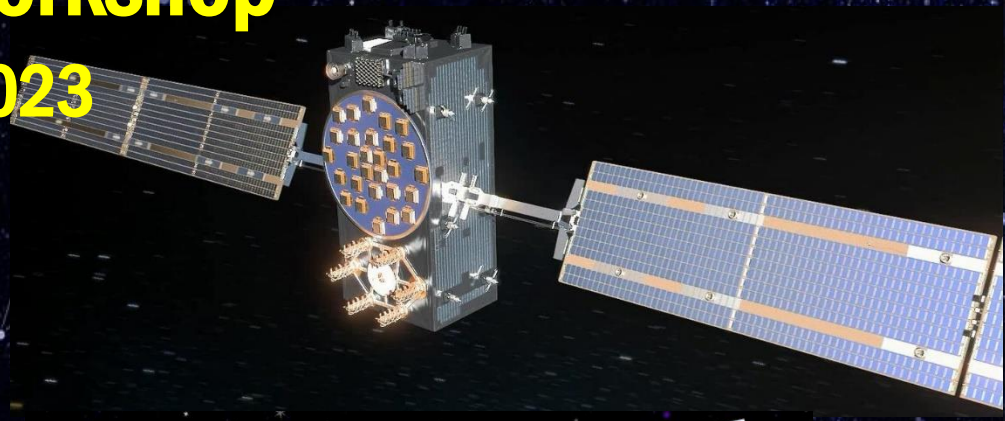
Beacon Manufacturers Workshop

Jacksonville, Florida, 16 June 2023



Cospas-Sarsat Programme updates

Dany St-Pierre
Cospas-Sarsat Secretariat

Presentation Overview

- Overall Mission and Participants
- System segments status: Space segment, Ground Segment, Beacon population
- MEOSAR Advantages
- Assisted Saves distribution and evolution
- 2022-23 Expert Working Groups outcomes
- CSC-67, CSC-68 outcomes and decisions
- JC-37 outcomes
- Main Developments since the 2022 BMW
- 2023-2024 Cospas-Sarsat Programme expectations

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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.

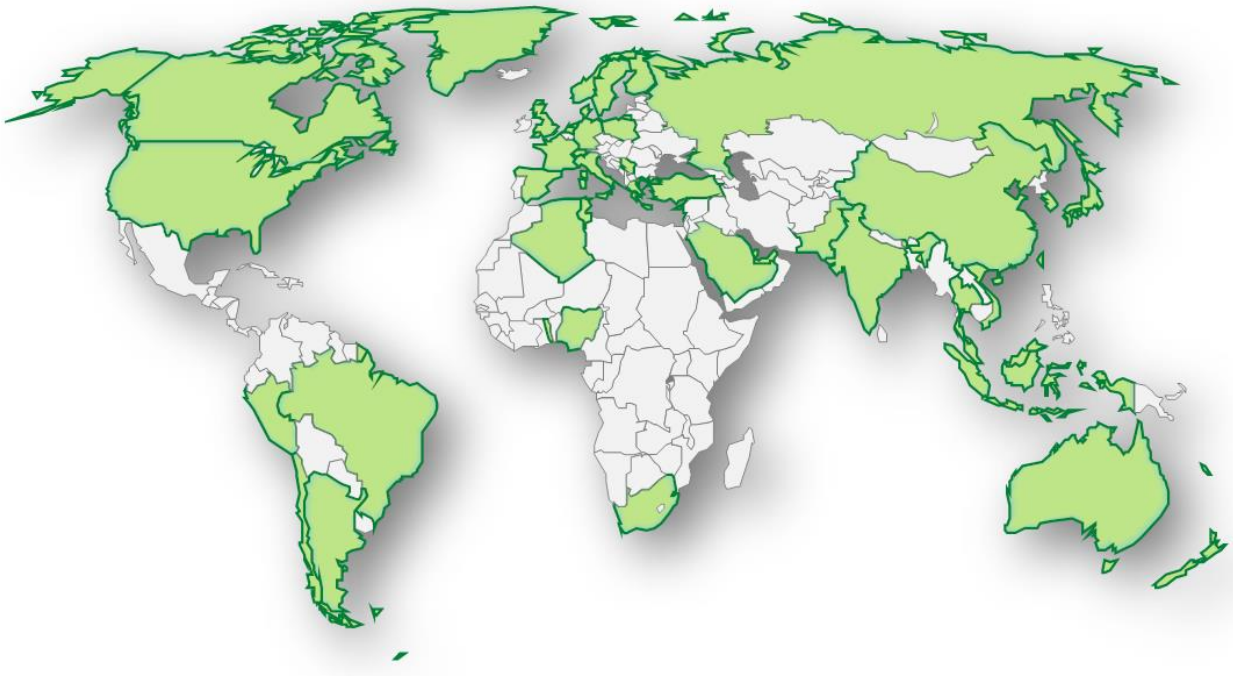
Strategy

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 worldwide and free of charge for the user in distress.

