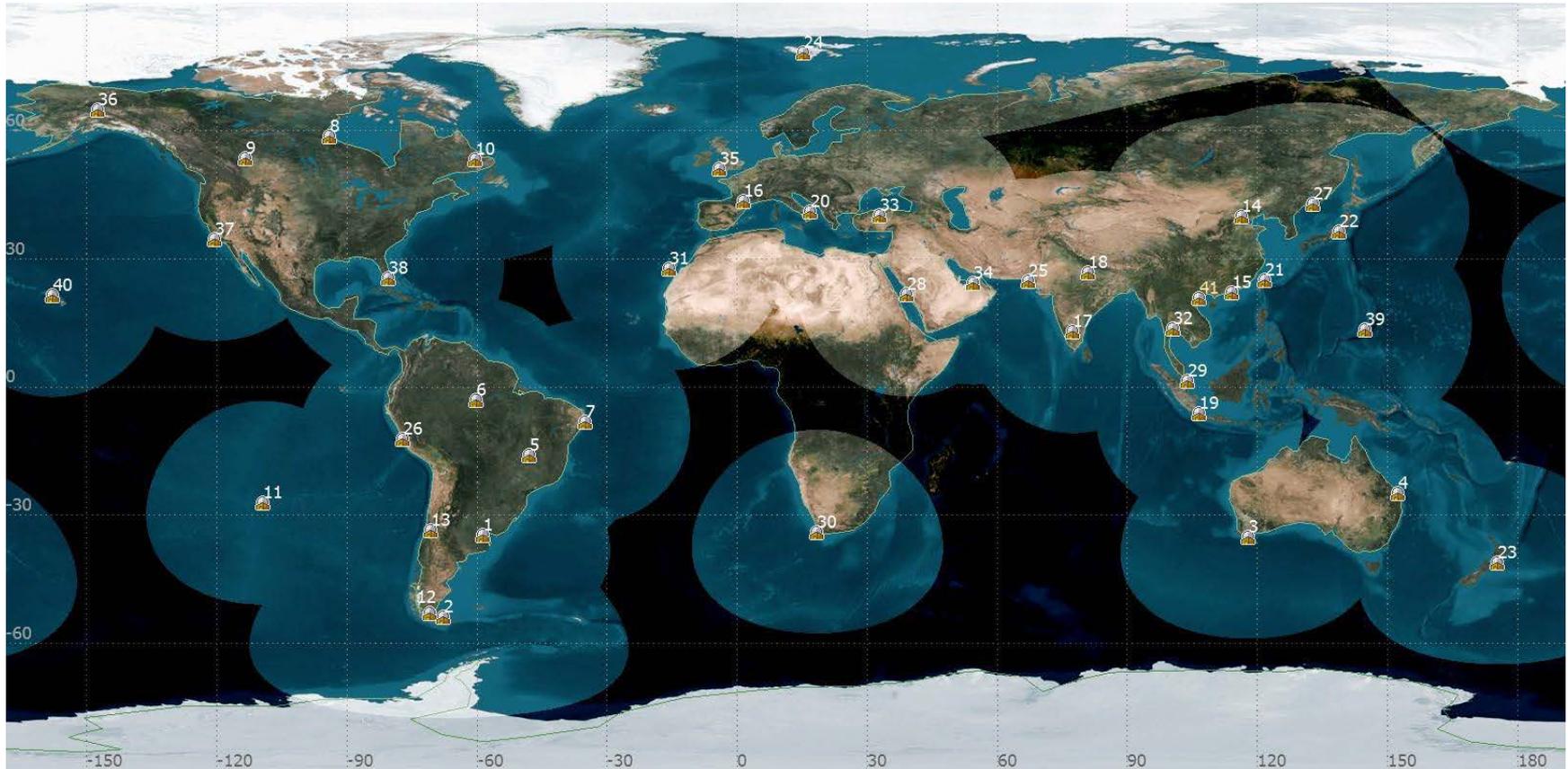
Algeria	New Zealand
Argentina	Nigeria
Australia	Norway
Brazil	Pakistan
Canada	Peru
Chile	Poland
China (P.R.)	Russia
Cyprus	Saudi Arabia
Denmark	Serbia
Finland	Singapore
France	South Africa
Germany	Spain
Greece	Sweden
Hong Kong	Switzerland
India	Thailand
Indonesia	Tunisia
Italy	Turkey
ITDC	UAE
Japan	UK
Korea (R. of)	USA
Netherlands	Vietnam

