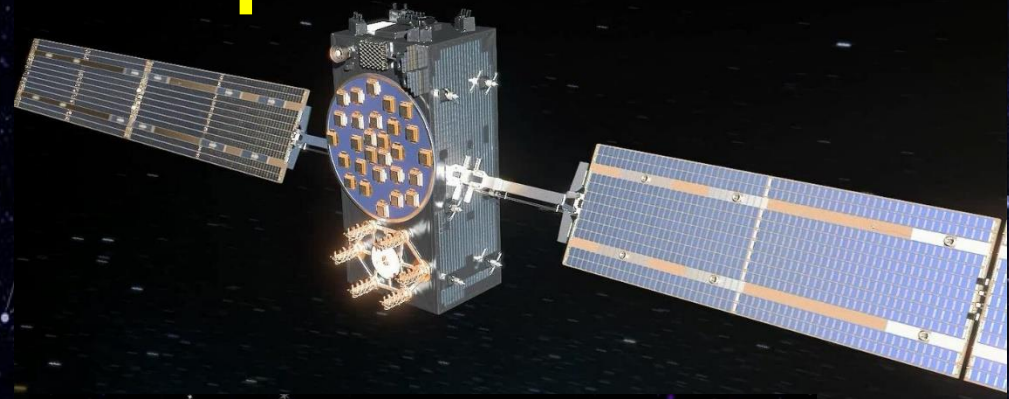
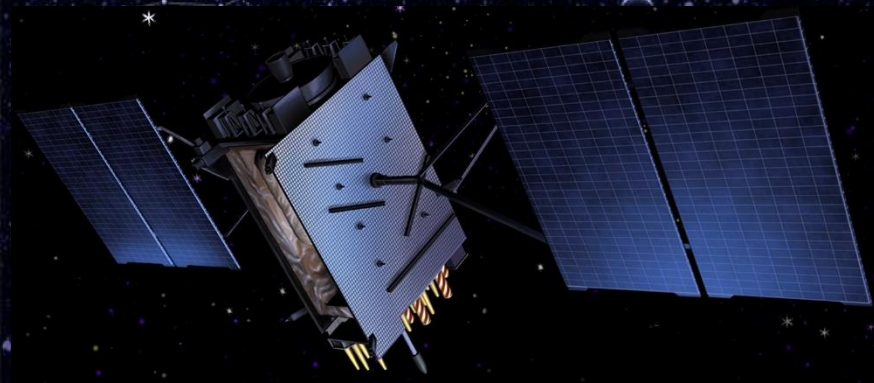


# Beacon Manufacturers Workshop

7 - 8 October 2020



**Cospas-Sarsat updates and ELT(DT) related developments**

**Dany St-Pierre**

**Cospas-Sarsat Secretariat**



# Cospas-Sarsat Programme

## Cospas-Sarsat Programme Status

- Overall Mission and Participants
- System segments status: Space segment, Ground Segment, Beacon population
- Assisted Saves distribution and evolution
- Upcoming developments

## ELT(DT) updates

- ELT(DT) deployment to market
- Historical Perspective
- ICAO, EASA latest ELT(DT)-related developments

## Type Approval/Test Laboratory Certification of new beacon types





# 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)



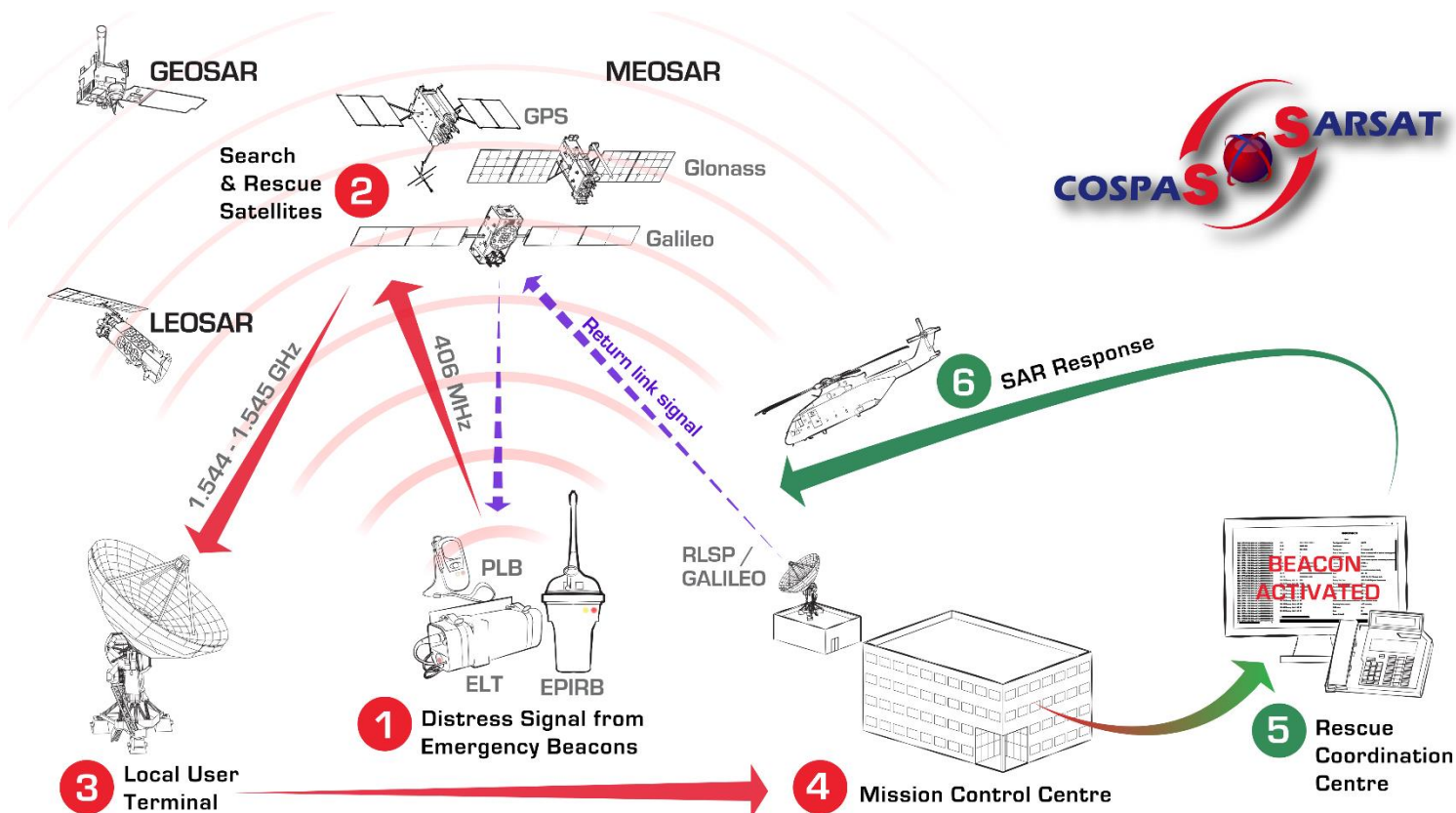
- Algeria
- Argentina
- Australia
- Brazil
- Canada
- Chile
- China (P.R.)
- Cyprus
- Denmark
- Finland
- France
- Germany
- Greece
- Hong Kong
- India
- Indonesia
- Italy
- ITDC
- Japan
- Korea (R. of)
- Malaysia
- Netherlands
- New Zealand
- Nigeria
- Norway
- Pakistan
- Peru
- Poland
- Qatar
- Russia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