Cospas-Sarsat Participants

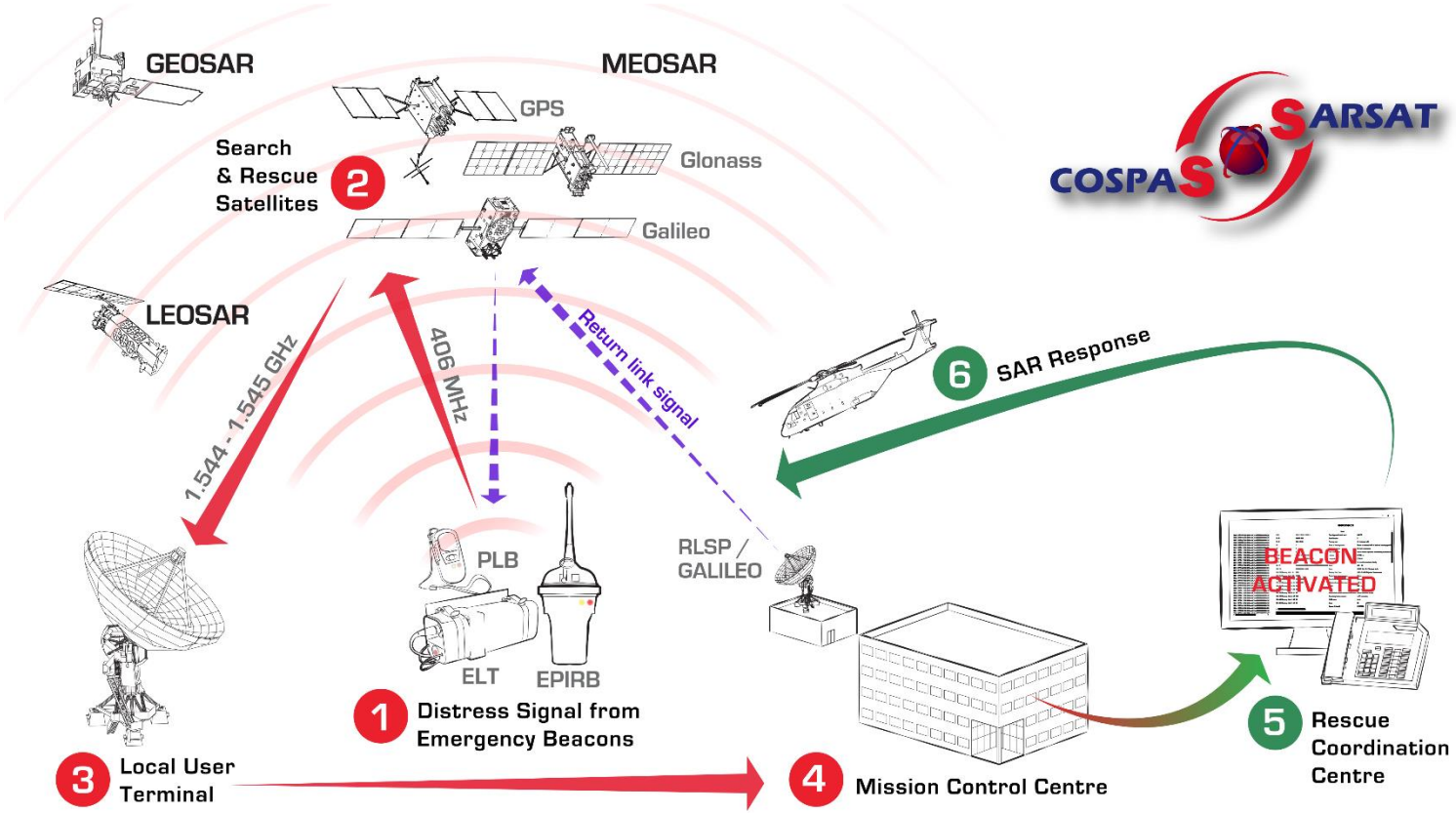
Cospas-Sarsat Participants (45)



>75% of World Population
>85% of World Wealth

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

Cospas-Sarsat System



Cospas-Sarsat Satellite Systems

3 Types of Satellite Systems

- LEOSAR: Legacy System first payload deployed in 1982. Main operational system since the beginning of the Cospas-Sarsat Programme.
- GEOSAR: first payloads deployed in the mid-late 90s to provide early alerts and complement the LEOSAR system and in the future MEOSAR system.
- Medium Earth Orbiting Search And Rescue (MEOSAR): First payloads deployed in the early 2000s, first operational payload deployed in 2012 (Galileo), declared at Early Operational Capability in 2016.

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Cospas-Sarsat LEO-GEO Components

Space Segment:

- 5 LEO payloads in operation (4 operating beyond their designed lifetime). Two additional Cospas payloads planned to be launched by the end of 2023 and two more by the end of 2025 (last ones expected).
- 11 GEO payloads in operation (+ 6 in-orbit spares), one more under tests. First MTGs made operational in 2023.

Ground Segment:

- 53 LEOLUTs (in 41 locations) in operation of which 10 are LEO/MEO capable, 3 more in 2 locations to be made operational in 2023.
- 27 GEOLUTs in operation + one back-up GEOLUT, 2 GEOLUTs under test and 3 more under development.
- 32 Mission Control Centres in operation + 2 MCCs in development.

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MEOSAR payload status

- Galileo: 26 SAR/Galileo payloads operational. 10 more planned still expected to be launched in the upcoming years. Galileo Second Generation payloads expected to be deployed from 2025.
- GPS: 22 DASS payloads used operationally (18 on DASS/GPS II 4 on DASS/GPS III), Additional DASS/GPS III to be deployed in the upcoming years. First L-band payloads on GPS III to be deployed no earlier than 2026.

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MEOSAR payloads status

- Glonass: 2 SAR/Glonass K1 payloads operational. One SAR/Glonass K1 payload expected to be commissioned in 2023. 1 SAR/Glonass K-2 payload planned to be put in orbit in 2023. 2 more SAR/Glonass K-2 payloads and 1 more SAR/Glonass K-1 payload expected to be deployed from 2023.
- BEIDOU: Six SAR/BDS operational (awaiting availability of the satellite ephemeris to be made available to MEOLUTs).
- 56 MEOSAR payloads available for operation.