Cospas-Sarsat Components

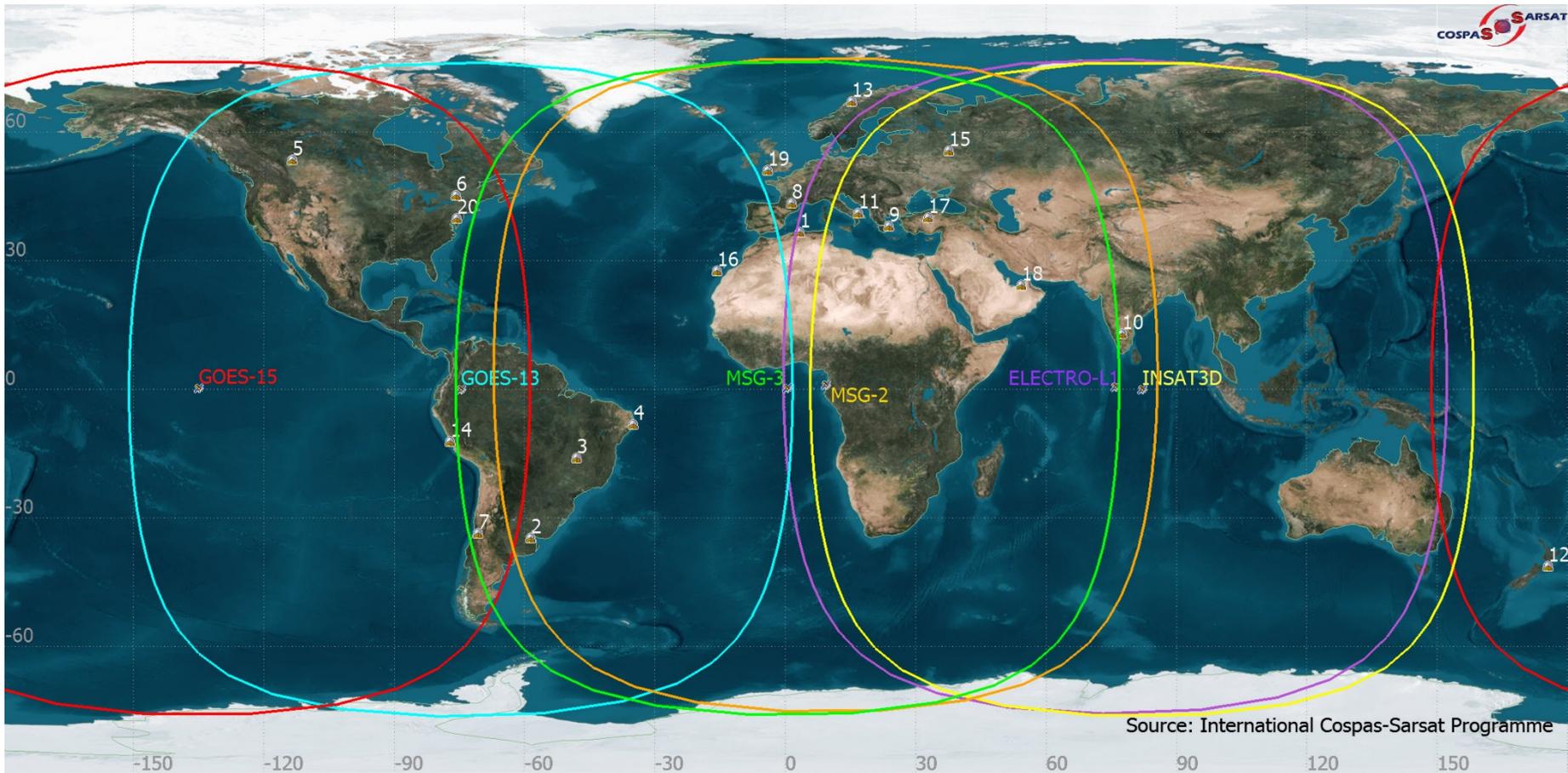


- Space Segment:**
- 5 LEO payloads (3 more still planned to be deployed by 2019)
 - 6 GEO payloads + 4 additional under in-orbit tests + 1 in-orbit spare (5 more planned before 2019)
- Ground Segment:**
- 54 Operational LEOLUTs
