



LUXEMBOURG  
SPACE AGENCY



THE GOVERNMENT  
OF THE GRAND DUCHY OF LUXEMBOURG  
*Ministry of the Economy*

# LUXEMBOURG REGISTRY OF SPACE OBJECTS

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# Introduction

The Registry of Space Objects (the National Registry) for which the Grand Duchy of Luxembourg assumes registration obligation is established following the Convention on Registration of Objects Launched into Outer Space, adopted by the United Nations (UN) General Assembly in New York on 12 November 1974 (the Convention), and the Law of 15 December 2020 on Space Activities.

On 27 January 2021, Luxembourg adhered to the [Convention on the Registration of Space Objects](#), becoming the 70<sup>th</sup> State Party to the Convention. The UN General Assembly adopted the Convention in 1974 to assist in the identification of space objects, address issues regarding States Parties responsibilities concerning their space objects, and ensure open access to the information provided by States and international intergovernmental organizations.

The Registration Convention ensures that a central registry of objects launched into outer space is established and maintained by the Secretary-General of the UN. Thus, once a space object is launched and as soon as practicable, the Registration Convention requires the 'State of registry' to furnish information about the launched space object to the Secretary-General. The UN keeps information provided by State Parties relating to the space objects and the space activity on its website. Furthermore, the Registration Convention requires Luxembourg to maintain its own appropriate registry of space objects, also embodied in Chapter 7, Article 15 in the [Law of 15 December 2020](#).

Prior to becoming a State Party to the Registration Convention, Luxembourg voluntarily provided registration information of space objects under [Resolution 1721 B \(XVI\)](#). Following adherence to the Convention, registration submissions are in accordance with Article IV of the Convention.

For information regarding registration information of space objects already submitted by Luxembourg to the UN, please refer to the United Nations Office for Outer Space Affairs (UNOOSA) [website](#).

# Definition of Terms

**Apogee:** The furthest distance in the space object's orbit from the surface of the body it is orbiting.

**Change of Status:** The date of the space object's decay, reentry, recovery, deorbit, or landing.

## **Change of Status in Operations:**

***Date when space object is no longer functional:*** The date using Coordinated Universal Time (UTC) (also referred to as Greenwich Mean Time (GMT)) when the space object ceases to perform operational functions for the State of registry.

***Date when space object is moved to a disposal orbit:*** The date using Coordinated Universal Time (UTC) when the space object is moved into a disposal orbit. See COPUOS Space Debris Mitigation Guidelines for recommendations on disposal orbits, [link](#)

***Physical conditions when space object is moved to a disposal orbit:*** The physical conditions when the space object is moved into a disposal orbit. Conditions can include the change in orbit (e.g. +300 km above GSO), passivation of the space object and other measures as recommended in the COPUOS Space Debris Mitigation Guidelines.

## **Change of Supervision of the Space Object:**

***Date of change in supervision:*** The date using Coordinated Universal Time (UTC) (also referred to as Greenwich Mean Time (GMT)) when the new owner or operator takes supervision of the space object.

***Identity of the new owner or operator:*** The identity of the new owner or operator of the space object.

## **Change of orbital position in the geostationary orbit**

***Previous orbital position:*** The previous operational location of the space object in  $\pm$  degrees East along the equator from the Greenwich meridian.

***New orbital position:*** The new operational location of the space object in  $\pm$  degrees East along the equator from the Greenwich meridian.

***Change of function of the space object:*** The function of the space object following change in supervision.

**COSPAR International Designator:** Alphanumeric designator established by the Committee on Space Research (COSPAR) for space objects that successfully reach Earth orbit and beyond. The designator can be obtained from the [Online Index of Objects Launched into Outer Space](#).

**Date of Launch:** The date of launch of the space object using Coordinated Universal Time (UTC) (also referred to as Greenwich Mean Time (GMT)).

**General Function of Space Object:** General information on the space object. Can include mission objectives, frequency plans, etc. If required, please attach text in a separate page.

**Geostationary Position:** Applicable only to space objects in the geostationary orbit. Planned and/or actual location of space object in  $\pm$  degrees East along the equator from the Greenwich meridian (e.g. for 10.5 degrees West, use -10.5 degrees East).