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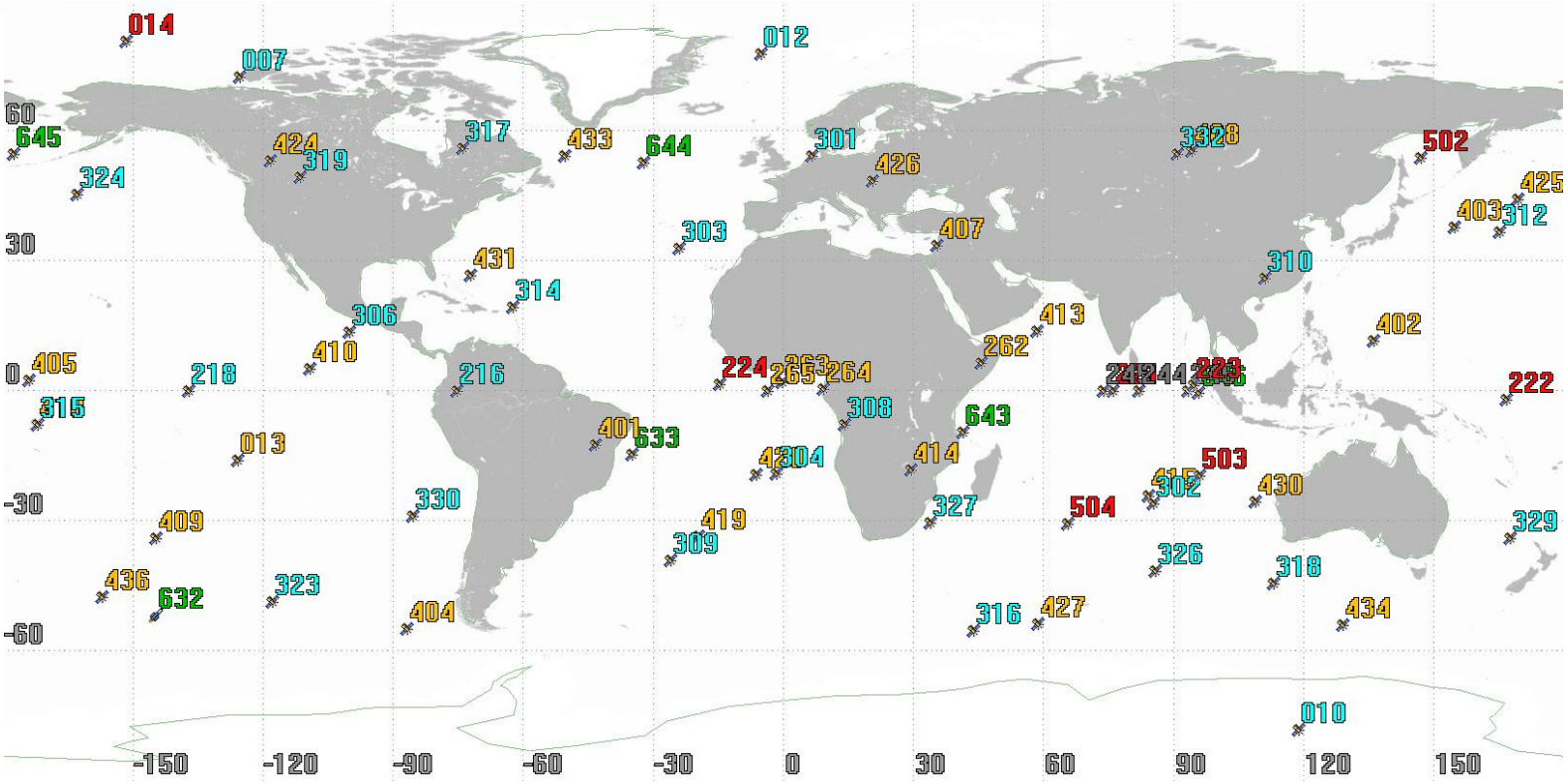
Total SAR payloads (as of now)



74 Cospas-Sarsat operational SAR payloads!

MEOSAR Ground Segment status

- 29 MEOLUTs commissioned
- 10 MEOLUTs commissioned to IOC/FOC standards
- 16 MEOLUTs commissioned FGB ELT(DT) capability
- 3 MEOLUTs commissioned for FGB+SGB ELT(DT) capability
- 1 MEOLUTs commissioned for SGB capability
- 17 MCCs with commissioned LGM capability +3 more expected to be commissioned in 2023.

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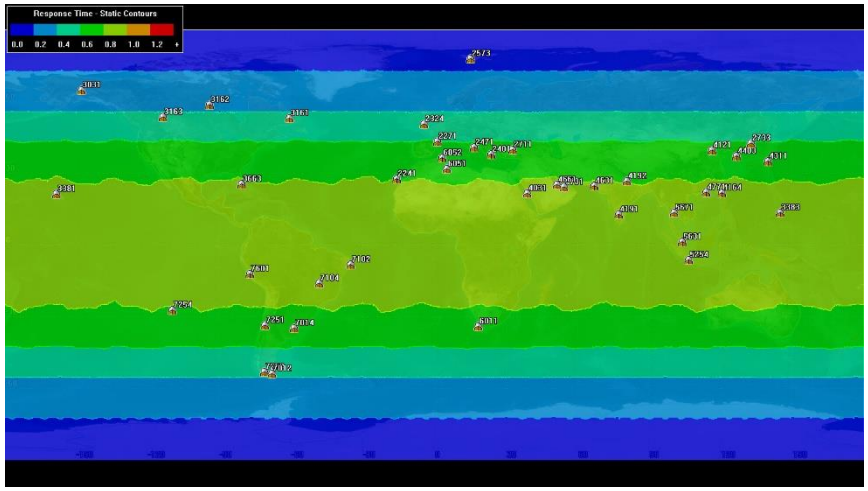
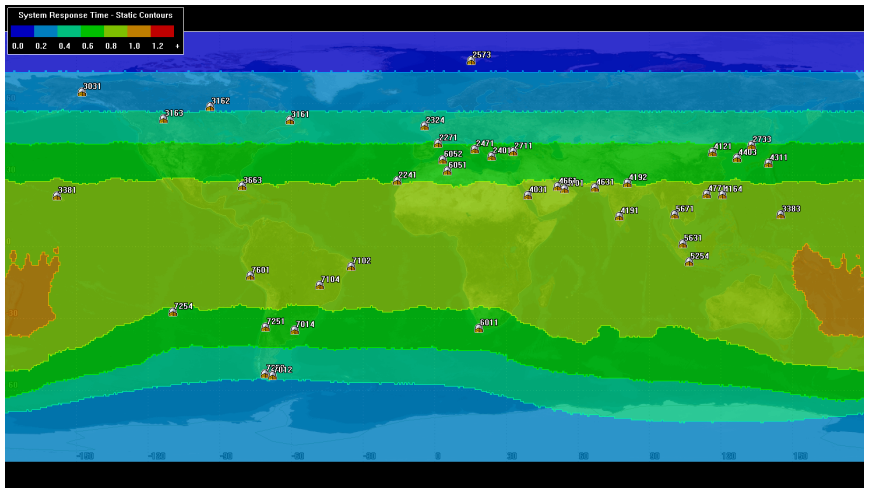
LEOSAR Latency (current)



Average LEOSAR latency time to satellites (Current configuration)



Average LEOSAR latency time to LEOLUTs (Current configuration)

