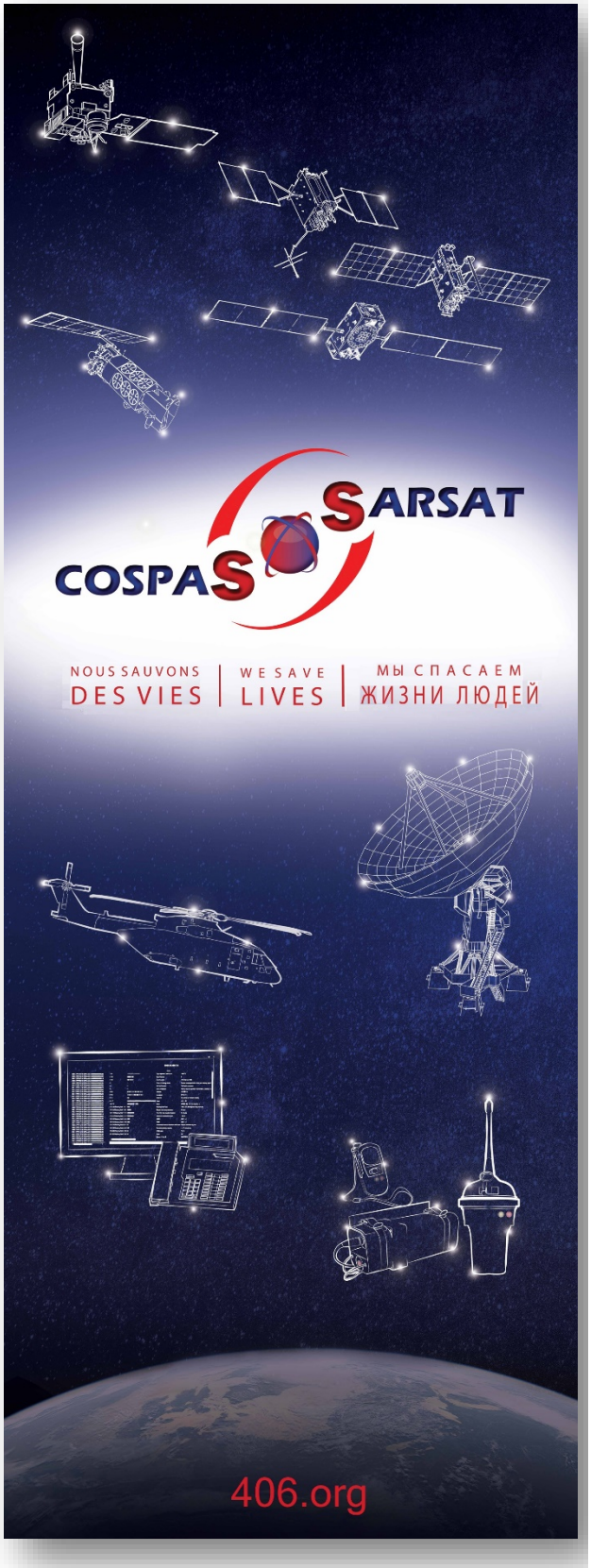

COSPAS-SARSAT SYSTEM DATA

No.45
December 2019

COSPAS-SARSAT SYSTEM DATA

No.45 - December 2019

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1 SUMMARY STATUS

PARTICIPANTS (1 December 2019)

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 (1 December 2019)

LEOSAR payloads (low-Earth orbit) (in operation):	4
GEOSAR payloads (geostationary orbit) (in operation):	9
MEOSAR payloads (medium-Earth orbit) (in operation):	45

GROUND SEGMENT (1 December 2019)

Local User Terminals operating in the LEOSAR system (LEOLUTs*)	59
Local User Terminals operating in the GEOSAR system (GEOLUTs)	27
Local User Terminals commissioned in the MEOSAR system (MEOLUTs)	21
Mission Control Centres (MCCs) (including seven commissioned LGM MCCs)	31

* These constitute 46 receiving stations as 27 co-located LUTs operate in dual mode.