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





# Cospas-Sarsat System





# Cospas-Sarsat Satellite Systems

## 3 Types of Satellite Systems

- **Low Earth Orbiting Search And Rescue (LEOSAR):** first payload deployed in 1982. Main operational system since the beginning of the Cospas-Sarsat Programme.
- **Geostationary Orbiting Search And Rescue (GEOSAR):** first payloads deployed in the mid-late 90s to provide early alerts and complement the LEOSAR 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.



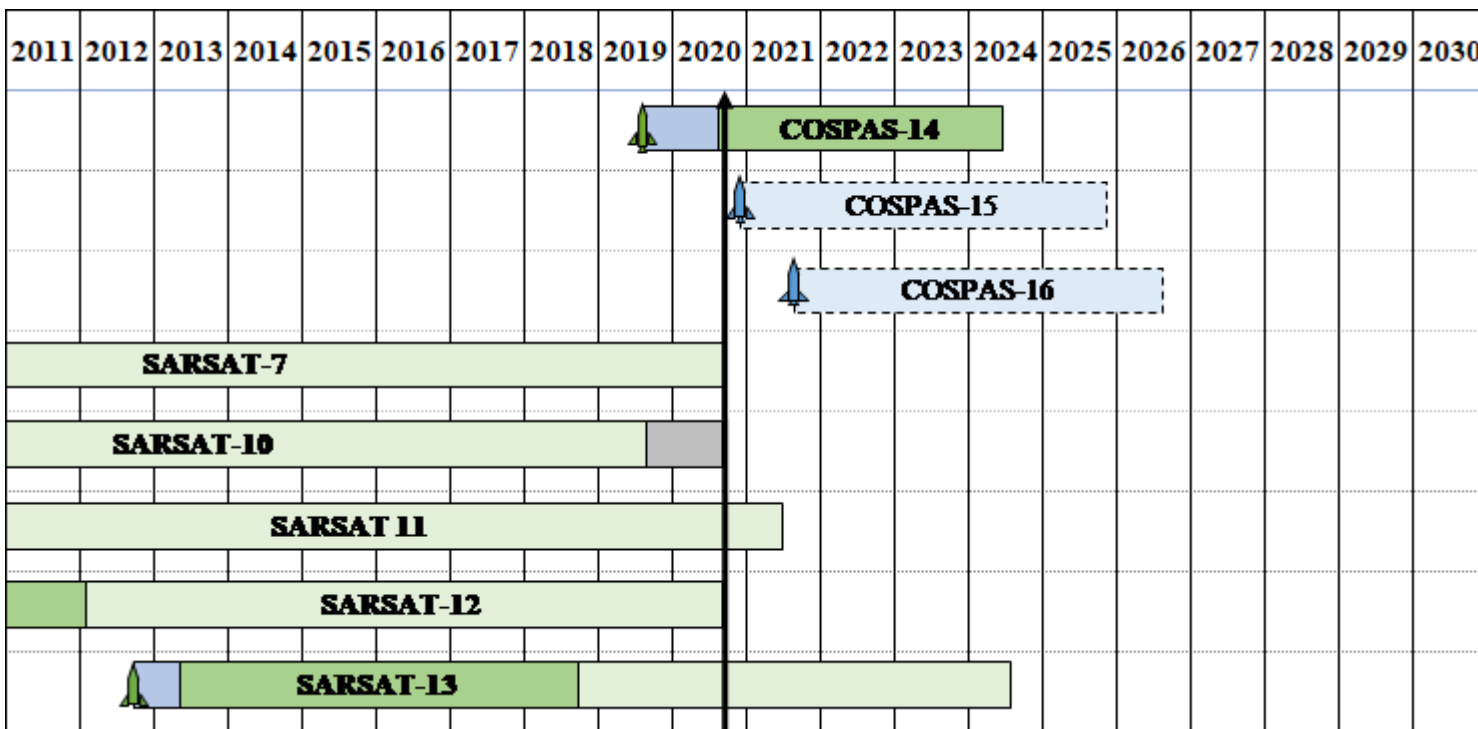


# Cospas-Sarsat LEO-GEO Components

- Space Segment:**
- 5 LEO payloads in operation (1 temporarily shutdown to avoid ground tracking interference). 1 additional LEO payload (Cospas-14) declared at IOC on October 2, 2020. 2 more Cospas payloads planned to be deployed in 2020 and 2021.
  - 8 GEO payloads in operation), 3 additional GEOSAR under in-orbit tests (4 more GEO payloads planned to be deployed between the end 2020 and 2025 to replace existing payloads).
- Ground Segment:**
- 52 LEOLUTs at FOC, 4 new LEOLUTs (in new locations) planned to be added in the next few years.
  - 24 Operational GEOLUTs (one more GEOLUT planned to be added)
  - 30 Operational Mission Control Centres in operation.