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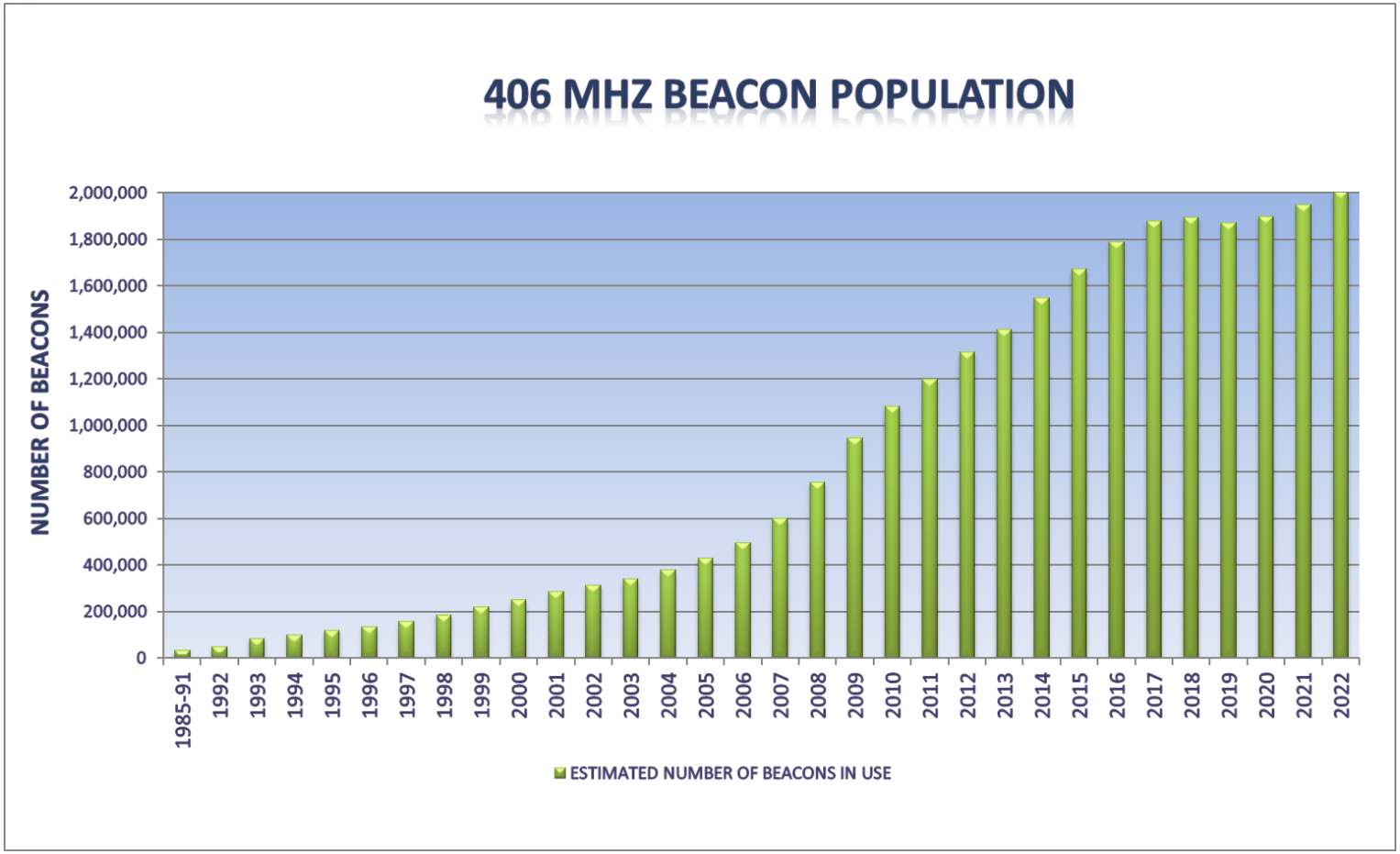
Beacon Population Evolution



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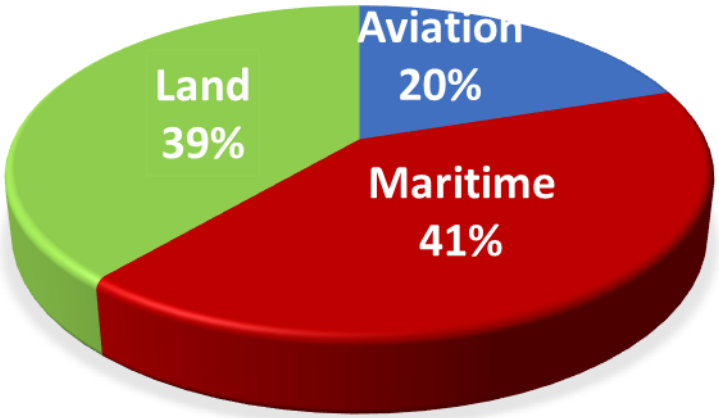
Cospas-Sarsat
SAR Events and Assisted Saves

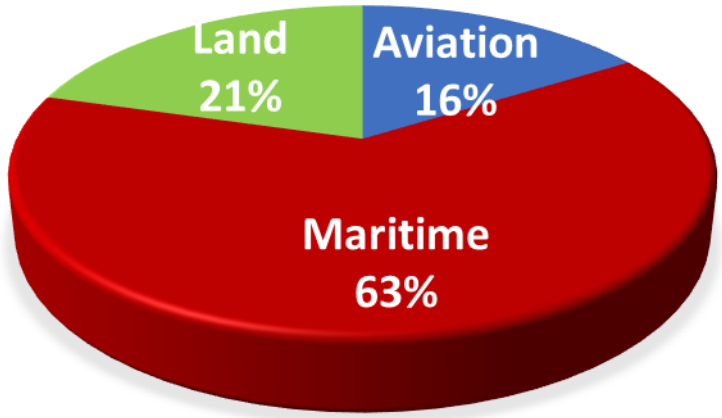
2022

SAR Events:	1144	SAR Events (1982 / 2022) :	18807
P. Rescued:	3223	P. Rescued (1982 / 2022) :	60636