406 MHz BEACON POPULATION (31 December 2018)

Global registered beacon population:	about 1,733,000
Global beacon population estimated using the registration-rate method:	about 2,249,000
Global beacon population estimated using the beacon-manufacturer survey:	about 1,892,000

SAR OPERATIONS (31 December 2018)

From **January to December 2018**, the Cospas-Sarsat System provided assistance in rescuing at least **2,185 persons in 904 SAR events**.

Type of Distress	SAR Events	Persons Rescued
Aviation	160	326
Maritime	348	1,246
Land	396	613
Total	**904**	**2,185**

From **September 1982 to December 2018**, the Cospas-Sarsat System provided assistance in **rescuing at least 48,738 persons in 14,531 SAR events**.

2 ASSISTANCE IN SEARCH AND RESCUE OPERATIONS

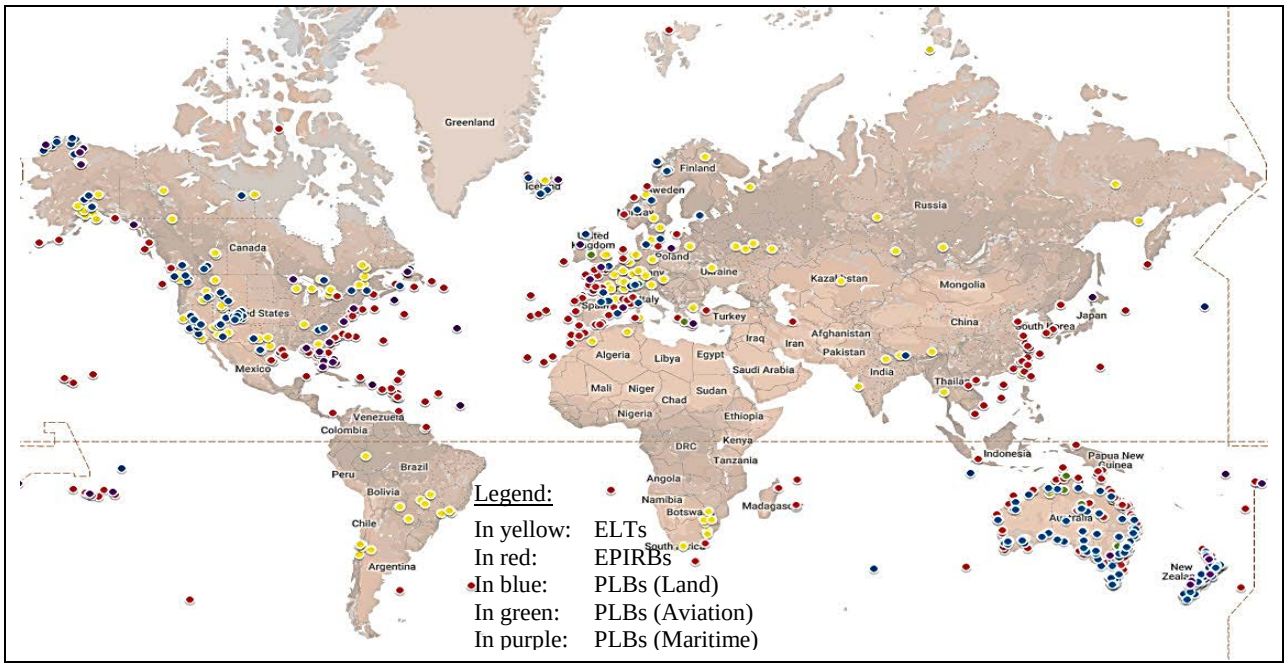

Figure 1: Geographic Distribution of Confirmed SAR Events for which Cospas-Sarsat Data Was Used (January - December 2018)

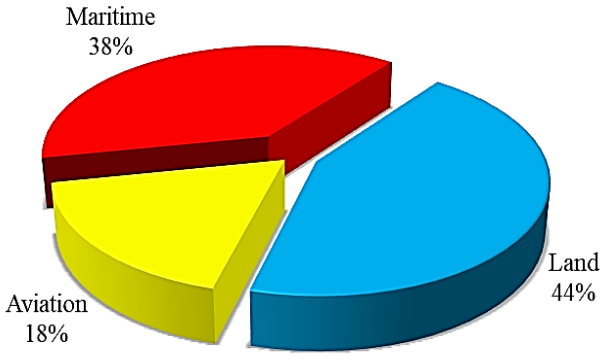

Figure 2: Distribution of SAR Events Assisted by Cospas-Sarsat by Type of Events (January - December 2018)