# Planned LEOSAR payload deployment schedule



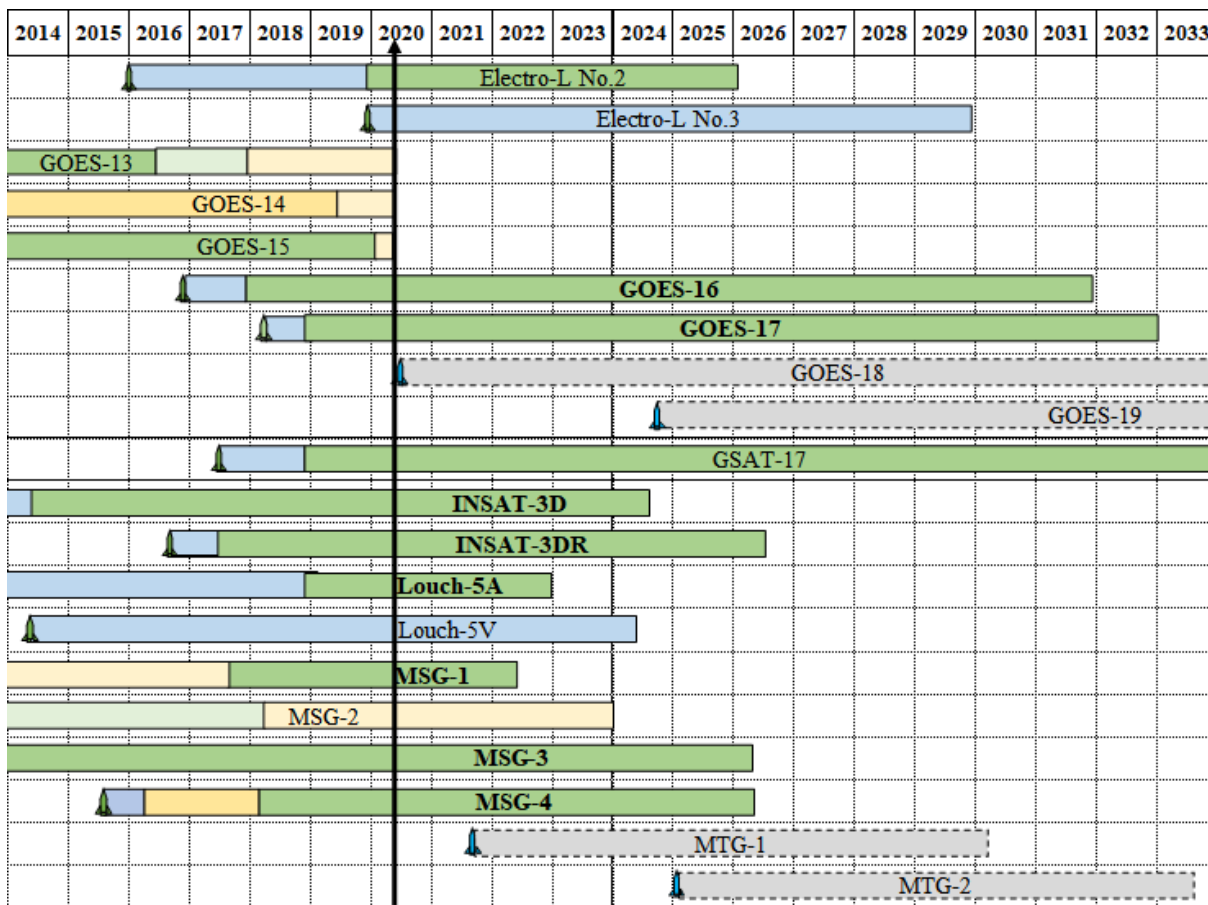




# Planned GEOSAR payload deployment schedule

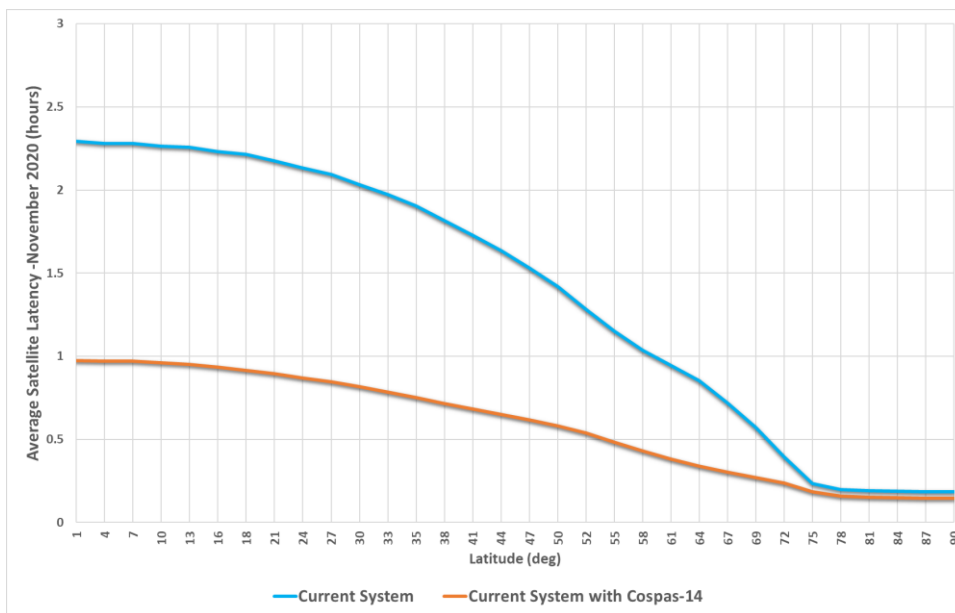
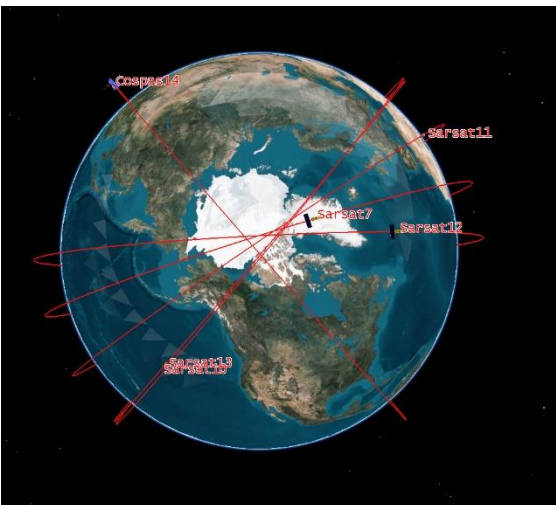
**Legend:**

- Future Launch
- Successful Launch
- (Blue) Under Test
- (Yellow) In Orbit Storage
- (Green) Operational
- (Grey) Not Available
- Pastel Color: Beyond Expected Life-Time
- Dashed Line: Planned
- Bold Font:** Currently Tracked





# Cospas-14 performance enhancement





# MEOSAR payload status

- **Galileo: 23 SAR repeater operational. 12 additional payloads are to be launched starting in December 2020 until 2022.**

The EC is undertaking the procurement of new satellites that will make the transition between the Galileo First Generation and Second Generation. These satellites will embark a new generation of SAR payloads which will be optimized for reaching the performances expected from SGBs. These transition satellites are planned to be launched from 2026.