 - 22 Operational GEOLUTs + 1 under test
 - 31 Operational Mission Control Centres
- Distress Beacons:**
- >1.77 million 406 MHz beacons (end of 2015)
 - about 50 active manufacturers

LEOSAR System Visibility (Dec 2015)



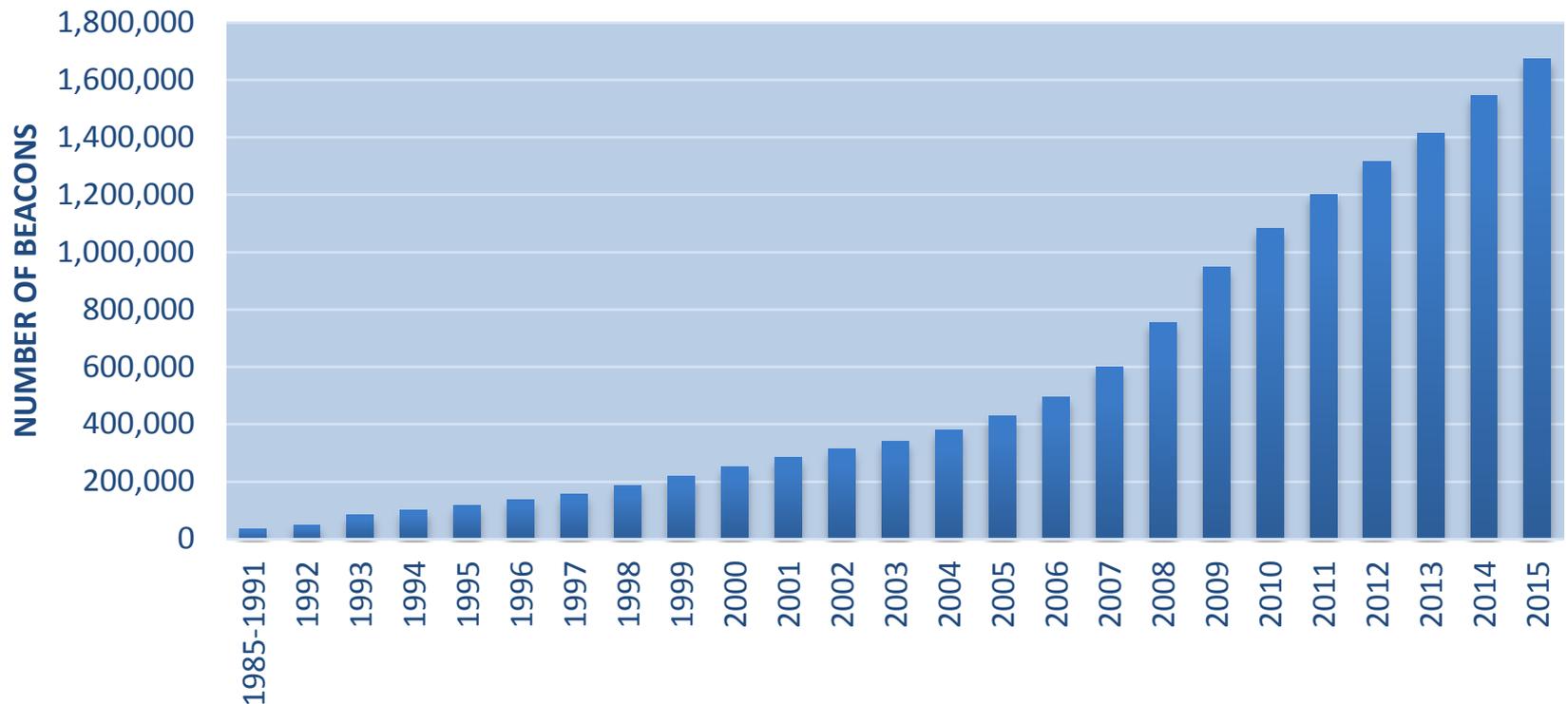
GEOSAR System Visibility (Dec 2015)



