

COSPAS-SARSAT SYSTEM DATA

No.47
December 2021

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1 SUMMARY STATUS

PARTICIPANTS	(31 December 2021)
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Parties to the International Cospas-Sarsat Programme Agreement (ICSPA):	4
Ground Segment Providers:	30
User States:	9
Ground Segment Operators:	2
Total number of Participants:	45

SPACE SEGMENT	(31 December 2021)
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LEOSAR payloads (low-Earth orbit) (in operation):	4
GEOSAR payloads (geostationary orbit) (in operation):	10
MEOSAR payloads (medium-Earth orbit) (in operation):	49

GROUND SEGMENT	(31 December 2021)
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Local User Terminals operating in the LEOSAR system (LEOLUTs):	55
Local User Terminals operating in the GEOSAR system (GEOLUTs):	27
Local User Terminals commissioned in the MEOSAR system (MEOLUTs):	26
Mission Control Centres (MCCs) (including fourteen commissioned LGM MCCs):	32

406 MHZ BEACON POPULATION	(31 December 2020)
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Global registered beacon population:	about 1,935,000
Global beacon population estimated using the registration-rate method:	about 2,534,000
Global beacon population estimated using the beacon-manufacturer survey:	about 1,899,000

SAR OPERATIONS	(31 December 2020)
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From January to December 2020 , the Cospas-Sarsat System provided assistance in rescuing at least 2,278 persons in 951 SAR events .	Type of Distress	SAR Events	Persons Rescued
	Aviation	220	280
	Maritime	382	1,528
	Land	349	470
	Total	951	2,278

From **September 1982 to December 2020**, the Cospas-Sarsat System provided assistance in rescuing at least **53,790 persons in 16,514 SAR events**.

2 ASSISTANCE IN SEARCH AND RESCUE OPERATIONS

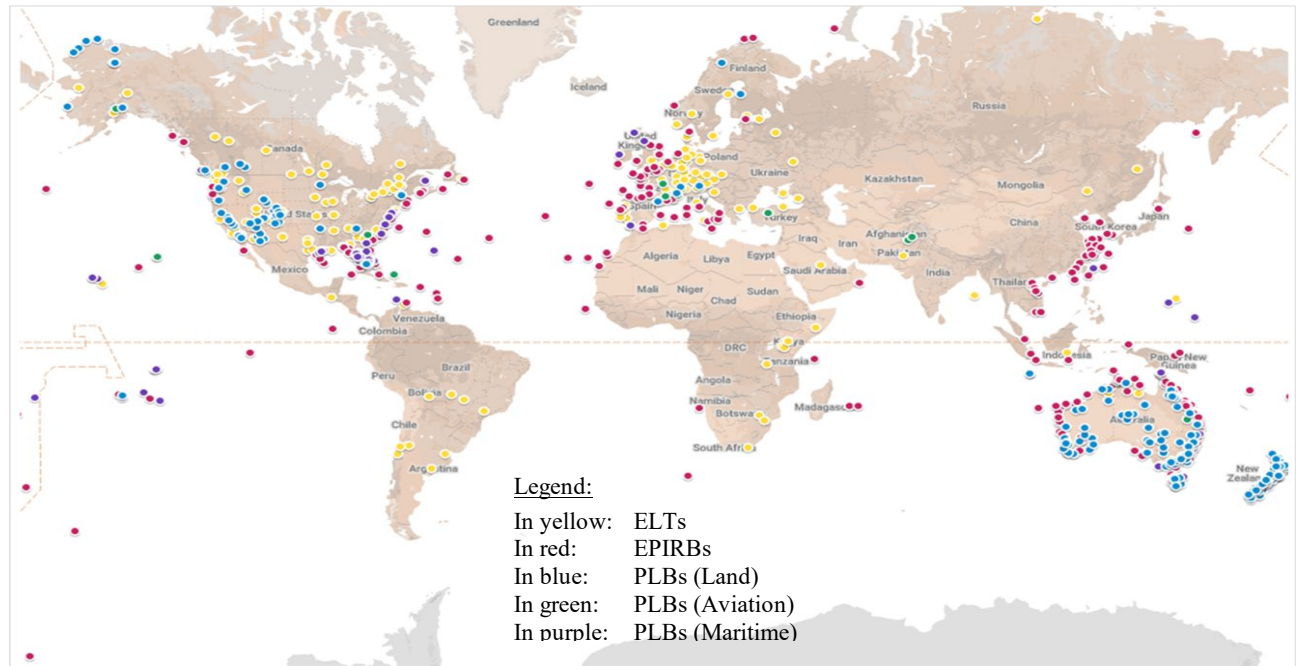


Figure 1: Geographic Distribution of Confirmed SAR Events for which Cospas-Sarsat Data Was Used (January - December 2020)