- **SAR/Glonass: Two experimental L-band SAR/Glonass payloads available to support the current MEOSAR D&E and EOC activities. Six additional Glonass payloads expected to be launched in the new term.**

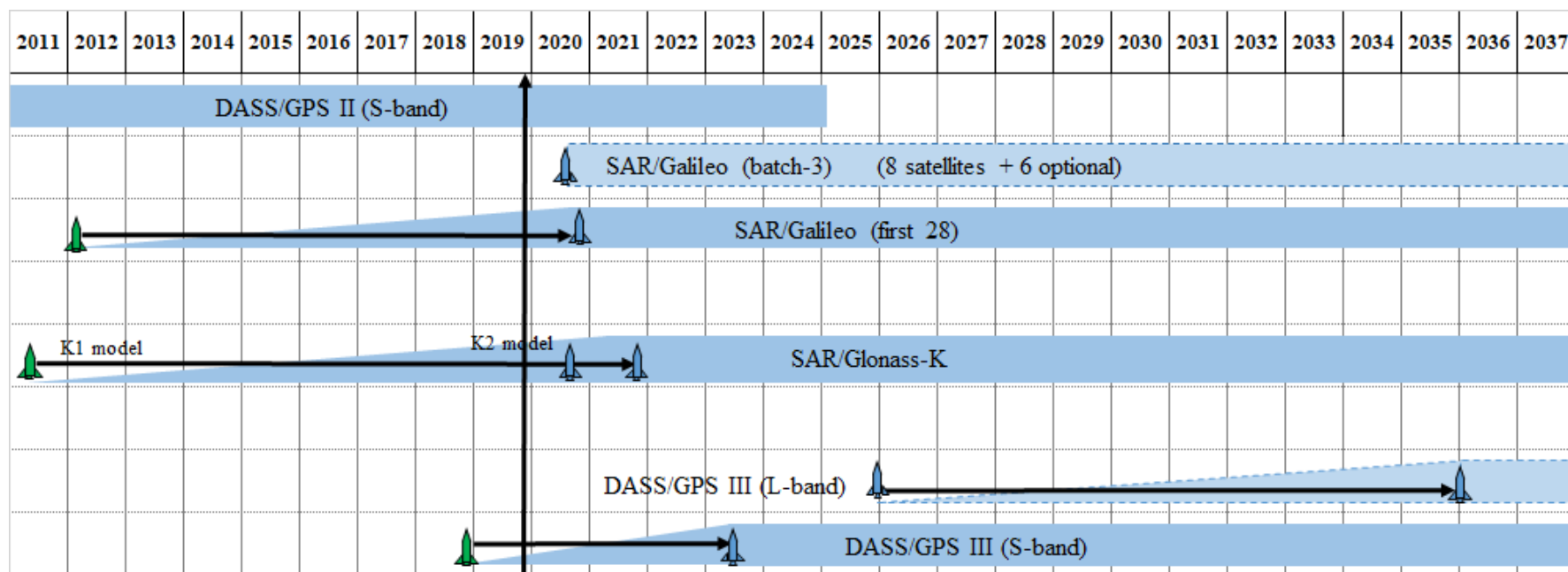


# MEOSAR payloads status

- **DASS/GPS II: 18 DASS payloads used operationally with two more DASS payloads in orbit under tests. One additional launched in June 2020. Five more DASS payloads to be deployed from 2020. First L-band payload to be deployed no earlier than 2026.**
- **Chinese BEIDOU: 6 BDS payloads successfully tested. 2 commissioning reports reviewed in 2019, 4 more to be reviewed in December 2020. The integration of the BDS payloads into the Cospas-Sarsat MEOSAR Space segment is contingent upon an MOU being put in place between China and Cospas-Sarsat (in progress).**
- **By the end of 2022 more than 60 MEOSAR payloads are expected to be made available for SAR operations.**



# Planned MEOSAR payload deployment schedule





# MEOSAR Ground Segment status

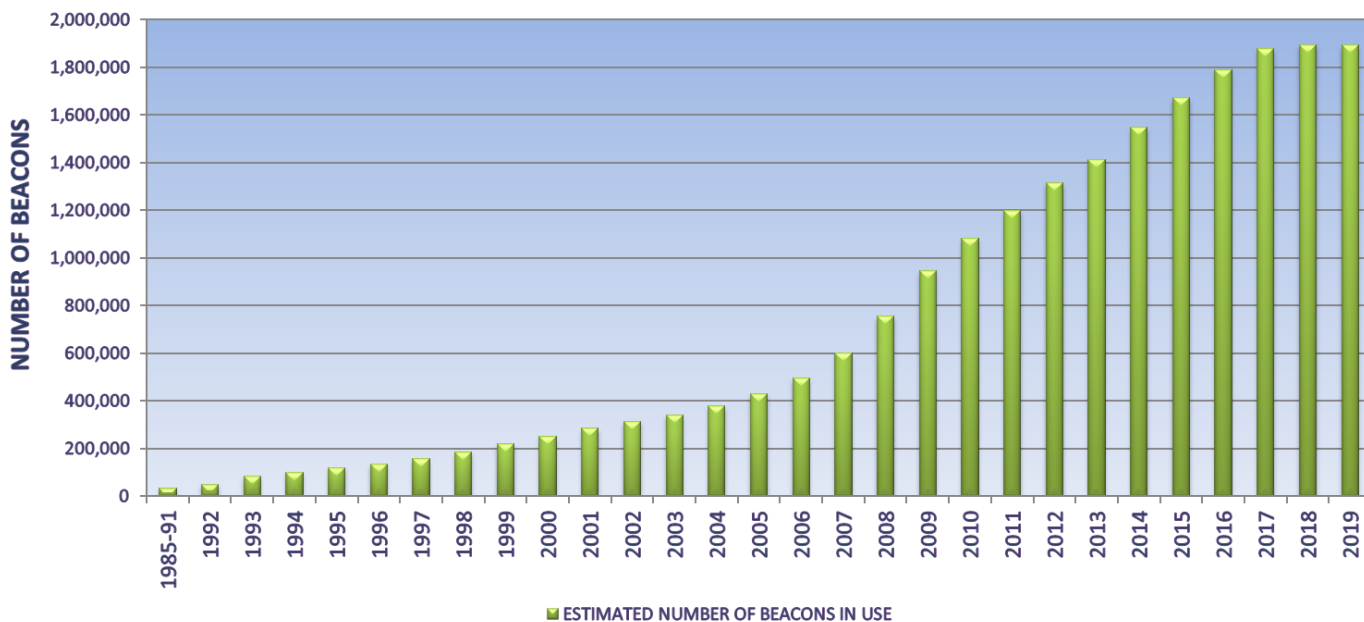
- 24 MEOLUTs Commissioned to EOC standards (currently 4 MEOLUTs successfully tested at IOC level).
- 3 additional MEOLUTs installed and available for testing.
- 18 additional MEOLUTs planned to be made operational between 2020 and 2025.
- 9 MCCs at FOC LGM level (Leosar, Geosar, Meosar (EOC))+ 2 MCCs at IOC LGM level.  
19 more MCCs planned to be commissioned at LGM by the end of 2021.