Beacon Population Evolution



406 MHz BEACON POPULATION EVOLUTION



Cospas-Sarsat

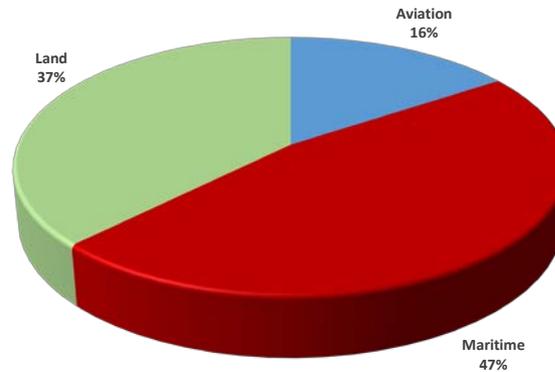
SAR Events and Assisted Saves



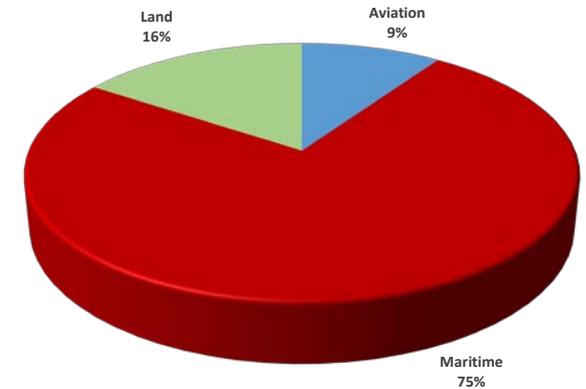
2014

SAR Events: 685
P. Rescued: 2354

SAR Events 2014



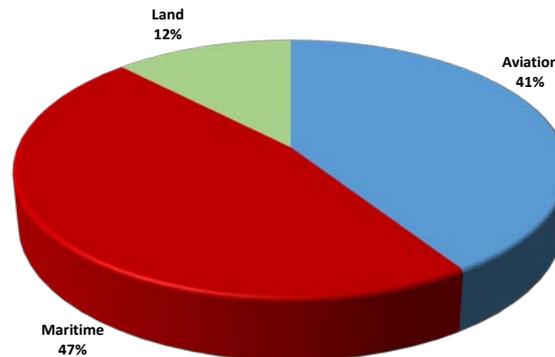
Persons Rescued 2014



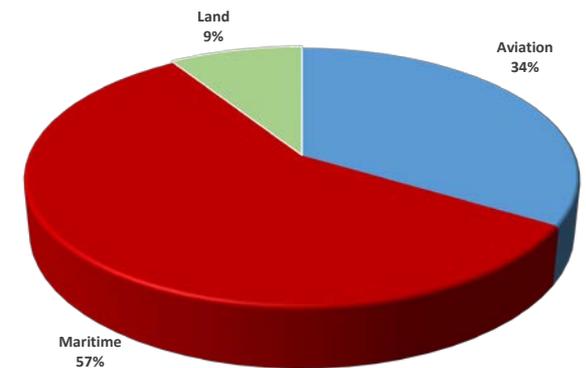
1982 to 2014

SAR Events: 11,070
P. Rescued: 39,565

SAR Events 1982-2014



Persons Rescued 1982-2014



Cospas-Sarsat SGB Documentation



- Cospas-Sarsat has defined operational requirements for second generation 406 MHz beacons (SGBs)
 - Operational Requirements for Cospas-Sarsat Second Generation 406 MHz Beacons, document C/S G.008
- Second Generation Beacon Implementation Plan (BIP), document C/S R.017

Cospas-Sarsat SGB Documentation



- Document C/S T.018 provides specifications for Second Generation Beacons (SGBs), Preliminary Issue B was approved in Dec 2015
- Document C/S T.021, Preliminary Issue A is in development and provides a Type Approval Standard for SGBs (in drafting, not released)
 - Both documents were further developed at TG-1/2016 and will continue to be worked on leading into JC-30 and likely JC-31.