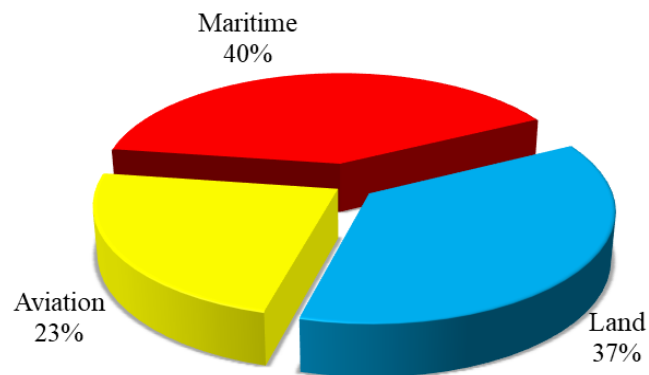


Figure 2: Distribution of SAR Events Assisted by Cospas-Sarsat by Type of Events (January - December 2020)

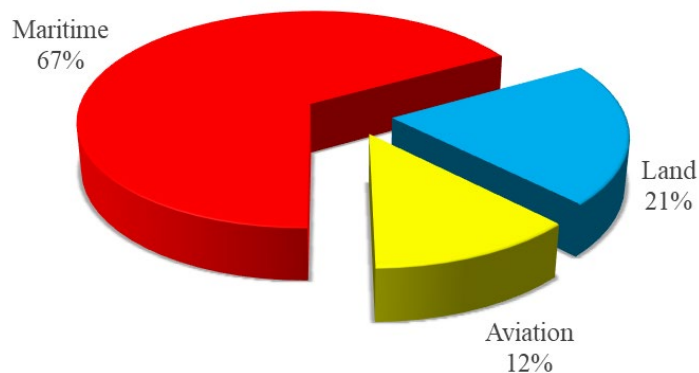


Figure 3: Persons Rescued by Type of SAR Event Assisted by Cospas-Sarsat (January - December 2020)

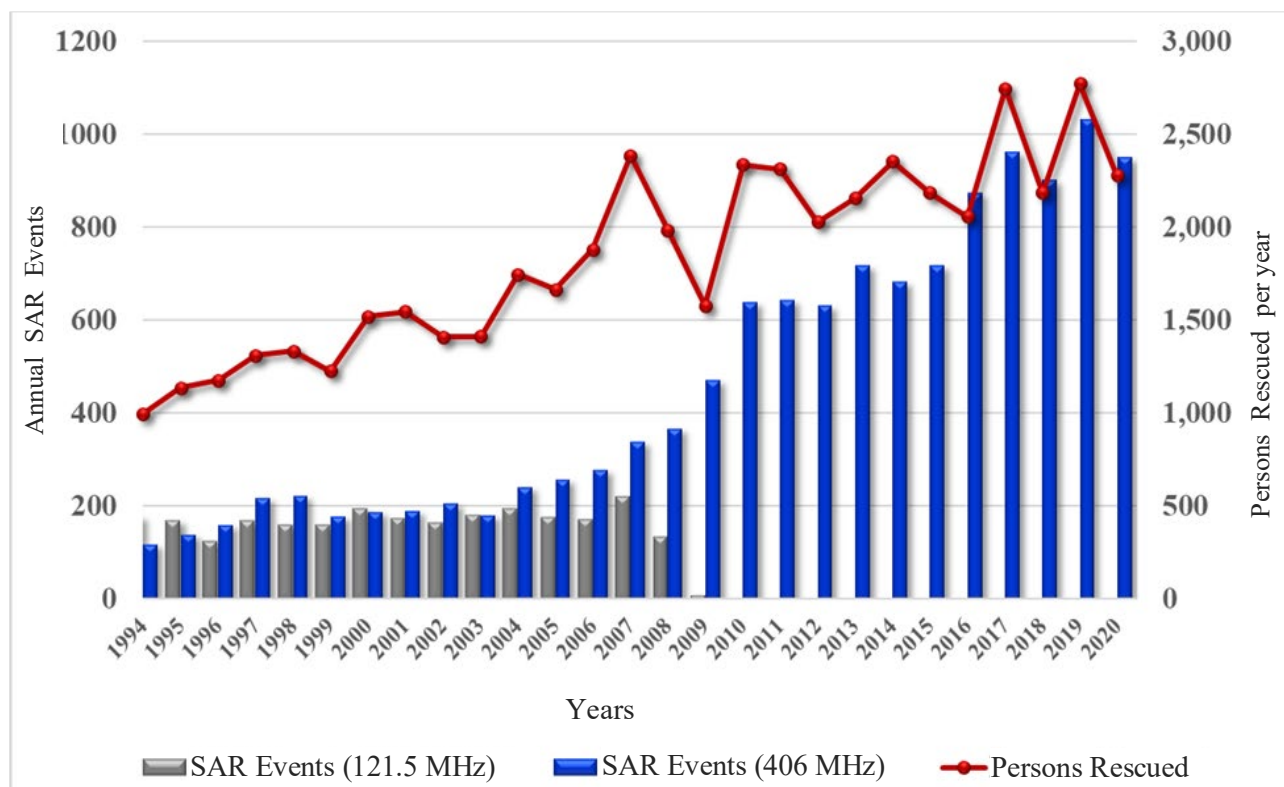


Figure 4: Number of SAR Events and Persons Rescued with the Assistance of Cospas-Sarsat Alert Data (January 1994 - December 2020)