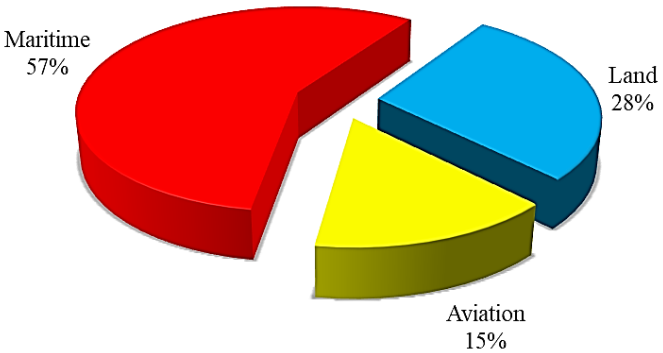

Figure 3: Persons Rescued by Type of SAR Event Assisted by Cospas-Sarsat (January - December 2018)

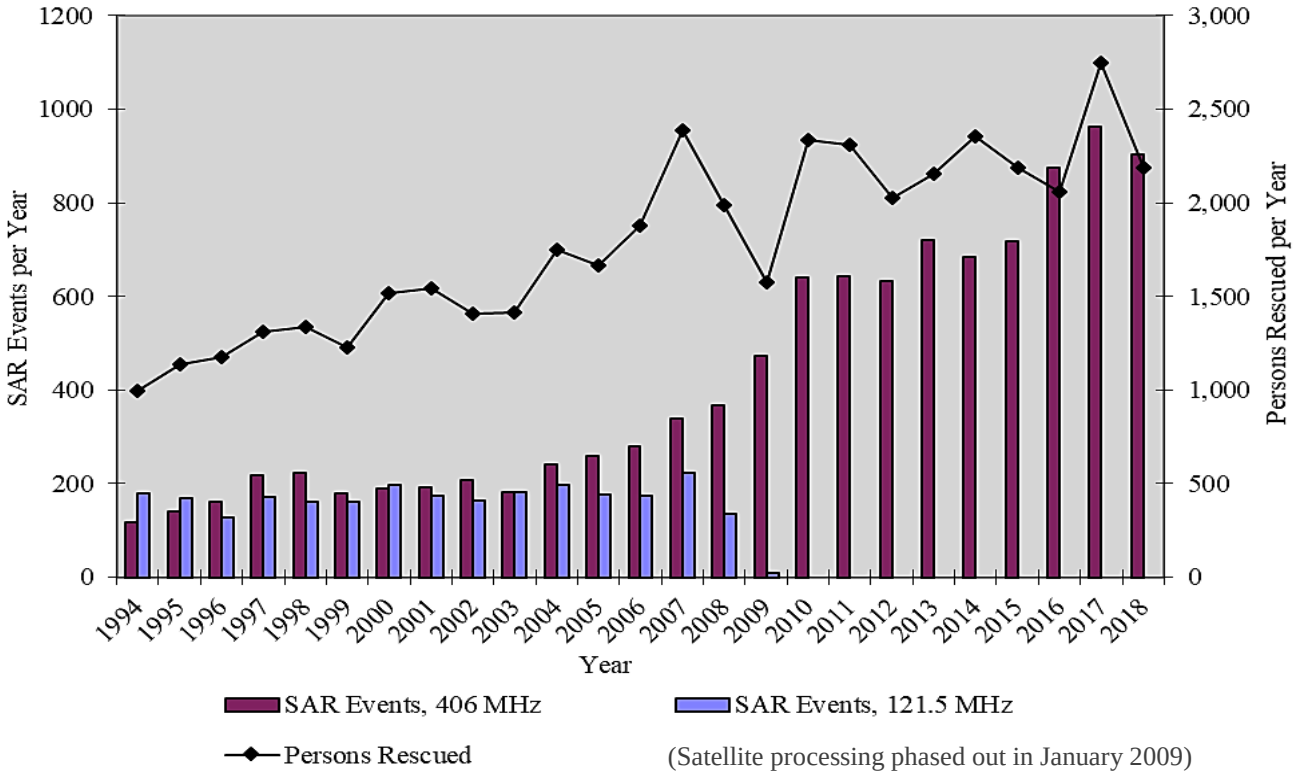

Figure 4: Number of SAR Events and Persons Rescued with the Assistance of Cospas-Sarsat Alert Data (January 1994 - December 2018)