TG-1/2016



TG-1/2016
Cospas-Sarsat Task Group Meeting on Second-Generation Beacon Specifications
4 - 8 April 2016, Montréal, Canada



Beacon Implementation Plan (C/S R.017) Timeline



Per Operational Requirements in C/S G.008

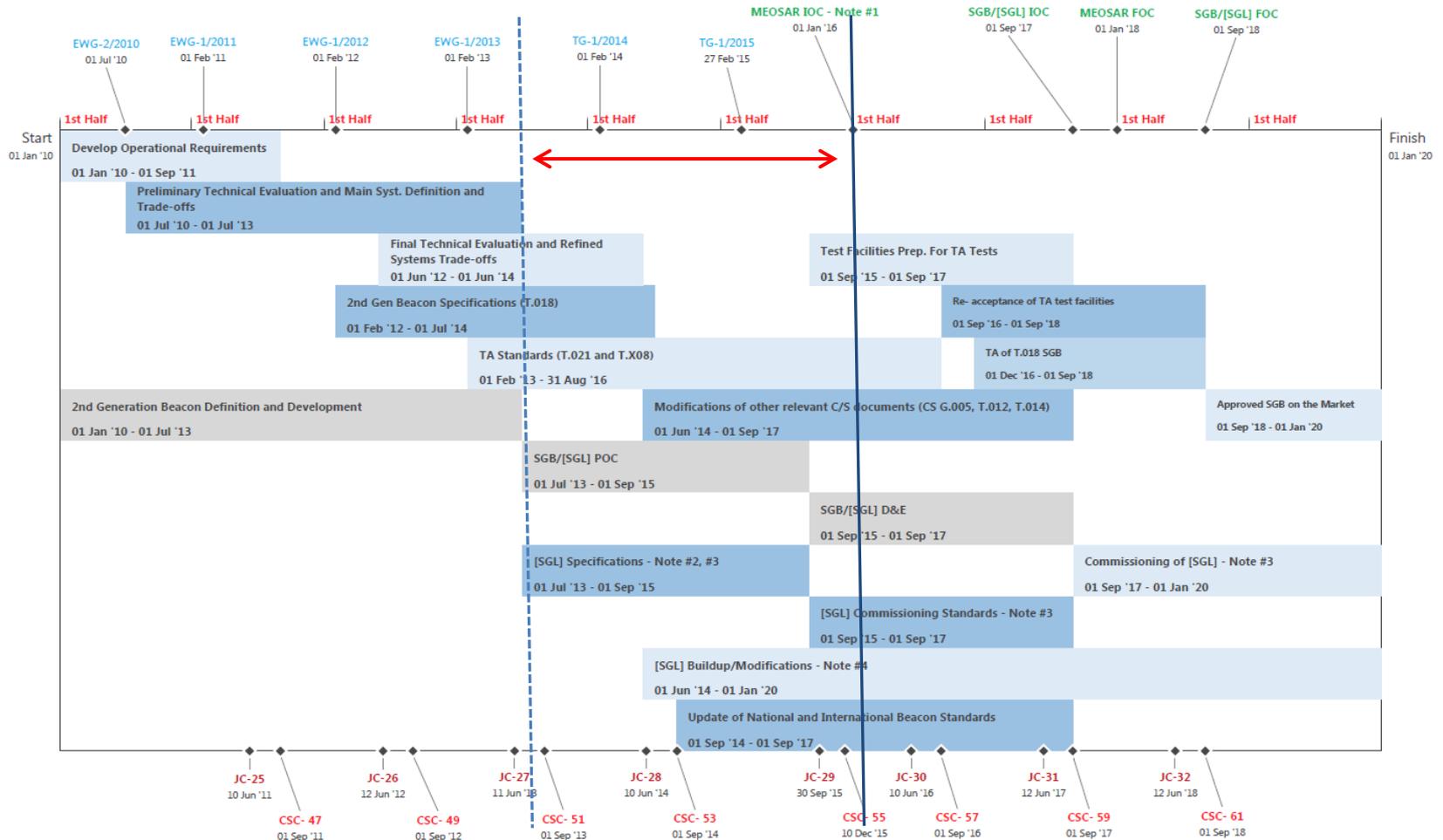
- LEOSAR SARP processing constraints limit the possible evolution of first generation beacon specifications
- SGBs after MEOSAR FOC not required to be LEOSAR SARP interoperable
- Wideband only SGBs will not be SARP interoperable, and so should not be deployed until MEOSAR FOC
- MEOSAR D&E not dependent on availability of SGBs