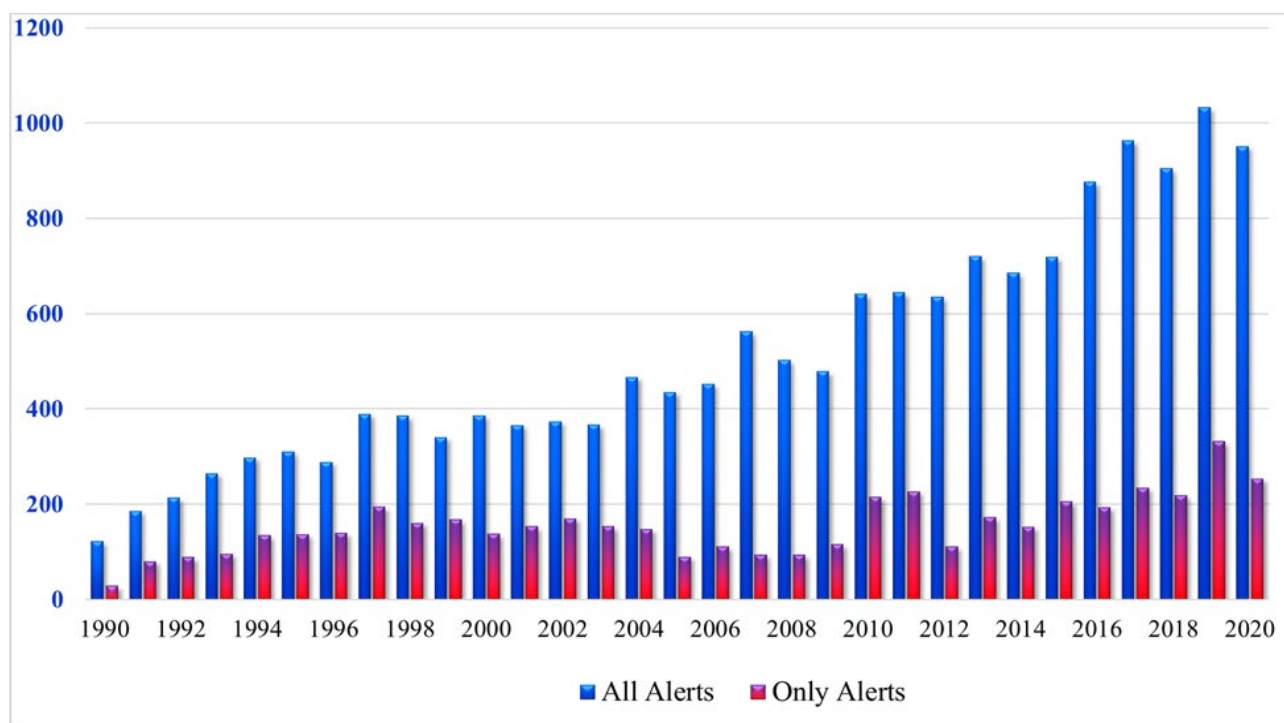


Figure 5: Number of SAR Events where Cospas-Sarsat Assisted and Number of SAR Events where Cospas-Sarsat Provided the Only Alert (January 1990 - December 2020)

3 PARTICIPATING COUNTRIES AND ORGANIZATIONS

Table 1: Cospas-Sarsat Participating Countries and Organizations (31 December 2021)