# Beacon Population Evolution



## 406 MHz BEACON POPULATION





# Cospas-Sarsat SAR Events and Assisted Saves

## 2019 (preliminary)

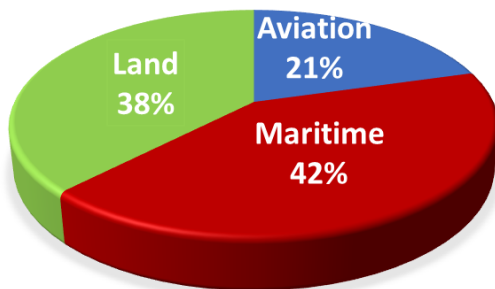
SAR Events: 1032

P. Rescued: 2774

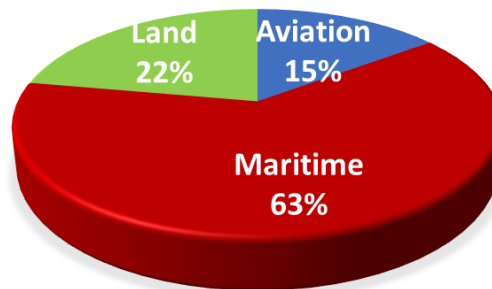
SAR Events (1982 / 2019) : 15,563 (TBC)

P. Rescued (1982 / 2019) : 51,512 (TBC)

2019 C/S EVENTS DISTRIBUTION



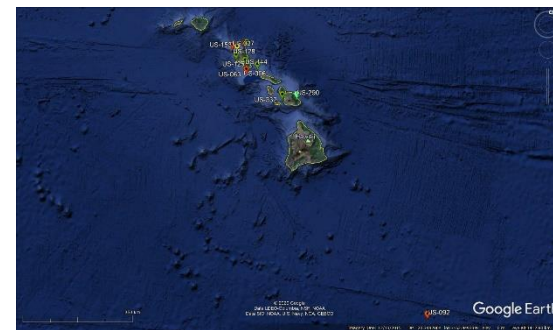
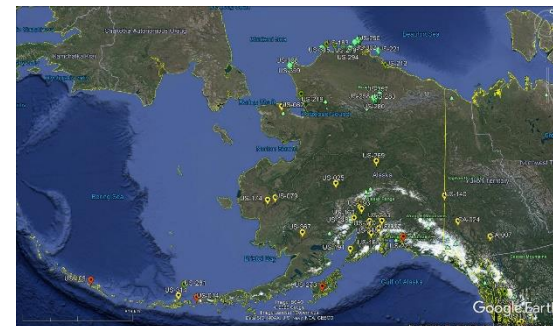
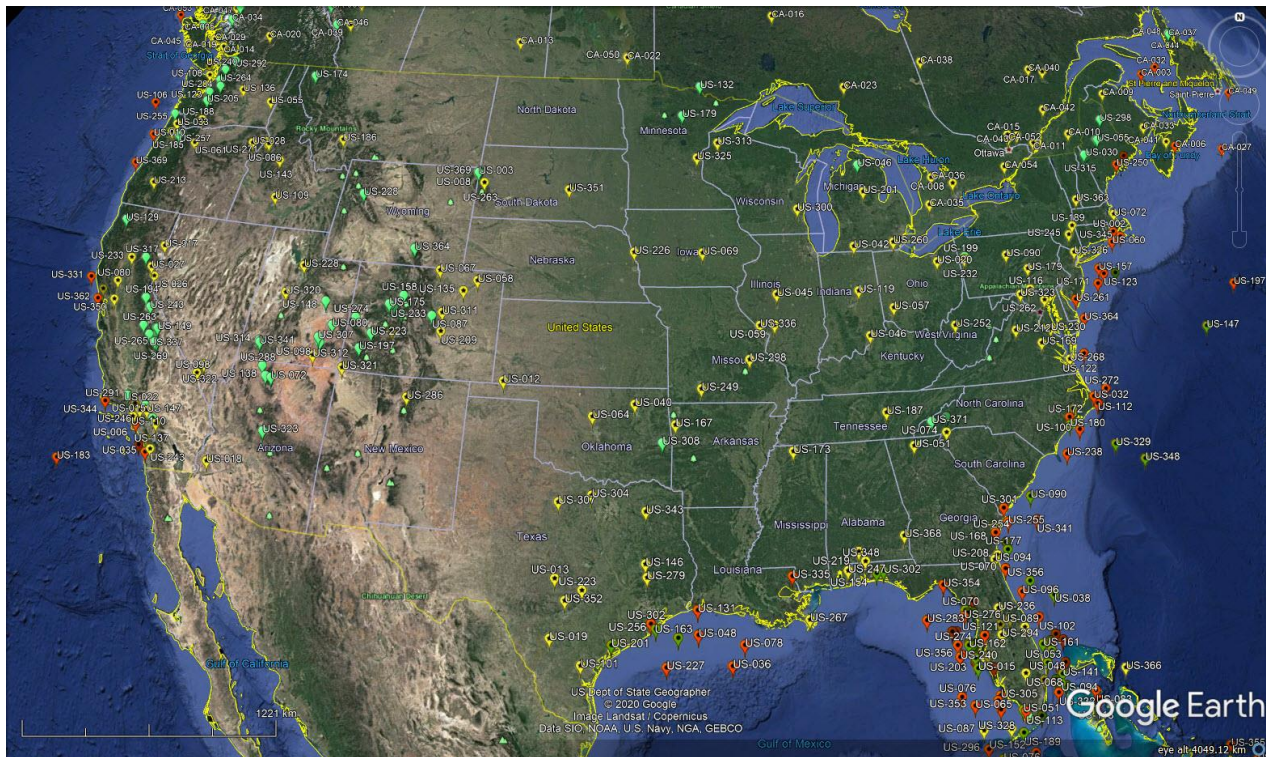
2019 C/S SAVES DISTRIBUTION