Beacon Implementation Plan C/S R.017 at TG-1/2016



- TG-1/2016 noted delays in the published SGB implementation timeline
- The SGB BIP had been developed before ICAO announced its GADSS and associated Autonomous Distress Tracking implementation deadlines
- No changes could be agreed to C/S R.017 until further consideration by the Council and JC

BIP Timeline Agreed at CSC-55/2015



SGB: Ongoing Work



- Content and order of transmission of the rotating fields
- Beacon's required transmission power (EIRP)
- Error correction trade-offs (enhanced BCH vs CRC)
- Intelligent transmit schedule after the first 30 seconds
- Characteristics of the homing signal
- Timeline, and ELT(DT) considerations
- POC Testing of SGBs is underway by NASA and other Participants

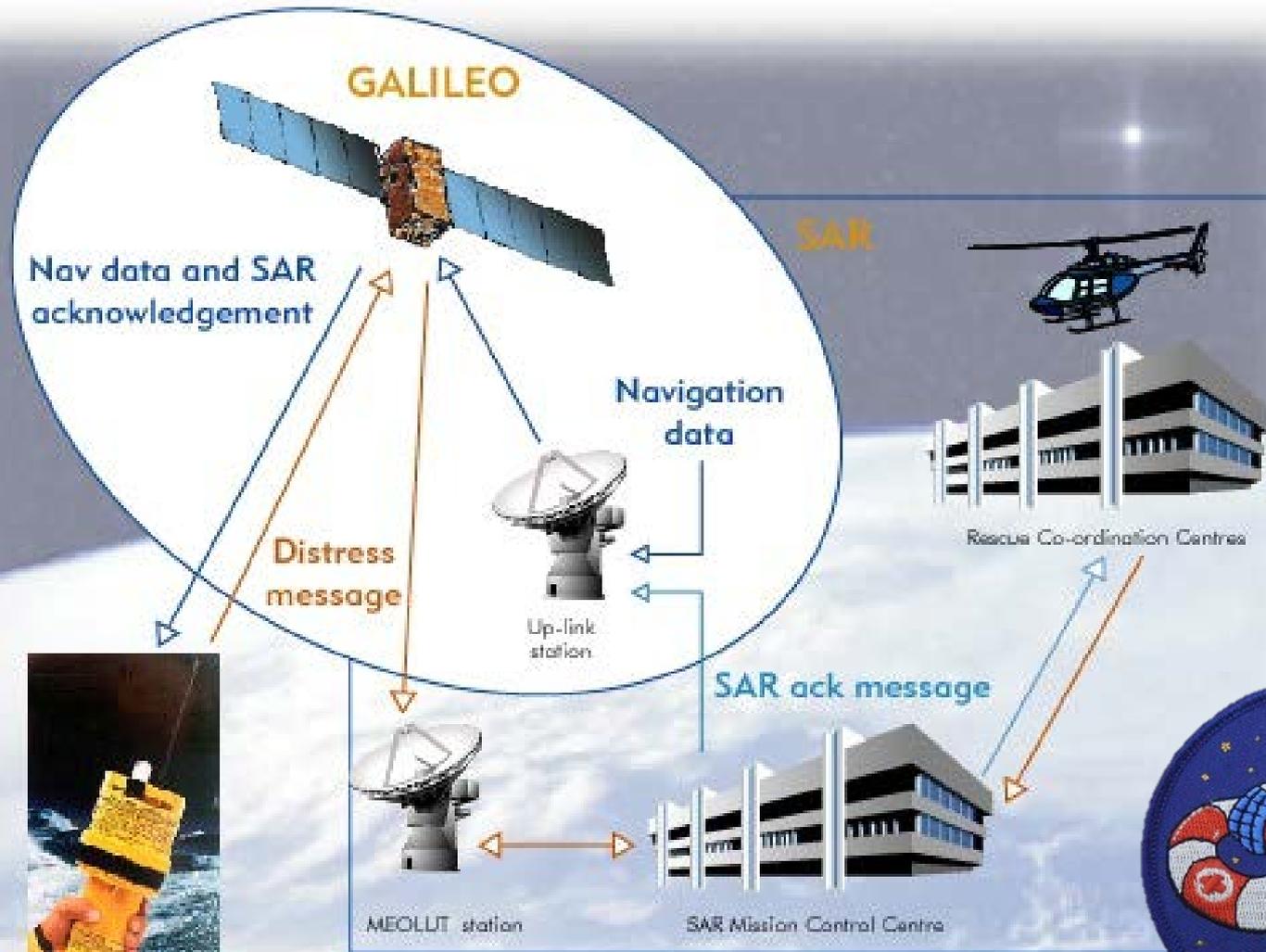


SGB Correspondence Working Groups



- Homing and Intelligent Tx Scheduling: Edwin.B.Thiedeman@uscg.mil, Co-Chair and Chris.Hoffman@acrartex.com, Co-Chair
- C/S T.018 (Specification for Second-Generation Cospas-Sarsat 406-MHz Distress Beacons)/T.021 (SGB Type Approval): Anthony.W.Foster@nasa.gov, Chair
- SGB Proof-of-Concept Test Campaign: Mickey.Fitzmaurice@noaa.gov, Chair
- T-ELT/ELT(DT) Fábio Carneiro Barbosa, flcbarbosa@gmail.com, Chair

SAR/Galileo Return Link



Return Link Service



- Procurement of the Operational Return Link Service Provider (RLSP) was initiated in October 2015
- RLSP development, deployment, and testing will span from January 2016 until October 2017 with a goal of providing Operational Return Link Services in early 2018.