**Inclination:** The angle relative to the equator of the Earth or celestial body the space object is orbiting. Measured counter-clockwise from the equator, stated in degrees.

**Launching State:** a) A State that launches or procures the launching of a space object; b) A State from whose territory or facility a space object is launched. In accordance with Article II of the Registration Convention, only one State of registry can exist for a space object. When more than one launching State exists, they should jointly determine which State should register the space object.

**Nodal period:** Time taken by the space object to complete one revolution around the body it is orbiting.

**Perigee:** The closest distance in the space object's orbit from the surface of the body it is orbiting.

**State of Registry / Intergovernmental Organization:** The launching State that carries the space object on its national registry of objects into outer space or the organization that has declared its acceptance of the rights and obligations provided for in accordance with Article VII of the Registration Convention. In accordance with Article II of the Registration Convention, only one State of registry can exist for a space object. When more than one launching State exists, they should jointly determine which State should register the space object.

**Territory or location of launch:** The territory or location of the launch of the space object. For a table of global launch locations, see <http://www.unoosa.org/oosa/SORegister/resources.html>

**Website:** Address on the World Wide Web for information on the space object/mission/operator.



# ASTRA 1A

**COSPAR International** 1988-109B  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** Société Européenne des Satellites (SES  
ASTRA S.A.)  
**Launch Date and Time:** 11/12/1988  
**Launch Location:** Kourou, French Guiana  
**Launch Vehicle Name:** Ariane

**Date of Decommissioning:** 10/12/2004  
**Additional Information:** The satellite is in a graveyard orbit, at a  
minimum perigee altitude of 400 km above  
the geostationary orbit

**Entry Date into National** 02/03/2021<sup>i</sup>  
**Registry:**

# ASTRA 1B

**COSPAR International** 1991-015A

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.

**Launch Date and Time:** 02/03/1991

**Launch Location:** Kourou, French Guiana

**Launch Vehicle Name:** Ariane

**Date of Decommissioning:** 12/07/2006

**Additional Information:** The satellite is in a graveyard orbit, at a minimum perigee altitude of 500 km above the geostationary orbit

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

# ASTRA 1C

**COSPAR International** 1993-031A  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.  
**Launch Date and Time:** 12/05/1993  
**Launch Location:** Kourou, French Guiana  
**Launch Vehicle Name:** Ariane

**Date of Decommissioning:** 31/07/2014  
**Additional Information:** The satellite is in a graveyard orbit, at a minimum perigee altitude of 387 km above the geostationary orbit

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

# ASTRA 1D

**COSPAR International** 1994-070A  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.  
**Launch Date and Time:** 31/10/1994  
**Launch Location:** Kourou, French Guiana  
**Launch Vehicle Name:** Ariane

**Nodal Period:** 1,435.8-1,436.4 minutes  
**Inclination:** Uncontrolled inclination since 22/10/2007. Orbital inclination is therefore increasing over time and was 9.2 degrees on 10/08/2020  
**Apogee:** 35,820 kilometers  
**Perigee:** 35,752 kilometers  
**Geostationary Position:** 73,0 degrees West since 30/11/2017

**General Function of Object:** Encrypted and unencrypted transmission of radio, television and multimedia data services and of occasional-use services

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## **Annex 1: ASTRA 1D**

<b>Date of Decommissioning:</b>	15/11/2021
<b>Additional Information:</b>	The satellite is in a graveyard orbit, at a minimum perigee altitude of 351 km above the geostationary orbit
<b>Entry Date into National Registry:</b>	16/11/2021

## ASTRA 1E

**COSPAR International** 1995-055A

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.

**Launch Date and Time:** 19/10/1995

**Launch Location:** Kourou, French Guiana

**Launch Vehicle Name:** Ariane

**Date of Decommissioning:** 12/06/2015

**Additional Information:** The satellite is in a graveyard orbit, at a minimum perigee altitude of 390 km above the geostationary orbit

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

# ASTRA 1F

**COSPAR International** 1996-021A  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.  
**Launch Date and Time:** 08/04/1996  
**Launch Location:** Baikonur, Kazakhstan  
**Launch Vehicle Name:** Proton

**Date of Decommissioning:** 04/11/2020  
**Additional Information:** The satellite is in a graveyard orbit, at a minimum perigee altitude of 312 km above the geostationary orbit

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

# ASTRA 1G

**COSPAR International** 1997-076A

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.