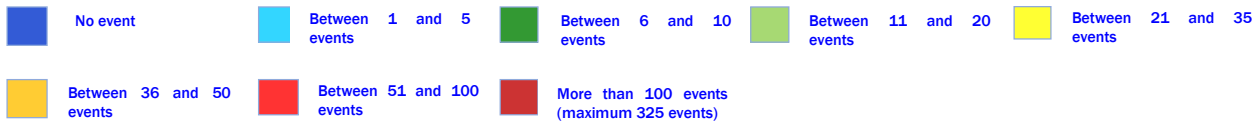
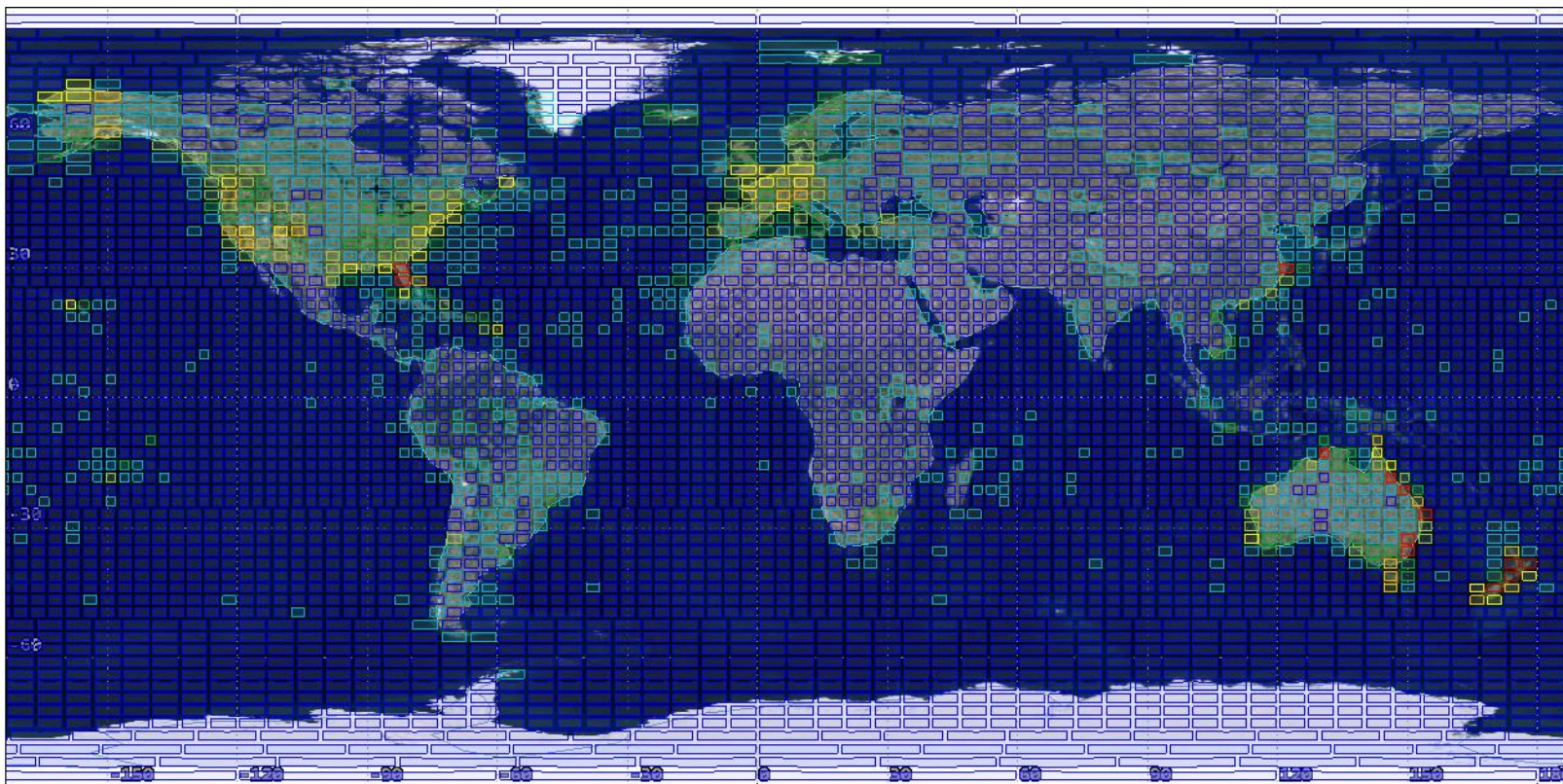
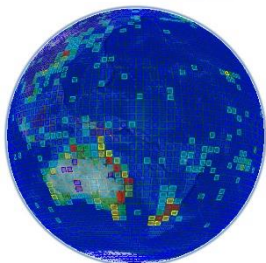


# 2019 USA Event Locations





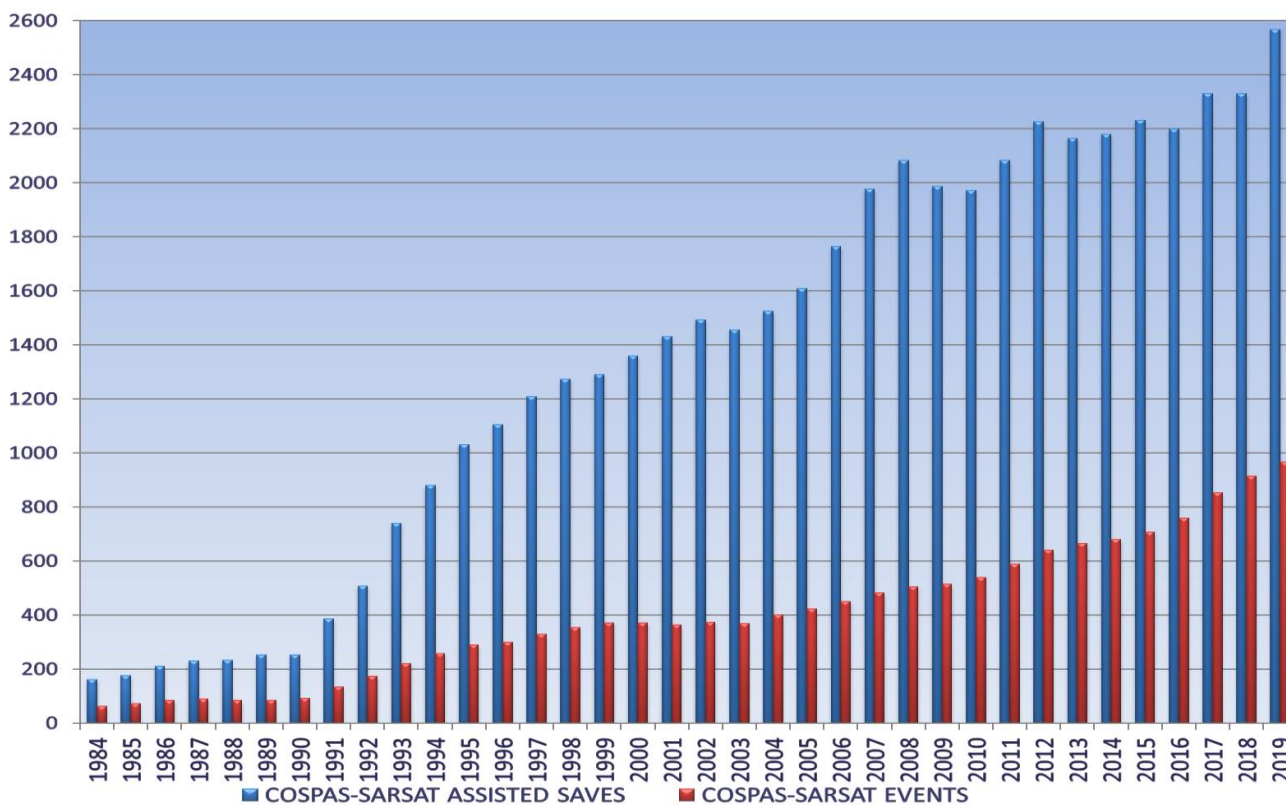
# 2014-2019 Worldwide Event Distribution