2022 C/S EVENTS DISTRIBUTION



2022 C/S SAVES DISTRIBUTION



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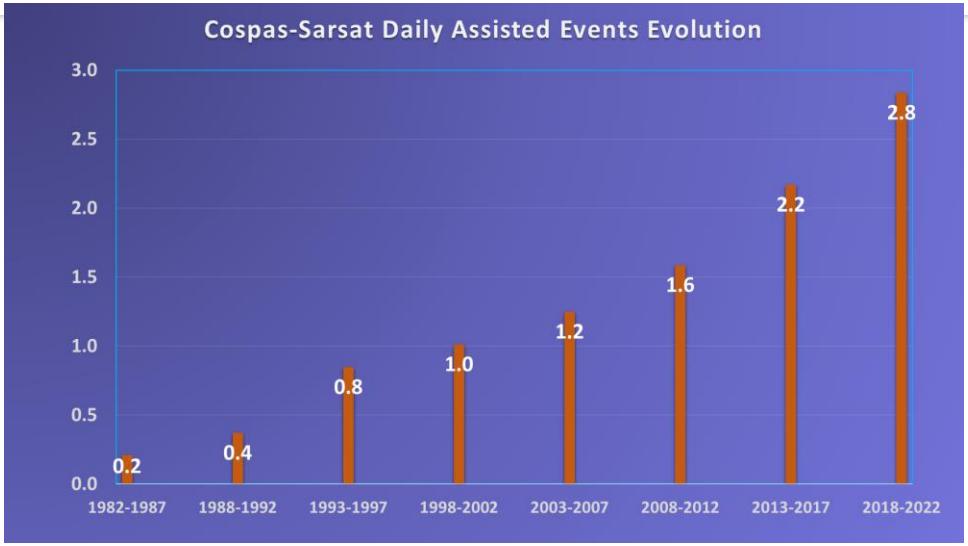
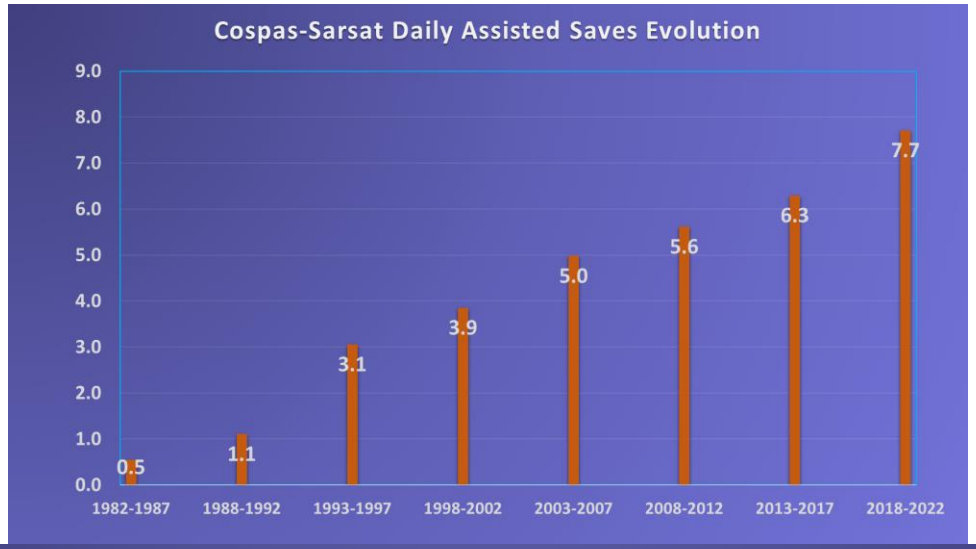
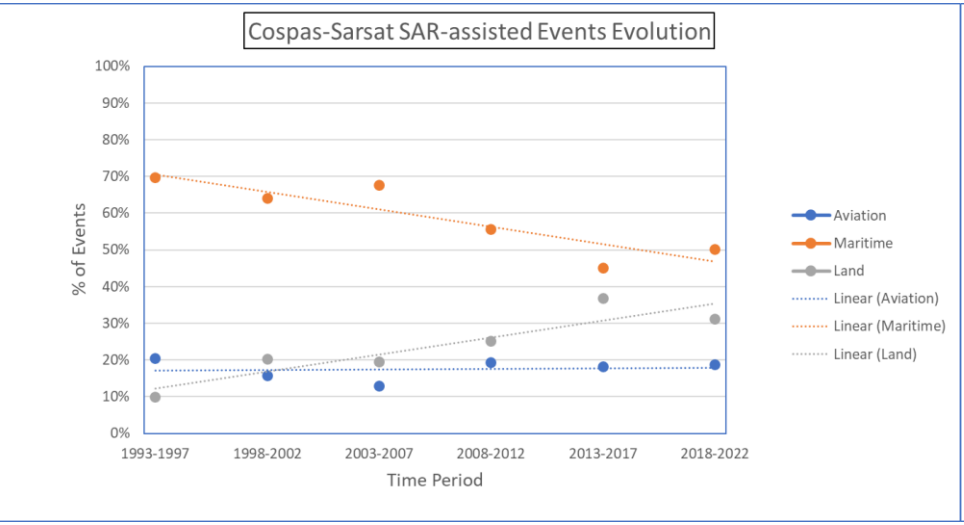
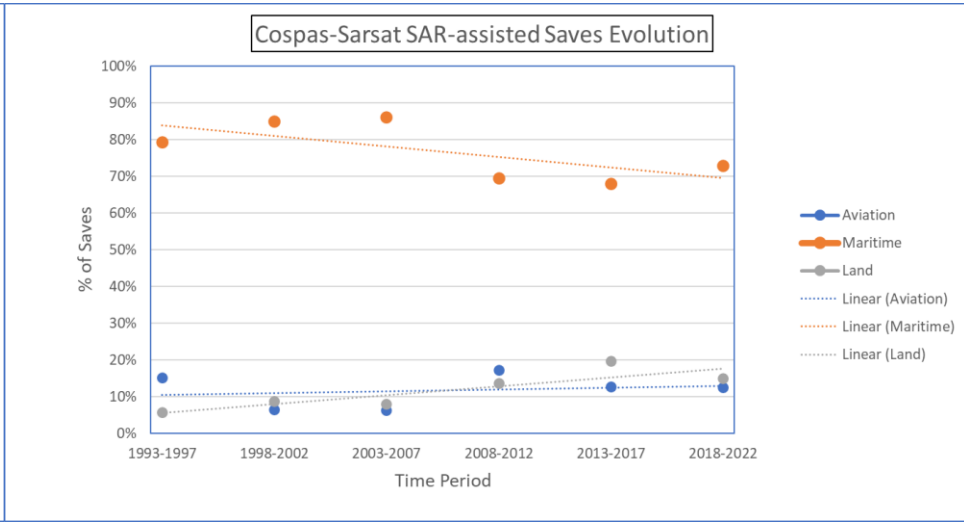
Cospas-Sarsat
SAR Events and Assisted Saves