Participant	Agency	Status
Algeria	Service SAR, Ministère de la Défense Nationale	Ground Segment Provider
Argentina	Argentina Air Force – SASS (Satellite Distress Alert Service)	Ground Segment Provider
Australia	Australian Maritime Safety Authority (AMSA)	Ground Segment Provider
Brazil	Air Space Control Department (DECEA), Operations Sub-Department (SDOP)	Ground Segment Provider
Canada	National SAR Secretariat (NSS)	Party - Space Segment Provider
Chile	Servicio de Búsqueda y Salvamento de la Fuerza Aérea de Chile	Ground Segment Provider
China (P. R. of)	Maritime Safety Administration	Ground Segment Provider
Cyprus	Larnaca Joint Rescue Co-ordination Centre	Ground Segment Provider
Denmark	Denmark Transport Authority	User State
Finland	Ministry of the Interior, The Finnish Border Guard	User State
France	Centre National d'Études Spatiales (CNES)	Party - Space Segment Provider
Germany	Federal Ministry of Transport and Digital Infrastructure	User State
Greece	Ministry of Maritime Affairs and Insular Policy	Ground Segment Provider
Hong Kong, China	Hong Kong Marine Department	Ground Segment Operator
India	Department of Space, Government of India	Space & Ground Segment Provider
Indonesia	National SAR Agency of Indonesia (BASARNAS)	Ground Segment Provider
Italy	Dipartimento della Protezione Civile	Ground Segment Provider
ITDC	International Telecommunication Development Company	Ground Segment Operator
Japan	Japan Coast Guard, Information-Communications Division, Administration Dept.	Ground Segment Provider
Korea (Rep. of)	Korea Coast Guard	Ground Segment Provider
Malaysia	Malaysia Maritime Enforcement Agency (MMEA)	Ground Segment Provider*
Netherlands (The)	The Netherlands Coastguard	User State
New Zealand	Rescue Coordination Centre New Zealand (RCCNZ)	Ground Segment Provider
Nigeria	National Emergency Management Agency (NEMA)	Ground Segment Provider
Norway	Royal Norwegian Ministry of Justice and Public Security	Ground Segment Provider
Pakistan	Space & Upper Atmosphere Research Commission (SUPARCO)	Ground Segment Provider
Peru	Dirección General de Capitanías y Guardacostas	Ground Segment Provider
Poland	Civil Aviation Authority	User State
Qatar	Doha Joint Rescue Coordination Centre (DJRCC), Ministry of Defence	Ground Segment Provider
Russian Federation	Morsviazsputnik	Party-Space Segment Provider
Saudi Arabia	General Authority of Civil Aviation, Directorate of Air Traffic Services	Ground Segment Provider
Serbia	Civil Aviation Directorate of the Republic of Serbia	User State
Singapore	Civil Aviation Authority of Singapore / Maritime and Port Authority of Singapore, Operations Planning	Ground Segment Provider
South Africa	South African Maritime Safety Authority (SAMSA)	Ground Segment Provider
Spain	Instituto Nacional de Técnica Aeroespacial (INTA)	Ground Segment Provider
Sweden	Swedish Civil Contingencies Agency	User State
Switzerland	Federal Office of Civil Aviation	User State
Thailand	Department of Civil Aviation, Ministry of Transport	Ground Segment Provider
Togo	Le Ministère des Infrastructures et des Transports	Ground Segment Provider*
Tunisia	Ministère du Transport, Direction Générale de l'Aviation Civile (DGAC)	User State
Turkey	Ministry of Transport, Maritime Affairs and Communication	Ground Segment Provider
UAE	Telecommunications Regulatory Authority	Ground Segment Provider
United Kingdom	Maritime and Coastguard Agency	Ground Segment Provider
USA	National Oceanic and Atmospheric Administration (NOAA)	Party-Space Segment Provider
Vietnam	Vietnam Maritime Administration (VINAMARINE) / Vietnam Maritime Communication and Electronics LLC (VISHIPEL)	Ground Segment Provider

Note: (*) Ground Segment equipment is not yet formally commissioned.

4 SPACE SEGMENT

Table 2: LEOSAR Payload Availability (31 December 2021)

Cospas-Sarsat Payload	Spacecraft	Launch Date	Capability	Status	SAR Processor (SARP)		SAR Repeater (SARR)
					Global Mode	Local Mode	
Cospas-14	Meteor-M No.2-2	July 2019	FOC	On	On	On	On
Sarsat-7	NOAA-15	May 1998	FOC	Off	Off	Off	Off
Sarsat-10	NOAA-18	May 2005	FOC	On	On	On	On
Sarsat-12	NOAA-19	February 2009	FOC	On	On	On	On
Sarsat-13	Metop-B	September 2012	FOC	On	On	On	On

Table 3: GEOSAR Payload Availability (31 December 2021)

Spacecraft	Launch Date	Position	Capability	Status	Comments
GOES-13	May 2006	60° W	FOC	Off	In-orbit spare
GOES-14	June 2009	105° W	FOC	Off	In-orbit spare
GOES-15	March 2010	135° W	FOC	Off	In-orbit spare
GOES-16 (East)	November 2016	75.2° W	FOC	On	Downlink center frequency is 1544.55 MHz
GOES-17 (West)	March 2018	137.2° W	FOC	On	
MSG-1	August 2002	41.5° E	FOC	On	(1)
MSG-2	December 2005	3.5° E	FOC	Off	In-orbit spare
MSG-3	July 2012	9.5° E	FOC	On	
MSG-4	July 2015	0°	FOC	On	
INSAT-3D	July 2013	82° E	FOC	On	
INSAT-3DR	September 2016	74° E	FOC	On	
GSAT-17	June 2017	93.5° E	IOC	On	Tracked occasionally
Electro-L No.2	December 2015	14.5° W	FOC	On	
Electro-L No.3	December 2019	76° E	FOC	On	
Louch-5A	December 2011	167° E	FOC	On	(1)
Louch-5V	April 2014	95° E	UT	On	

Notes: (Tables 2 and 3)

1 Moving in an elliptic orbit. Operational for GEOLUTs equipped with active-tracking capability,

FOC Full Operational Capability,

IOC Initial Operational Capability,

N/A Information Not Available,

TBD To Be Determined,

UT Under Test.