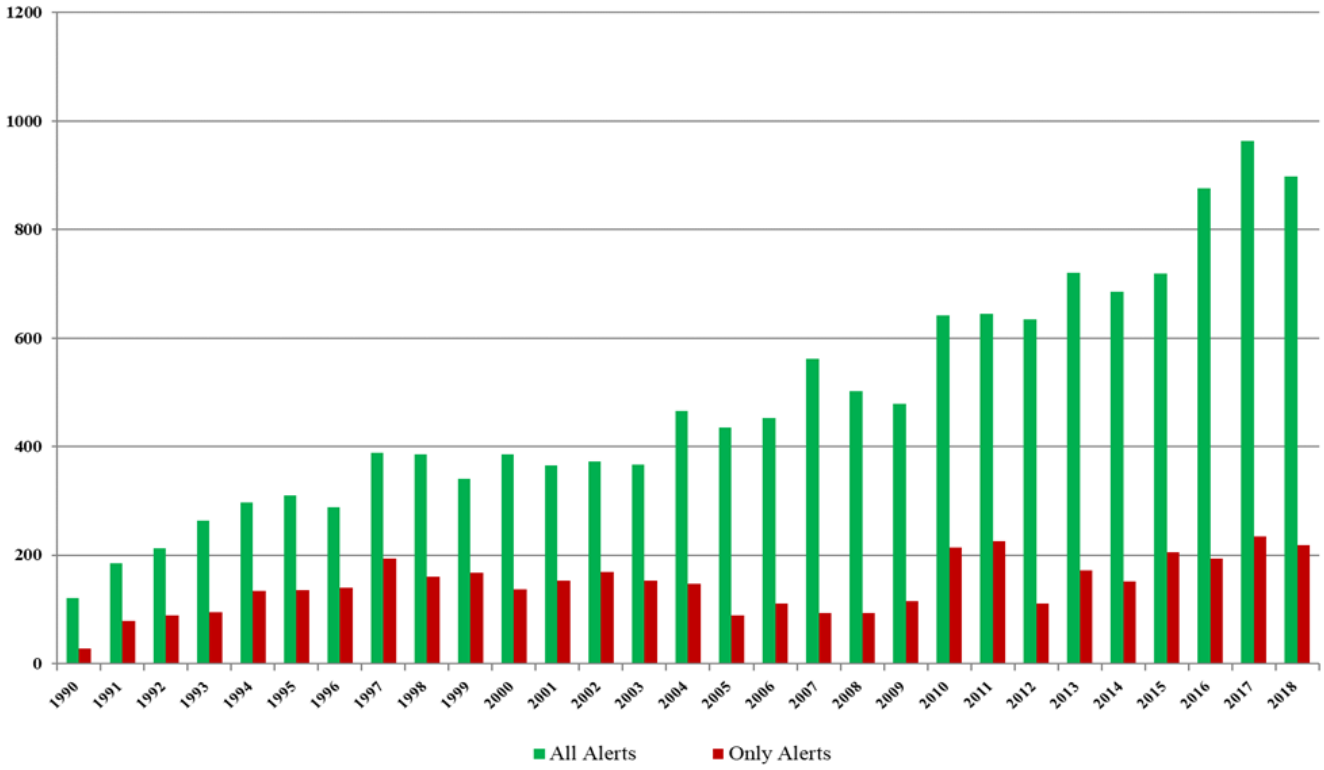

Figure 5: Number of SAR Events where Cospas-Sarsat Assisted and Number of SAR Events where Cospas-Sarsat Provided the Only Alert (January 1990 - December 2018)