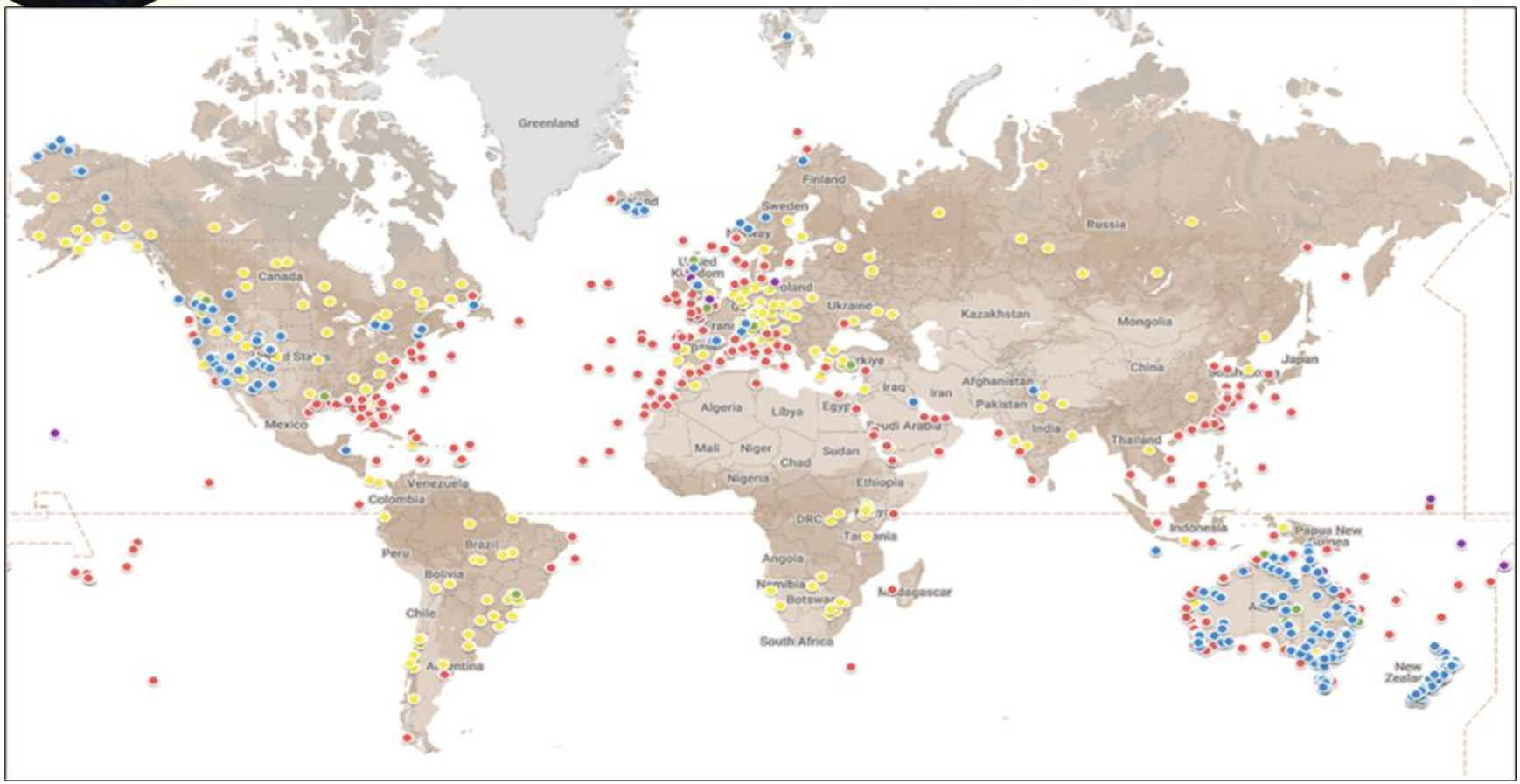


Cospas-Sarsat
SAR Events and Assisted Saves Trends





Cospas-Sarsat events distribution (2022)



2022 Geographic Distribution of Reported SAR Events
(for which Cospas-Sarsat Data were used)

Cospas-Sarsat 2022-23 Expert Working Groups

- Experts Working Group Meeting on Evaluation of MEOSAR Global Coverage:
  - Main outcomes: Coverage assessments provided to CSC-67 and CSC-68 for MEOSAR IOC FGB capability, MEOSAR IOC SGB capability, FGB ELT(DT) capability and SGB ELT(DT) capability.
- Experts Working Group Meeting on Commissioning of MCCs
  - Main outcomes: Review of LGM MCC commissioning reports for the TAMCC and CMC and provision of recommendations to CSC-67. Review of MCC commissioning reports for the FMCC for SGB-processing capability and provision of recommendations to CSC-67

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2022-23 Expert Working Groups outcomes

- Experts Working Group Meeting on Commissioning of LUTs
  - Main outcomes: Review of commissioning reports for Hawaii 6+4 MEOLUTs for ELT(DT) capability, La Reunion MEOLUT for IOC/FOC performance and FGB ELT(DT) capability, and of MD1, MD2 and GSE GEOLUTs and provision of recommendations to CSC-67
  - Review of commissioning reports for Hawaii 6+6 MEOLUTs for ELT(DT) capability, Khabarovsk GEOLUTs for FGB ELT(DT) capability and of Singapore and Guam LEOLUTs for RLS and FGB ELT(DT) capability provision of recommendations to CSC-69
- Experts Working Group Meeting on Commissioning of Space Segment Assets
  - Main outcomes: Review of commissioning reports for the new SAR/Glonass MEOSAR repeaters and for the new Galileo 434 and 410 MEOSAR repeaters, and of the GEOSAR repeaters for the Louch-5V and GOES-18

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2022-23 Expert **Working Groups outcomes**

- Experts Working Group Meeting on FGB and SGB ELT(DT) and SGB System Test (and associated CWG):
  - Main outcomes: Review the results of the System and Capacity Tests undertaken by Cospas-Sarsat Participants, at CSC-67. Awaiting additional SGB capability to be implemented in key MEOLUTs to conduct further System capability testing. Likely to restart its activities in 2024.
- Extended Test Facility Capabilities and New Beacon Types Expert Group
  - Main outcomes: Extended capability from SGB ELT(DT) type approval for EPG reviewed and interim approval granted by Parties.

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CSC-67 Main Outcomes

- Approved amendments to 12 T-Series documents, 4 O-Series documents and 1 G-Series documents
- Approved Terms of Reference for 2023 Experts Working Group Meeting on:
  - SGB System Capacity Testing (EWG-1C/2023)
  - Evaluation of MEOSAR Global Coverage (EWG-2C/2023, Closed Council)
  - Commissioning of MCCs (EWG-3C/2023)
  - Commissioning of LUTs (EWG-4C/2023)
  - Commissioning of Space Segment Assets (EWG-5C/2023)

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CSC-67 Main Outcomes

- Declaration of Intent Between the Co-Operating Agencies of the International Cospas-Sarsat Programme and the Maritime Safety Administration of the People's Republic of China for Co-Operation on the Cospas-Sarsat Medium-Altitude Earth Orbit Search and Rescue (MEOSAR) Satellite System
- Declaration of Full Operational Capability (FOC) for first generation-based ELT(DT)s starting 1 January 2023

Key CSC-68/CLD Decisions

- Agreement to amendments to documents C/S R.012 regarding the conditions of entry for MEOSAR IOC and MEOSAR FOC
- Decision to declare the MEOSAR system at its initial operational capability (IOC), effective as at 25 April 2023
- Agree that further work was required on the matter of MEOSAR QMS to refine the QMS requirements that would be expected for the declaration of MEOSAR at FOC.