Bold font style in the “Status” column shows payloads that were tracked on 31 December 2021.

A GEOSAR coverage map is available at Figure 7 “GEOSAR Satellite Coverage” in section 5 of this document, showing footprints for commissioned payloads that are switched on.

Table 4: MEOSAR Payload Availability (31 December 2021)

Constellation	Downlink Frequency	Capability	Number / Status	Comments
Galileo	L-Band	FOC	24/On	In addition, two more Galileo satellites with no SAR payload onboard are Return-Link-Service-capable.
Glonass-K1	L-Band	2/A – 1/UT	3/On	One payload available for detection testing. One payload available for detection and location testing.
GPS BIIR & F	S-Band	FOC	18/On	Experimental payloads. Commissioned.
GPS III A	S-Band	FOC	4/On	Eight GPS III satellites with DASS / S-band capability expected.

Notes: A Available,
FOC Full Operational Capability,
IOC Initial Operational Capability,
UT Under Test.

5 GROUND SEGMENT

Note: Ground Segment equipment under development is not listed under this section.

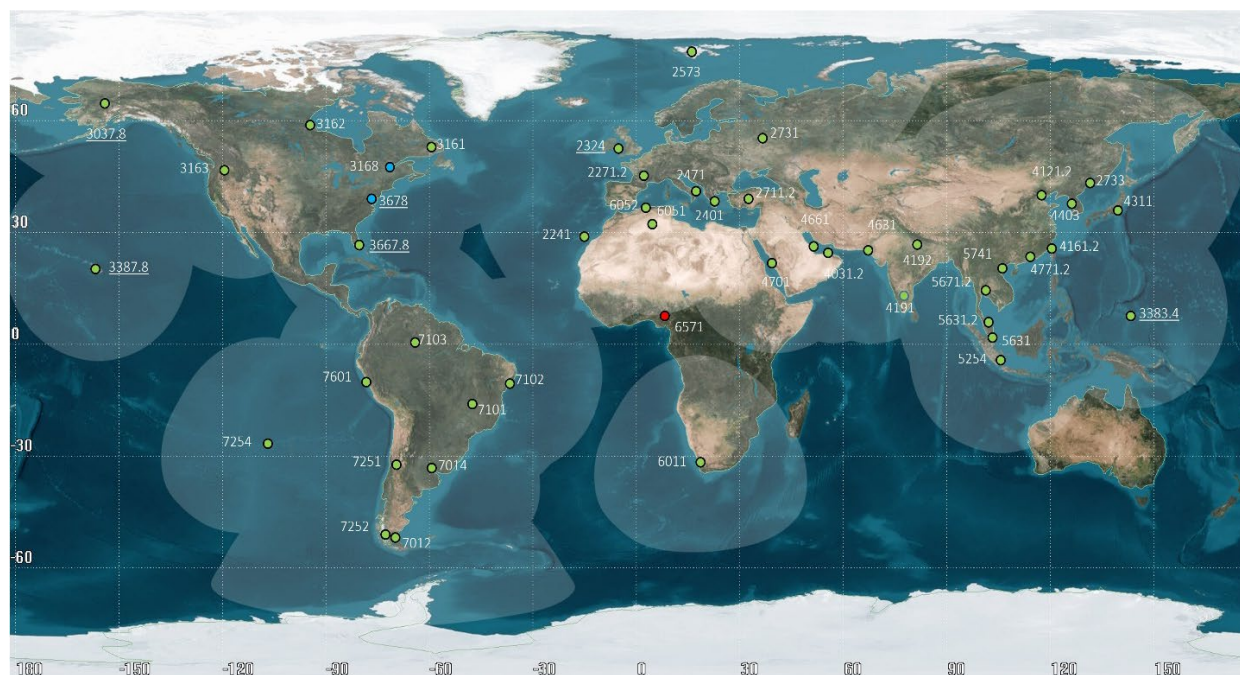


Figure 6: LEOSAR and Operational LEOLUT Mutual-Visibility Areas (31 December 2021)

Notes: The Abuja LEOLUT (6571) is not operational. Nigerian MCC is configured as a SAR point of contact of the Spanish MCC.

Underlined numbers refer to combined LEO-MEO installations.