Return Link Service



- The implementation date for the C/S A.001 (DDP) required to ensure RLS capabilities were approved at CSC-55 as:
 - LGM MCCs would be required to have the capability of operationally processing RLS protocol beacons by October 2016,
 - All MCCs would be required to have the capability of operationally processing RLS protocol beacons by December 2017

Return Link Service



- Amendments were approved at CSC-55 in December 2015 to the following documents to accommodate RLS beacons:
 - C/S T.001 “Specification for Cospas-Sarsat 406 MHz Distress Beacons”, and
 - C/S T.007 “Cospas-Sarsat 406 MHz Distress Beacons Type-Approval Standard”.
- T.007 currently states that the RLS protocol will be effective by 1 January 2017, but may be subject to further review.

MEOSAR Space Segment Status



- 12 L-band (10 Galileo, 2 GLONASS) satellites currently available
 - 3 satellites require additional precise orbit data to be provided by a ground FTP server being implemented by the EC
- 2 additional Galileo L-band satellites will be launched in May 2015 and should be available in the upcoming months
- EC plans to launch 4 additional L-band Galileo satellites by the end of 2016
- Two Glonass L-band satellite became operational on 17 Feb 2016, the status of the second is not clear at the moment
- New webpage - Status of Cospas-Sarsat MEOSAR Payload Instruments at <https://www.cospas-sarsat.int/en/system/meosar-system-status/status-of-cospas-sarsat-meosar-payload-instruments>