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JC-37 Main Outcomes

- First Cospas-Sarsat Meeting Face-to-face meeting since February 2020
- Ground Segment commissioning:
  - MEOLUT: Mingenew MEOLUT recommended to be commissioned for ELT(DT) (FGB and SGB) capability and FGB IOC/FOC capability. SGB (non-ELT(DT) Capability to be further evaluated in September 2023
  - MCC: SPMCC recommended to be commissioned for FGB ELT(DT) capability
- Development of a Two-Way Communications concept (SGBs only)

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JC-37 Main Outcomes

- Test Facility Upgrades: EPG recommended to be fully approved for SGB ELT(DT)s TA testing
- Recommendations to have 2 new EWGs (Hybrid meetings) in 2024, one for C/S T.021 development and one dedicated to TWC
- Proposed amendments to 13 Technical (T) documents, 4 Operational (O) documents, 3 General (G) documents and 1 Programme (P) document
- Recommendation to close channel D effective 1 July 2025 and recommendation to open channel S effective 1 January 2025.

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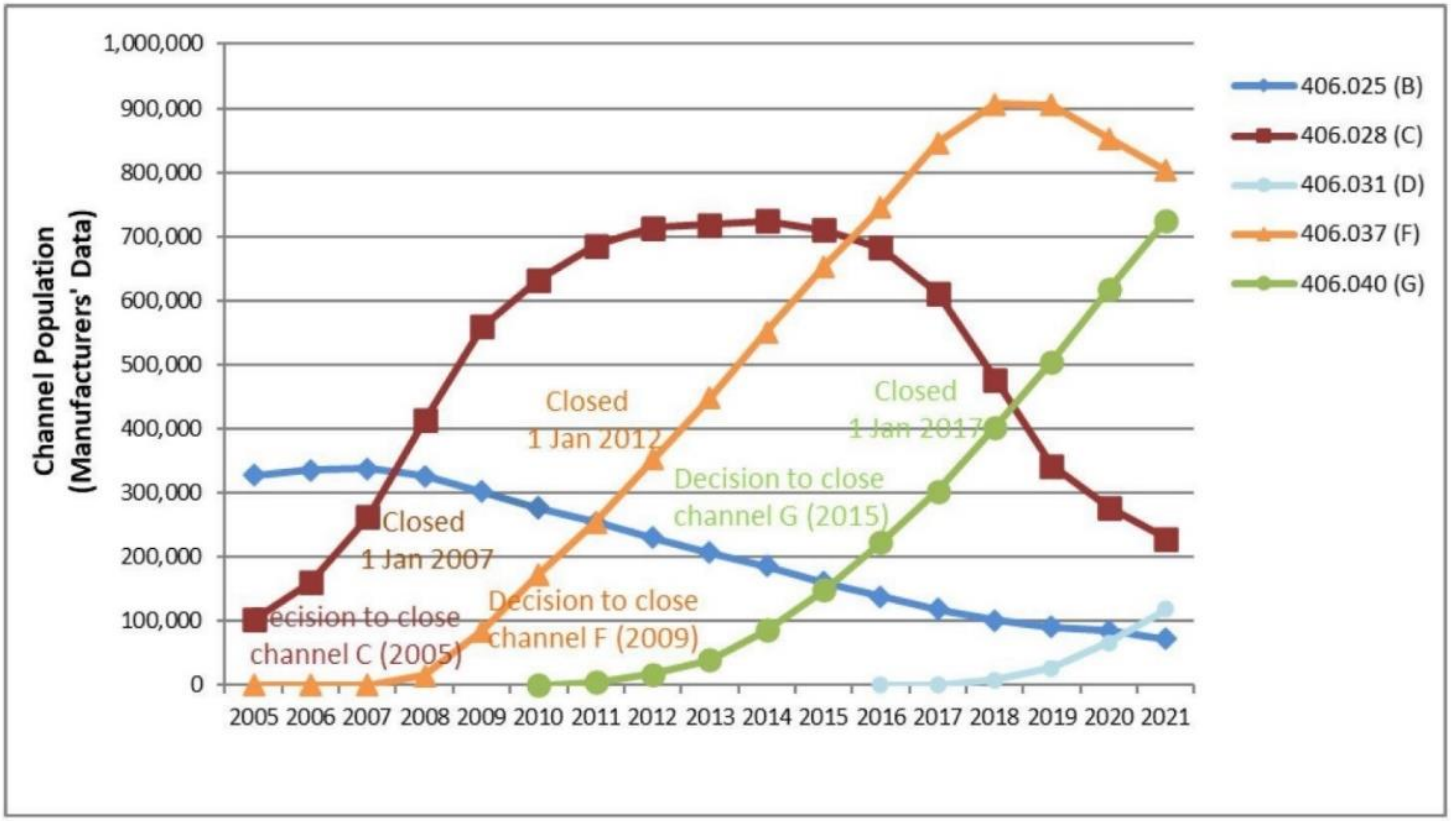
Why closing channel D for FGBs on 1 July 2025