The Cospas-Sarsat LEOSAR system provides global coverage for 406-MHz beacons. Light-blue areas show areas of LEOSAR-satellite/LEOLUT ‘mutual visibility’, i.e., where a LEOSAR satellite passing inside the area can be actively tracked by a LEOLUT. When a satellite is outside a light-blue area and detects beacons, data is stored onboard and periodically retransmitted for receipt by a LEOLUT as soon as the satellite reenters another light-blue area. The map was created assuming a satellite altitude of 850 km with a 5°-elevation detection angle at the LEOLUT. Below is the list of the LEOLUTs and their status.

Table 5: LEOSAR Ground Segment Status (LEOLUTs) (31 December 2021)

Code	Location	Provider	Status	Associated MCC	Dual	Comments
2241	Maspalomas	Spain	FOC	SPMCC	No	
2271-2-d	Toulouse	France	FOC	FMCC	Yes	
2324	Lee-on-Solent	UK	FOC	UKMCC	No	
2401	Penteli	Greece	FOC	GRMCC	No	
2471	Bari	Italy	FOC	ITMCC	No	
2573	Spitsbergen	Norway	FOC	NMCC	No	
2711-2	Ankara	Turkey	FOC	TRMCC	Yes	
2733	Nakhodka	Russia	FOC	CMC	No	
3037-8	Alaska	USA	FOC	USMCC	Yes	
3161	Goose Bay	Canada	FOC	CMCC	No	
3162	Churchill	Canada	FOC	CMCC	No	
3163	Edmonton	Canada	FOC	CMCC	No	
3168	Ottawa (LOW)	Canada	Backup	CMCC	No	Testing and operational back-up facility.
3383-4	Guam	USA	FOC	USMCC	Yes	
3387-8	Hawaii	USA	FOC	USMCC	Yes	
3667-8	Florida	USA	FOC	USMCC	Yes	
3678	Maryland (LME)	USA	FOC	USMCC	No	LEO-MEO support Equipment.
4031-2	Jeddah	Saudi Arabia	FOC	SAMCC	Yes	
4121-2	Beijing	China (P.R. of)	FOC	CNMCC	Yes	
4161-2	Keelung	ITDC	FOC	TAMCC		
4191	Bangalore	India	FOC	INMCC	No	
4192	Lucknow	India	FOC	INMCC	No	
4311	Futtsu	Japan	FOC	JAMCC	No	
4403	Incheon	Korea (Rep. of)	FOC	KOMCC	No	
4631	Karachi	Pakistan	FOC	PAMCC	No	
4661	Doha	Qatar	FOC	QAMCC	No	
4701	Abu Dhabi	UAE	FOC	AEMCC	No	
4771-2	Hong Kong	Hong Kong China	FOC	HKMCC	Yes	
5254	Jakarta	Indonesia	FOC	IDMCC	No	
5331-2	Kuntan	Malaysia	UD	MYMCC*	Yes	
5631	Singapore	Singapore	FOC	SIMCC	No	
5671-2	Bangkok	Thailand	FOC	THMCC	Yes	
5741	Haiphong	Viet Nam	FOC	VNMCC	No	
6011	Cape Town	South Africa	FOC	ASMCC	No	
6051	Ouargla	Algeria	FOC	ALMCC	No	
6052	Algiers	Algeria	FOC	ALMCC	No	
6571	Abuja	Nigeria	CNO	NIMCC	No	MCC configured as a SPOC of the Spanish MCC.
7012	Rio Grande	Argentina	FOC	ARMCC	No	
7014	El Palomar	Argentina	FOC	ARMCC	No	
7101	Brasilia	Brazil	FOC	BRMCC	No	
7102	Recife	Brazil	FOC	BRMCC	No	
7103	Manaus	Brazil	FOC	BRMCC	No	
7251	Santiago	Chile	FOC	CHMCC	No	
7252	Punta Arenas	Chile	FOC	CHMCC	No	
7254	Easter Island	Chile	FOC	CHMCC	No	
7601	Callao	Peru	FOC	PEMCC	No	

Notes: CNO Commissioned, Not Operational, UD Under Development,
 FOC Full Operational Capability, IOC Initial Operational Capability,
 (*) Ground Segment equipment not yet formally commissioned.

Table 6: GEOSAR Ground Segment Status (GEOLUTs) (31 December 2021)