3 PARTICIPATING COUNTRIES AND ORGANIZATIONS

Table 1: Cospas-Sarsat Participating Countries and Organizations (1 December 2019)

Participant	Agency	Status
Algeria	Service SAR, Ministère de la Défense Nationale	Ground Segment Provider
Argentina	Argentina Navy – 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, Bureau of Harbour Super-intendency	Ground Segment Provider
Cyprus	Larnaca Joint Rescue Co-ordination Centre	Ground Segment Provider*
Denmark	Denmark Transport Authority	User State
Finland	Ministry of the Interior, 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	Ministry of Justice	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
UK	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

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

4 SPACE SEGMENT

Table 2: LEOSAR Payload Availability (1 December 2019)

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	UT	On	UT	UT	UT
Sarsat-7	NOAA-15	May 1998	FOC	On	On	On	On
Sarsat-10	NOAA-18	May 2005	FOC	Off	Off	Off	Off
Sarsat-11	Metop-A	October 2006	FOC	On (2)	On	On	On
Sarsat-12	NOAA-19	February 2009	FOC	On	On	On	On
Sarsat-13	Metop-B	September 2012	FOC	On (2)	On	On	On

Table 3: GEOSAR Payload Availability (1 December 2019)

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 (West-1)	March 2010	137° W	FOC	**On**	
GOES-16 (East)	November 2016	75° W	FOC	**On**	Downlink center frequency is 1544.5**5** MHz
GOES-17 (West-2)	March 2018	128° 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**	(2)
INSAT-3D	July 2013	82° E	FOC	**On**	
INSAT-3DR	September 2016	74° E	FOC	**On**	
GSAT-17	June 2017	93.5° E	IOC	Off	
Electro-L No.2	December 2015	76° E	IOC	On	
Louch-5A	December 2011	167° E	IOC	**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,
2 Subject to periodic manoeuvres,
FOC Full Operational Capability,
IOC Initial Operational Capability,
N/A Information Not Available
TBD To Be Determined,
UT Under Test.

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 (1 December 2019)

Constellation	Downlink Frequency	Capability	Number / Status	Comments
Galileo	L-Band	FOC	23/On (1) & 1/Off	Payload #422 switched-off for maintenance.
Glonass-K1	L-Band	UT	2/On	One payload available for detection testing. One payload available for detection and location testing.
GPS BIIR & F	S-Band	FOC	19/On	Experimental payloads. Commissioned.
GPS III A	S-Band	UT	2/Off	Eight GPS III satellites with DASS / S-band capability expected.

Notes: FOC Full Operational Capability,
IOC Initial Operational Capability,
UT Under Test,
1 In addition, two more Galileo satellites with no SAR payload onboard are Return-Link-Service-capable.