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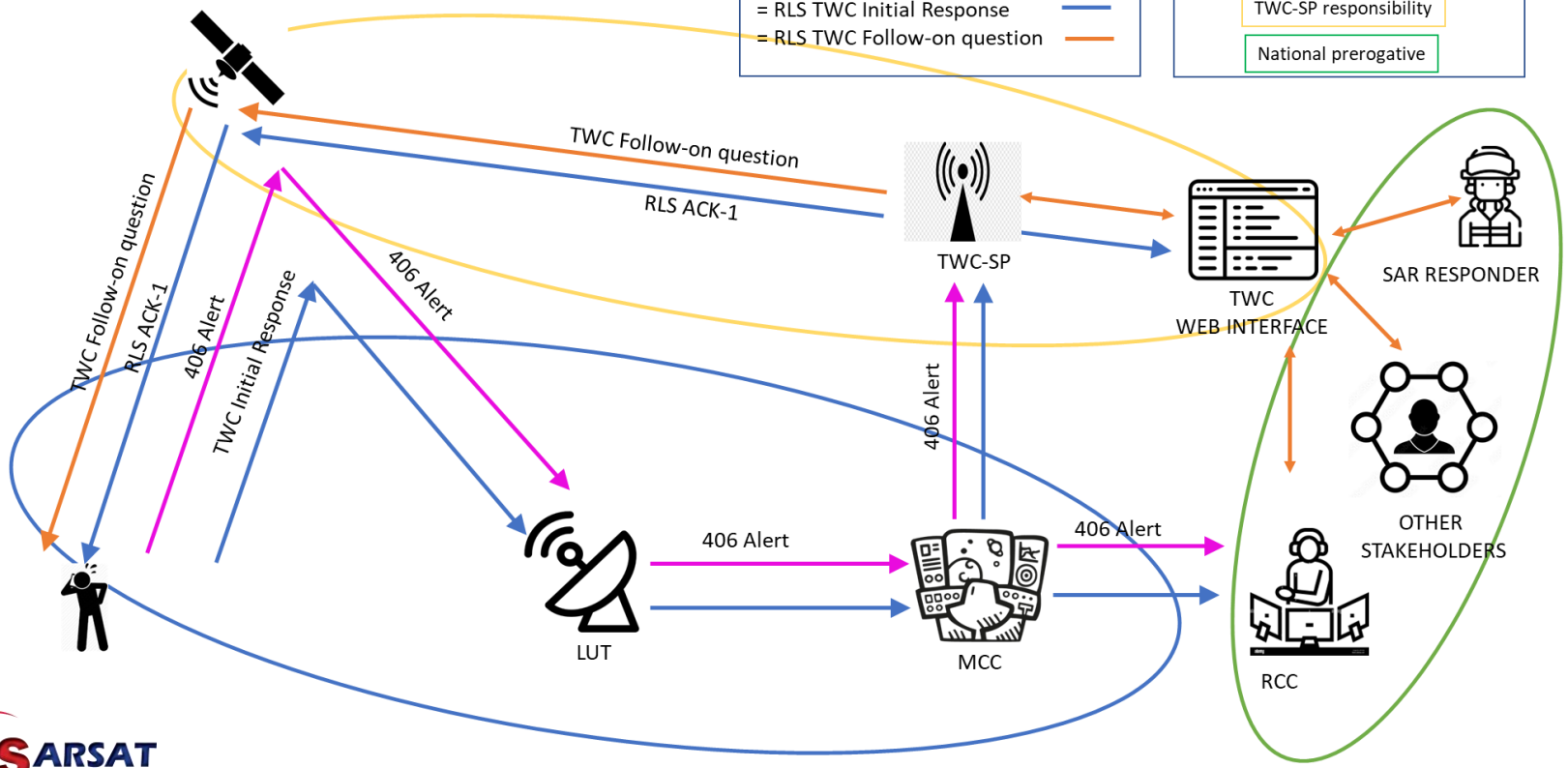
TWC Concept
(Preliminary version to be further developed)



TWC Concept
Programme's Objectives

- Enhance Cospas-Sarsat's ability to conduct its current mission through the addition of optional two-way communications capability.
- To the extent possible, align the introduction of an optional TWC capability with the introduction into operations of SGBs (both targeted for no later than 2024-2025).
- Introduce a capability which is focussed on the needs of SAR authorities while encouraging the carriage of a beacon by making a product appealing to the consumer.
- Introduce a message-based TWC capability focussed on enhancing the SAR responders situational awareness.
- Consider the introduction of a capability which could support, limited free text messaging in special use beacons.

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TWC desired end state

- The implementation and operation, through a collaborative and shared effort among the Cospas-Sarsat Programme, RLSP/TWC-SPs, national authorities and beacon manufacturers, of a Cospas-Sarsat capability which provides SAR authorities with an optional capability to gain additional information about a distress event and provide instructions by communicating directly with a victim through pre-determined messages using second generation beacons (SGB) which are capable of providing information (questions/answers) from the beacon user to the SAR stakeholder by means of 406 MHz message and receiving questions and instructions from the search and rescue authority in a return link message (two-way communications) through at least one, and potentially more than one, RLSP/ TWC-SP.

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Cospas-Sarsat main developments (goals and progress status)

Activity	Goals	Progress since BMW 2022
MEOSAR	• Reduced time to deliver distress alerts and positions • Allow a better tracking of moving beacons • More flexibility in beacon design and allowing more services to be provided (ELT(DT)s, SGBs)	• New Galileo and GLONASS SAR payloads put in operation • New MEOLUTs commissioned, now 10 at IOC/FOC level • New MCCs commissioned at LGM FOC • MEOSAR IOC declaration
ELT(DT)s	• Enhance the likelihood of locating an aircraft accident site • Compliance with the new ICAO and EU regulations for large aircraft from 2024	• Improvement to beacon specifications and type approval procedures • FGB ELT(DT) FOC declaration • 16 MEOLUT commissioned with ELT(DT) capability • First Test facility provided with full acceptance to undertake the type approval of FGB ELT(DT)s .One test facility provided with interim approval to undertake SGB ELT(DT) type approval tests • First FGB ELT(DT) type approval • First installation of FGB ELT(DT) on aircraft
SGBs	• Allow beacon independent location determination positions to be more accurately determined (one order of magnitude compared with FGBs) • More accurate encoded locations • More information possibly conveyed to RCCs (longer and more flexible message content)	• Improvement to beacon specification and type approval procedure • SGB Coverage Evaluation (continued) • First test facility provided with full acceptance to undertake type approval testing of SGBs (non-ELT (DT)s) • First SGB type approval. • First MEOLUT commissioned for SGB capabilities
RLS	• New service aimed at enhancing the beacon user feedback	• ≈15 RLS-capable beacons typed approved
TWC	• New service aimed at enhancing the efficiency of the rescue operations	• Preliminary concept and establishment of responsibilities

2023-2024 Cospas-Sarsat Programme Expectations

- Additional Ground Segment assets (LUTs and MCCs) being commissioned for various additional new capabilities (i.e., IOC/FOC, ELT(DT) and SGB)
- Further development of the Two-Way Communication Concept with possibly first Cospas-Sarsat documents amendments related with this functionality
- Additional space segments being launched and commissioned (LEOSAR, GEOSAR and MEOSAR)
- Possibly more accepted test labs made available for the type approval of FGB ELT(DT)s and SGBs
- Refine the QMS requirements that would be expected for the declaration of MEOSAR at FOC.
- Council to reassess the evolution of the Cospas-Sarsat System and determine the appropriateness of declaring new operational phases (e.g., SGB ELT(DT) FOC?)

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For More Information

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