Code	Location	Provider	Status	Associated GEOSAR	Comments
2242	Maspalomas	Spain	FOC	GOES-East	
2243	Maspalomas	Spain	FOC	MSG-4	
2273	Toulouse	France	FOC	MSG-4	
2323	Lee-on-Solent	UK	FOC	MSG-4	
2402	Penteli	Greece	FOC	MSG-3	
2472	Bari	Italy	FOC	MSG-3	
2713	Ankara	Turkey	FOC	MSG-3	
2735	Moscow	Russia	FOC	Electro-L No.3	
2736	Moscow	Russia	FOC	Electro-L No.2	
3166	Edmonton	Canada	FOC	GOES-West	
3167	Ottawa	Canada	FOC	GOES-East or GOES-West	
3169	Ottawa	Canada	FOC	GOES-East or GOES-West	
3674	Maryland	USA	FOC	GOES-East	
3675	Maryland GSE	USA	FOC	GOES-East or GOES-West	Test facility used operationally as needed.
3676	Maryland	USA	FOC	GOES-West	
4194	Bangalore	India	FOC	INSAT-3D	
4194bis	Bangalore	India	FOC	INSAT-3DR	
4662	Doha	Qatar	FOC	MSG-4	
4702	Abu Dhabi	UAE	FOC	MSG 4	
4707	Abu Dhabi	UAE	FOC	MSG-1	Active-tracking capable antenna.
5123	Goudies Road	New Zealand	FOC	GOES-West	
5124	Goudies Road	New Zealand	FOC	Louch-5A	Active-tracking capable antenna.
6053	Algiers	Algeria	FOC	MSG-4	
7011	El Palomar	Argentina	FOC	GOES-East	
7104	Brasilia	Brazil	FOC	GOES-East	
7105	Recife	Brazil	FOC	MSG-4	
7253	Santiago	Chile	FOC	GOES-East	
7602	Callao	Peru	FOC	GOES-West	

Notes: FOC Full Operational Capability,
IOC Initial Operational Capability.

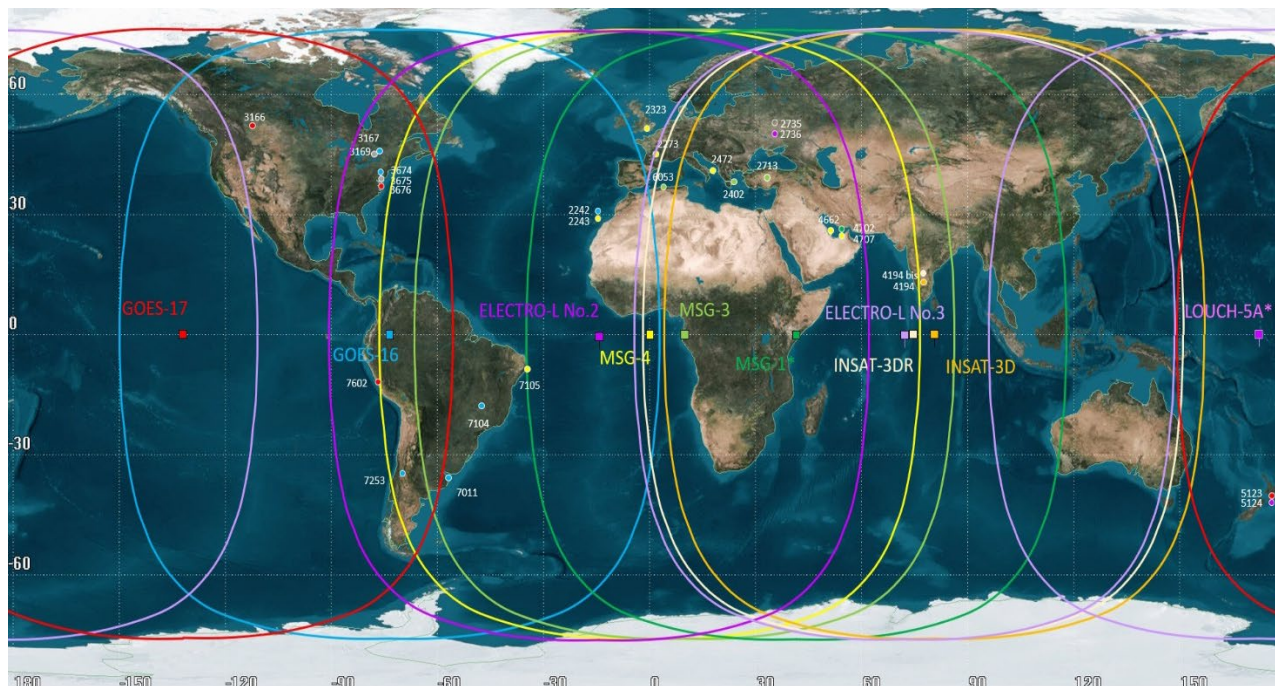


Figure 7: Operational GEOSAR Satellite Coverage (31 December 2021)

Note:

(*) MSG-1 and Louch-5A moving on elliptical orbits, associated footprints displayed on this map are centered on their average position.