# Cospas-Sarsat events and assisted saves evolution

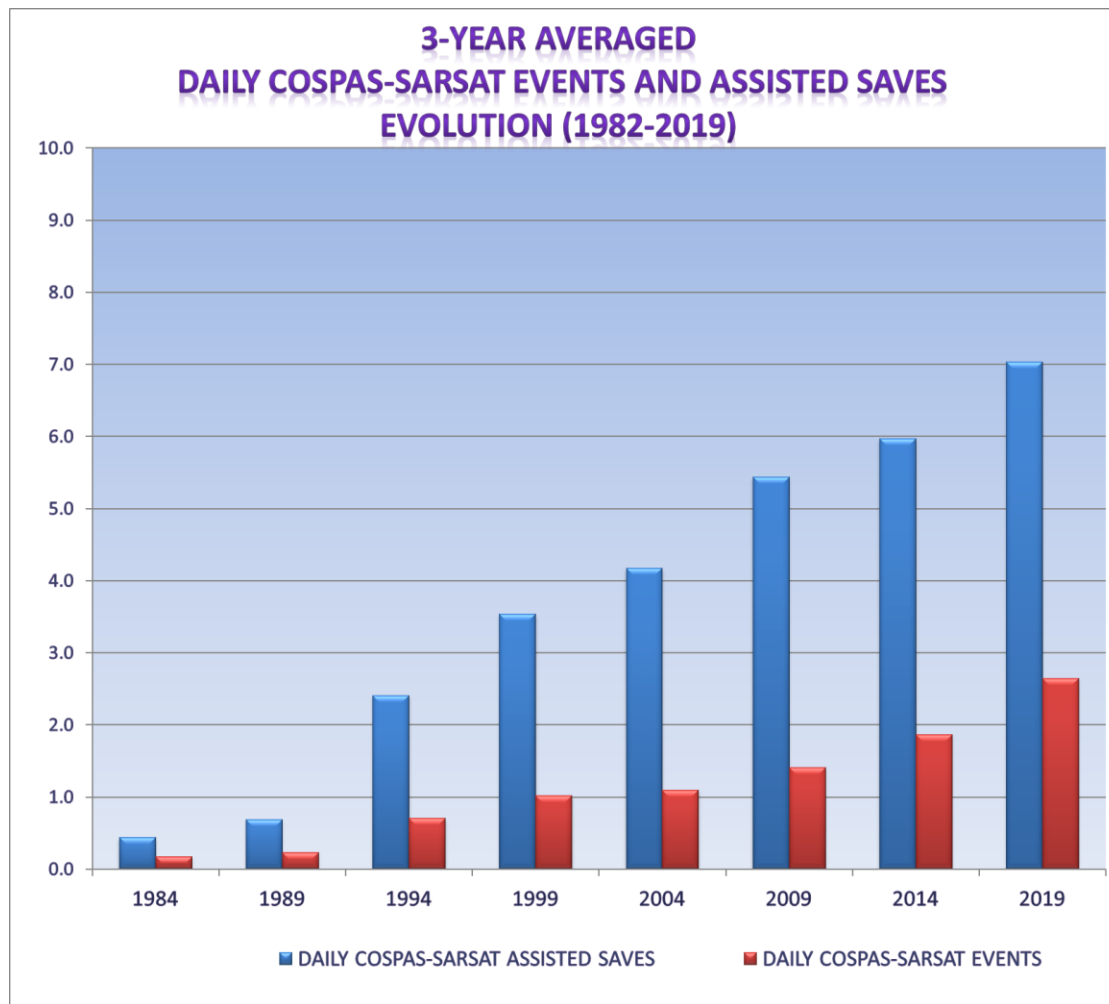
### 3-YEAR ROLLING AVERAGED COSPAS-SARSAT EVENTS AND ASSISTED SAVES (1982-2019)





# Cospas-Sarsat events and assisted saves evolution

**AN AVERAGE OF 7  
ASSISTED SAVES  
IN 2.6 EVENTS PER  
DAY IN THE LAST 3  
YEARS**





# Cospas-Sarsat Short-Term Upcoming Developments

	Goals	Cospas-Sarsat Main Progress since last BMW (2019)
MEOSAR	<ul style="list-style-type: none"> <li>• Reduce time to deliver distress alerts and positions</li> <li>• Allow better tracking of moving beacons</li> <li>• More flexibility in beacon design</li> <li>• Allow more services to be provided</li> </ul>	<ul style="list-style-type: none"> <li>• New payloads made available</li> <li>• New MEOLUTs commissioned</li> <li>• New MCCs commissioned</li> </ul>
ELT(DT)	<ul style="list-style-type: none"> <li>• Enhance the likelihood of locating an aircraft accident site.</li> <li>• Compliance to new ICAO and EASA requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Modifications to beacon specifications and type approval procedure</li> <li>• Initiate ELT(DT) Test facility certification process</li> <li>• Modifications to ground segment to process ELT(DT)s</li> </ul>
SGB	<ul style="list-style-type: none"> <li>• Allow beacon positions to be more accurately determined (one order of magnitude better compared to T.001 compliant beacons)</li> <li>• More information possibly conveyed to RCCs (longer and more flexible message content)</li> </ul>	<ul style="list-style-type: none"> <li>• Modifications to beacon specifications and type approval procedure</li> <li>• Initiate SGB Test facility certification process</li> </ul>
RLS Type 1 Acknowledgment	<ul style="list-style-type: none"> <li>• New service to enhance beacon user experience</li> </ul>	<ul style="list-style-type: none"> <li>• Began RLS IOC phase and authorize the Return Link Service for public use (limited to specific countries)</li> <li>• First RLS-capable beacons typed approved</li> </ul>





# Cospas-Sarsat “Expert” Working Groups in 2020

- Experts Working Group Meeting on Second-Generation Beacons (SGBs) and SGB/FGB ELT(DT)s
- Experts Working Group Meeting on Commissioning of MCCs
- Experts Working Group Meeting on Commissioning of LUTs
- Experts Working Group Meeting on Commissioning of Space Segment Assets
- Experts Working Group Meeting on RLS Transition from IOC to FOC
- Experts Working Group Meeting on Evaluation of MEOSAR FOC Global Coverage
- Technical Team on Extended Test Facility Capabilities and approval of new beacon types
- 7 active correspondence working groups



# Main elements for ELT(DT) deployment to market

- ELT(DT)-related Cospas-Sarsat beacon specifications and type approval procedure
- Cospas-Sarsat Certified Test facilities
- Modifications to Cospas-Sarsat ground segments to adequately process and distribute ELT(DT) alerts to appropriate stakeholders
- National regulations to complement Cospas-Sarsat ELT(DT) specifications and testing and allow/regulate the use of ELT(DT)s
- International regulations providing incentive for Administrations to regulate the use of ELT(DT)s



# ELT(DT)s historical perspective

- The original concept (triggered-in-flight ELT) was aimed at improving the reliability of ELT transmissions (especially for large aircraft which are usually impacting the ground at high velocities) by allowing for an ELT to be activated prior to an accident and continuously locating the signals using the MEOSAR system to eventually locate the accident site. From 2013 several tests have been undertaken by Cospas-Sarsat Participants using fast moving beacons or ELTs triggered-in-flight (ELT(DT) concept) to demonstrate the technical feasibility of Cospas-Sarsat ELT(DT)s.
- In December 2015, EASA published CAT.GEN.MPA.210 “Location of an aircraft in distress – Aeroplanes” which requires that aeroplanes of certain categories be equipped with “robust and automatic means to accurately determine, following an accident where the aeroplane is severely damaged, the location of the point of end of flight”. This MPA was applicable to certain categories of aircraft (large aircraft) certified after 1 January 2021.
- In 2016, ICAO adopted ADT requirements, which became effective on 11 July 2016 with an implementation date of 1 January 2021. The requirements aim at providing the location of an aircraft accident site of 6 nm accuracy (Annex 6, chapter 6.18).
- The EASA and ICAO requirements became strong incentives for the Cospas-Sarsat programme to further develop and support the concept of ELT(DT)s.