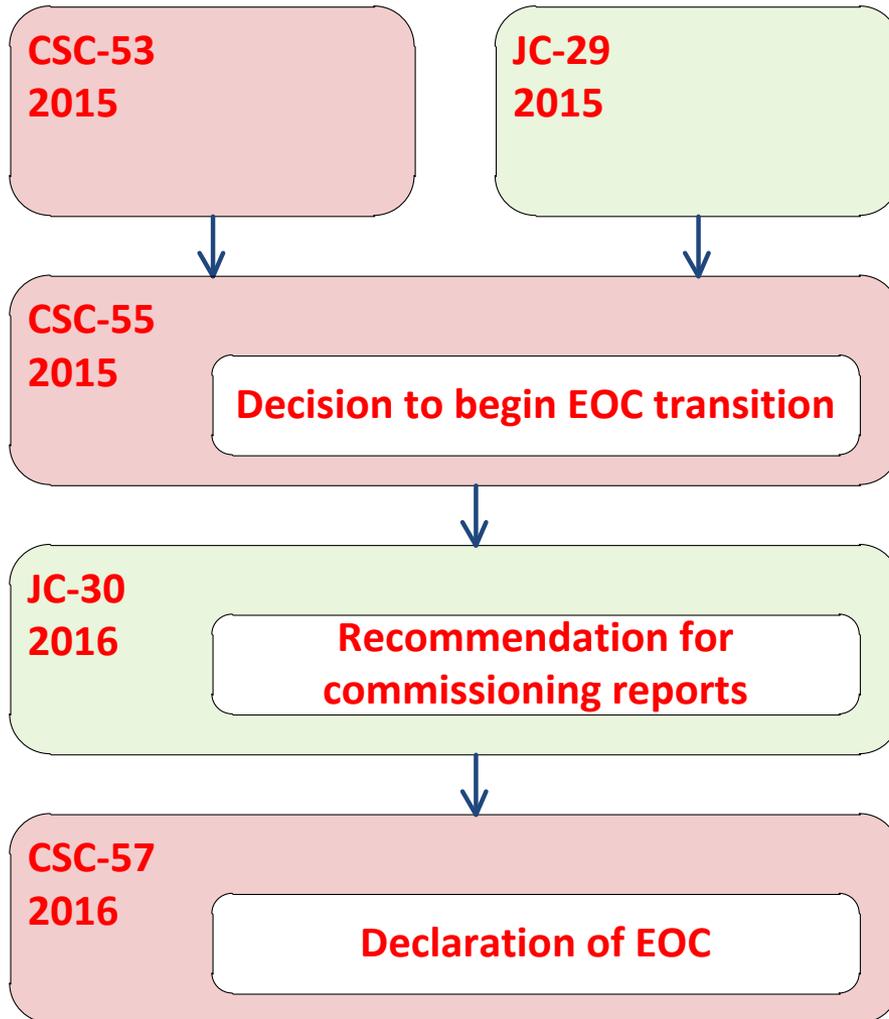
MEOSAR Development



- Demonstration and Evaluation (D&E) Phase
- Early Operational Capability (EOC)
- The Phase II report is being written now by a CWG
- D&E Phase III entrance criteria for available L-band satellites (eight) have been met but commencement has been delayed due to focus on EOC entrance
- Fourteen L-band satellites are required for the complete test campaign
- Phase III planning will be discussed in detail at the Task Group Meeting on MEOSAR Evolution (TG-2/2016) in June 2016

MEOSAR Development

Early Operational Phase (EOC)



At CSC-55, the Council reviewed the EOC entrance criteria and decided to begin MEOSAR EOC transition.

The EOC period will:

- be initiated before the MEOSAR D&E Phase is completed and will allow early operational use of MEOSAR alert data
- allow the nascent MEOSAR system to augment the performance of the LEO/GEO system and allow SAR services to familiarize themselves with the MEOSAR system before entry into IOC

Evolution of Cospas-Sarsat



- MEOSAR space segment launch delays and initial test results have prolonged the D&E phase
- Full Operational Capability (FOC) dependent upon global deployment of MEOSAR ground and space segment
- MEOSAR EOC/IOC/FOC not dependent upon second generation beacon availability, however deployment of new beacons cannot occur until sufficient MEOSAR space/ground segment is operational

For More Information...



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