Table 7: Mission Control Centre Status (31 December 2021)

Code	MCC	Location	Provider	DDR	Status in Operation	Comments
4700	AEMCC	Abu Dhabi	UAE	SCDDR	FOC	
6050	ALMCC	Algiers	Algeria	SCDDR	LGM	Commissioned against MEOSAR EOC criteria.
7010	ARMCC	El Palomar	Argentina	WDDR	FOC	
6010	ASMCC	Cape Town	South Africa	SWPDDR	FOC	
5030	AUMCC	Canberra	Australia	SWPDDR	LGM	Commissioned against MEOSAR EOC criteria.
7100	BRMCC	Brasilia	Brazil	WDDR	FOC	
7250	CHMCC	Santiago	Chile	WDDR	LGM	Commissioned against MEOSAR EOC criteria.
2730	CMC	Moscow	Russia	EDDR	FOC	
3160	CMCC	Trenton	Canada	WDDR	FOC	
4120	CNMCC	Beijing	China	NWPDDR	FOC	
2090	CYMCC	Larnaca	Cyprus	CDDR	LGM	Commissioned against MEOSAR EOC criteria.
2270	FMCC	Toulouse	France	CDDR	LGM	Commissioned against MEOSAR EOC criteria.
2400	GRMCC	Athens	Greece	CDDR	LGM	Commissioned against MEOSAR EOC criteria.
4770	HKMCC	Hong Kong	Hong Kong China	NWPDDR	FOC	
5250	IDMCC	Jakarta	Indonesia	SWPDDR	FOC	
4190	INMCC	Bangalore	India	EDDR	FOC	Manned 7d/7 between 03:00 and 11:30 UTC.
2470	ITMCC	Bari	Italy	CDDR	FOC	
4310	JAMCC	Gunma	Japan	NWPDDR	LGM	Commissioned against MEOSAR EOC criteria.
4400	KOMCC	Incheon	Korea (Rep. of)	NWPDDR	FOC	
5330	MYMCC	Kuantan	Malaysia	SWPDDR	UD	
6570	NIMCC	Abuja	Nigeria	SCDDR	CNO	Configured as a SPMCC SPOC.
2570	NMCC	Bodoe	Norway	CDDR	LGM	Commissioned against MEOSAR EOC criteria.
4630	PAMCC	Karachi	Pakistan	EDDR	FOC	
7600	PEMCC	Callao	Peru	WDDR	FOC	
4660	QAMCC	Doha	Qatar	SCDDR	LGM	Commissioned against MEOSAR EOC criteria. No associated MEOLUT.
4030	SAMCC	Jeddah	Saudi Arabia	SCDDR	FOC	
5630	SIMCC	Singapore	Singapore	SWPDDR	LGM	Commissioned against MEOSAR EOC criteria.
2240	SPMCC	Maspalomas	Spain	SCDDR	LGM	Commissioned against MEOSAR EOC criteria.
4160	TAMCC	Chinese Taipei	ITDC	NWPDDR	FOC	
6710	TGMCC	Lomé	Togo	SCDDR	UD	
5670	THMCC	Bangkok	Thailand	SWPDDR	FOC	
2710	TRMCC	Ankara	Turkey	CDDR	LGM	Commissioned against MEOSAR EOC criteria.
2320	UKMCC	Fareham	United Kingdom	CDDR	LGM	Commissioned against MEOSAR EOC criteria.
3660	USMCC	Suitland	USA	WDDR	LGM	Commissioned against MEOSAR EOC criteria.
5740	VNMCC	Haiphong	Viet Nam	NWPDDR	FOC	

Notes: CNO Commissioned, Not Operational, FOC Full Operational Capability,
IOC Initial Operational Capability, LGM LEOSAR, GEOSAR, MEOSAR-capable,
UD Under Development.

6 BEACONS

The registered 406-MHz beacon population reported by the Administrations at the end of 2020 was about 1,935,000 devices.

The estimated 2020 global 406-MHz beacon population computed using the registration-rate method was about 2,534,000 units.

The estimated 2020 global 406-MHz beacon population computed using the results of the beacon-manufacturer survey was about 1,899,000 units.

All information on Cospas-Sarsat type-approved 406-MHz beacons and a list of 406-MHz beacon manufacturers are available on the Cospas-Sarsat website at www.cospas-sarsat.int.

7 COSPAS-SARSAT SYSTEM OVERVIEW



Figure 8: Cospas-Sarsat System Overview

Legend:

COSPAS: Space system for the search of vessels in distress,
 SARSAT: Search and rescue satellite-aided tracking system,
 ELT: Emergency Locator Transmitter, in-flight Distress Tracking,
 ELT(DT): Emergency Locator Transmitter for Distress Tracking
 EPIRB: Emergency Position-Indicating Radio Beacon,
 GEO: Geostationary satellite system,

LEO: Low Earth Orbit satellite system,
 LUT: Local User Terminal,
 MCC: Mission Control Centre,
 MEO: Medium Earth Orbit satellite system,
 PLB: Personal Locator Beacon,
 RCC: Rescue Coordination Centre,
 RLSP: Return Link Service Provider,
 SAR: Search and Rescue.

Cospas-Sarsat Programme videos are available at:

<https://www.cospas-sarsat.int/en/search-and-rescue/programme-videos-en>.



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