# ICAO and EASA latest ELT(DT)-related developments

- In September 2019, the EU adopted EASA [Regulation \(EU\) 2019/1384](#) postponing the applicability date of CAT.GEN.MPA.210 to 1 January 2023.
- EASA is currently developing RMT.0400 (Guidance material for CAT.GEN.MPA.210), a preliminary version of the document was circulated for comments in May 2019. A revised draft version was re-circulated in February 2020 via NPA 2020-03 (last review before final publication). EASA received about than 500 comments on the document and now estimates that the guidance material will not be released in 2020.
- Following discussions at the 40<sup>th</sup> Session of the ICAO Assembly (Fall 2019) and follow-on consultations with States and Industry, the ICAO Council has extended the applicability of the ADT requirements for Distress Tracking (Annex 6, chapter 6.18 ) from 1 January 2021 to 1 January 2023.



# ICAO and EASA latest ELT(DT)-related developments

- In order to make available ADT data available to various stakeholders ICAO developed the concept of a Distress tracking Repository (DTR), a web-based solution aimed at ensuring that position information of aircraft in distress could be made available to the appropriate organizations.
- In late 2019, ICAO opened a tender process for development and maintenance of the location of an aircraft in a “pilot” distress repository (LADR, formerly known as the distress tracking repository (DTR)). A workshop was held in August 2020 to review the “pilot” LADR functionality prior to the full production model.
- ICAO is planning for the full production LADR model to be made available in Q2 2021.



## Type Approval/Test Laboratory Certification of new beacon types

- ELT(DT)s and SGBs have characteristics which are relatively/fundamentally different from typical PLBs, EPIRBs and ELTs. The type approval of these types of beacons will require new tests to be undertaken by certified test laboratories and as such will require a partial/full recertification of these laboratories.
- At CSC-61 (February 2019) a group of technical experts from the Cospas-Sarsat Secretariat and the four Parties has been appointed to review the application packages of test facilities that wish to extend their test capabilities to ELT(DT) and/or SGBs. This group has also been authorized to review the type approval application(s) of beacons that may be submitted in parallel to the application of a test facility.



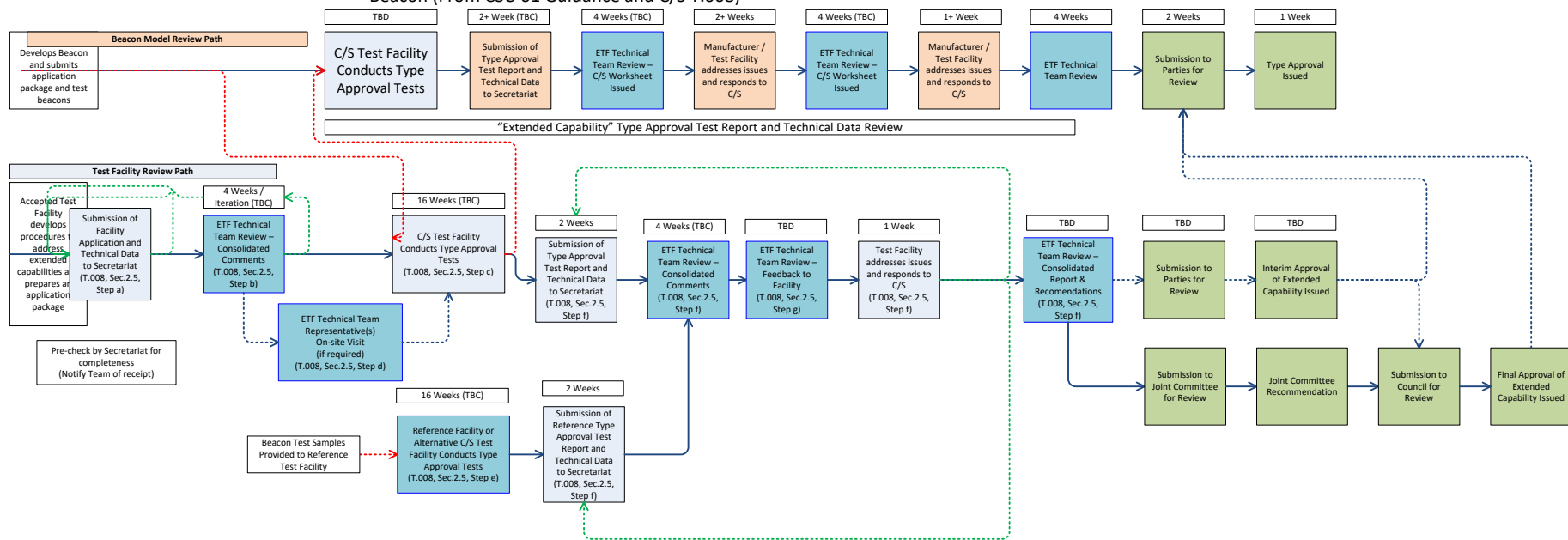
## Type Approval/Test Laboratory Certification of new beacon types

- A first application package for SGB certification was received from a test lab in May 2019, followed by a first ELT(DT) application package from a different lab in October 2019.
- The recertification of these two laboratories is progressing well but progress has been partially impaired by the COVID-19 situation.
- According to a recent survey made by the Secretariat the remaining certified test facilities will submit their application packages to the group of technical experts for recertification for ELT(DT)s and SGBs as follow:
  - FGB ELT(DT)s: 2 applications in Q2 2021, 2 applications in Q3 2021
  - SGB ELT(DT)s: 3 applications in Q2 2021, 1 application in Q4 2021
  - SGBs (general): 1 application in Q1 2021, 2 applications in Q2 2021, 1 application in Q4 2021.



# Extended Test Facility Certification Process Flowchart

Anticipated Cospas-Sarsat Type Approval Process for First Article Extended Capability  
Beacon (From CSC-61 Guidance and C/S T.008)





# Cospas-Sarsat System as of end of 2022





# For More Information

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