5 GROUND SEGMENT

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

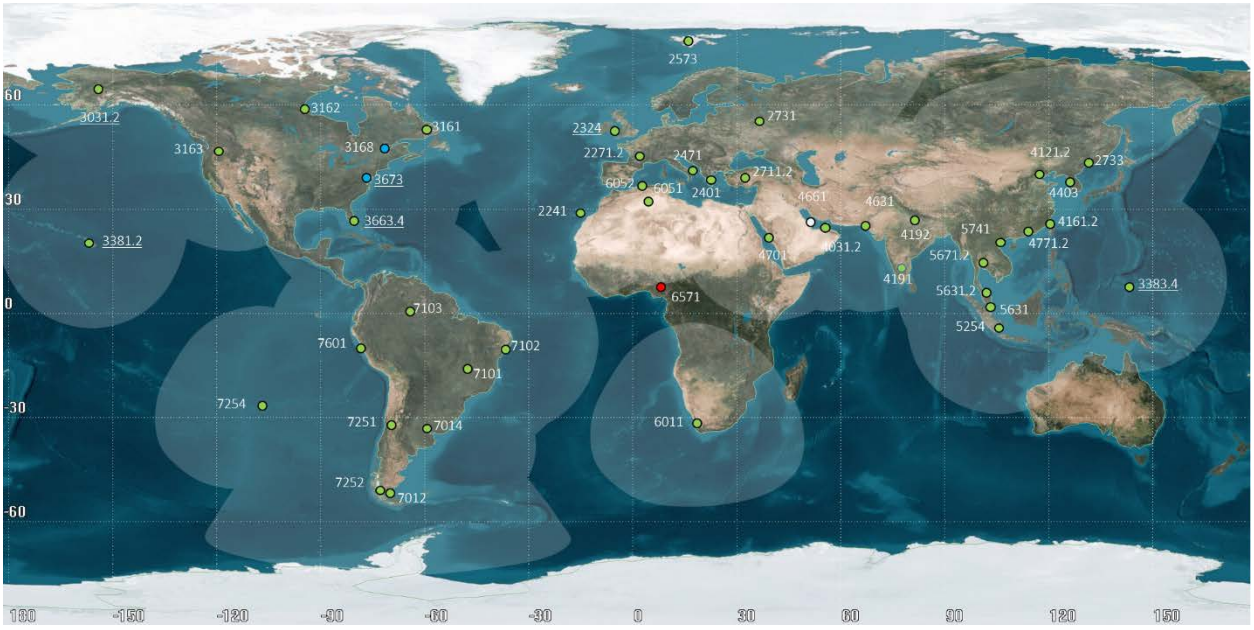

Figure 6: LEOSAR and Operational LEOLUT Mutual-Visibility Areas (1 December 2019)

Notes: 6571 The Abuja LEOLUT 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) (1 December 2019)

Code	Location	Provider	Status	Associated MCC	Dual	Comments
2271-2-d	Toulouse	France	**FOC**	FMCC	Yes	
2241	Maspalomas	Spain	**FOC**	SPMCC	No	
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	
3031-2	Alaska	USA	**FOC**	USMCC	Yes	To be replaced by LEO-MEO antennas.
3161	Goose Bay	Canada	**FOC**	CMCC	No	
3162	Churchill	Canada	**FOC**	CMCC	No	
3163	Edmonton	Canada	**FOC**	CMCC	No	
3168	Ottawa	Canada	**Backup**	CMCC	No	Test and backup facility.
3381-2	Hawaii	USA	**FOC**	USMCC	Yes	To be replaced by LEO-MEO antenna (3387-8).
3383-4	Guam	USA	**FOC**	USMCC	Yes	To be replaced by LEO-MEO antennas.
3663-4	Florida	USA	**FOC**	USMCC	Yes	To be replaced by LEO-MEO antennas (3667-8).
3673	Maryland	USA	**FOC**	CMCC	No	LEOSAR Support Equipment. To be replaced by LEO-MEO antenna (3678).
4031-2	Jeddah	Saudi Arabia	**FOC**	SAMCC	Yes	
4121-2	Beijing	China (P.R. of)	**FOC**	CNMCC	Yes	
4161-2	Keelung	ITDC	**FOC**	TAMCC	Yes	To be replaced by Dapingding antennas (4164-5).
4191	Bangalore	India	**FOC**	INMCC	No	
4192	Lucknow	India	**FOC**	INMCC	No	
4313	Gunma	Japan	**FOC**	JAMCC	No	
4403	Incheon	Korea (Rep. of)	**FOC**	KOMCC	No	
4631	Karachi	Pakistan	**FOC**	PAMCC	No	
4661	Doha	Qatar	**IOC**	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	Providing data to LGM IDMCC (under development).
5331-2	Kuntan	Malaysia	**IOC**	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) (1 December 2019)

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	Pending	Satellite to be tracked is pending as Electro-L No.1 was decommissioned on 1 June 2017.
2736	Moscow	Russia	IOC	Electro L No.2	
3166	Edmonton	Canada	FOC	GOES-West	
3167-9	Ottawa	Canada	FOC	GOES-East & GOES-West	
3674	Maryland	USA	FOC	GOES-East	
3676	Maryland	USA	FOC	GOES-West	
4194	Bangalore	India	FOC	INSAT-3D	
4194bis	Bangalore	India	FOC	INSAT-3DR	
4662	Doha	Qatar	IOC	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.

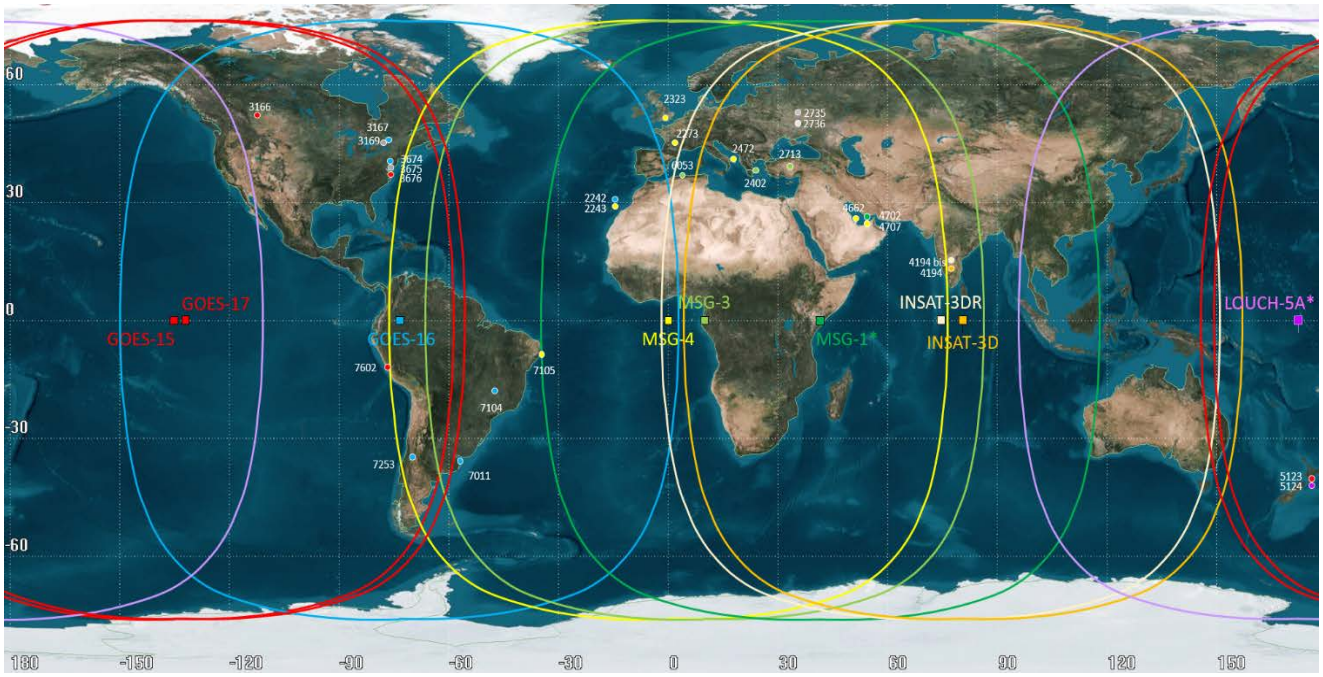

Figure 7: Operational GEOSAR Satellite Coverage (1 December 2019)

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

Electro L No.2 has been commissioned in geostationnary orbit at 76° E; however, it is not tracked operationally yet.

Table 7: Mission Control Centre Status (1 December 2019)

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

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

6 BEACONS

The registered 406-MHz beacon population reported by the Administrations at the end of 2018 was about 1,733,000 devices.

The estimated 2018 global 406-MHz beacon population computed using the registration-rate method was about 2,249,000 units.

The estimated 2018 global 406-MHz beacon population computed using the results of the beacon-manufacturer survey was about 1,892,000 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,	LEO:	Low Earth Orbit satellite system,
SARSAT:	Search and rescue satellite-aided tracking system,	LUT:	Local User Terminal,
ELT:	Emergency Locator Transmitter. in-flight Distress Tracking,	MCC:	Mission Control Centre,
		MEO:	Medium Earth Orbit satellite system,
ELT(DT):	Emergency Locator Transmitter for Distress Tracking	PLB:	Personal Locator Beacon,
		RCC:	Rescue Coordination Centre,
EPIRB:	Emergency Position-Indicating Radio Beacon,	RLSP:	Return Link Service Provider,
GEO:	Geostationary satellite system,	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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