**Launch Date and Time:** 02/12/1997

**Launch Location:** Baikonur, Kazakhstan

**Launch Vehicle Name:** Proton

**Nodal Period:** 1,435.8-1,436.4 minutes

**Inclination:** Uncontrolled inclination since 23/05/2014. Orbital inclination is therefore increasing over time and was 4.7 degrees on 10/08/2020

**Apogee:** 35,820 kilometers

**Perigee:** 35,752 kilometers

**Geostationary Position:** 63.24 degrees East since 18/08/2019

**General Function of Object:** Encrypted and unencrypted transmission of radio, television and multimedia data services

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>



## **Annex 1: ASTRA 1G**

### **New Basic Orbital Parameters**

<b>Inclination:</b>	Uncontrolled inclination since 23/05/2014. Orbital inclination is therefore increasing over time and was 5.2 degrees on 10/02/2021
<b>Geostationary position:</b>	19.4 degrees East from 10/02/2021
<b>Entry Date into National Registry:</b>	02/03/2021

## Annex 2: ASTRA 1G

<b>Date of Decommissioning:</b>	29/06/2023
<b>Additional Information:</b>	The satellite is in a graveyard orbit, at a minimum perigee of 314 km above the geostationary orbit. The propulsion is fully vented, batteries depleted, and transmitters switched off.
<b>Nodal Period:</b>	1454 minutes
<b>Inclination</b>	7 degrees
<b>Apogee:</b>	36,171 kilometers
<b>Perigee:</b>	36,100 kilometers
<b>Entry Date into National Registry:</b>	04/07/2023

## ASTRA 2A

**COSPAR International** 1998-050A  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.  
**Launch Date and Time:** 30/08/1998  
**Launch Location:** Baikonur, Kazakhstan  
**Launch Vehicle Name:** Proton

**Nodal Period:** 1,435.8-1,436.4 minutes  
**Inclination:** Uncontrolled inclination since 10/08/2018.  
Orbital inclination is therefore increasing over time and was 1.8 degrees on 10/08/2020  
**Apogee:** 35,820 kilometers  
**Perigee:** 35,752 kilometers  
**Geostationary Position:** 28 degrees East since 06/08/2020

**General Function of Object:** Encrypted and unencrypted transmission of radio, television and multimedia data services

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

# ASTRA 1H

**COSPAR International** 1999-033A  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.  
**Launch Date and Time:** 18/06/1999  
**Launch Location:** Baikonur, Kazakhstan  
**Launch Vehicle Name:** Proton

**Date of Decommissioning:** 12/10/2019  
**Additional Information:** The satellite is in a graveyard orbit, at a minimum perigee altitude of 340 km above the geostationary orbit

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## ASTRA 2B

**COSPAR International** 2000-054A

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.

**Launch Date and Time:** 14/09/2000

**Launch Location:** Kourou, French Guiana

**Launch Vehicle Name:** Ariane 5

**Nodal Period:** 1,435.8-1,436.4 minutes

**Inclination:** Uncontrolled inclination since 07/06/2014. Orbital inclination is therefore increasing over time and was 4.6 degrees on 10/08/2020

**Apogee:** 35,820 kilometers

**Perigee:** 35,752 kilometers

**Geostationary Position:** 19.6 degrees East since 01/10/2019

**General Function of Object:** Encrypted and unencrypted transmission of radio, television and multimedia data services

**Entry Date into National** 02/03/2021<sup>i</sup>

**Registry:**

## **Annex 1: ASTRA 2B**

### **New Basic Orbital Parameters**

#### **Additional Information:**

The satellite is in a graveyard orbit, at a minimum perigee altitude of 340 km above the geostationary orbit

#### **Apogee:**

36,221 kilometers

#### **Perigee**

36,124 kilometers

#### **Entry Date into National**

15/07/2021

#### **Registry:**

## ASTRA 2D

**COSPAR International** 2000-081A

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.

**Launch Date and Time:** 20/12/2000

**Launch Location:** Kourou, French Guiana

**Launch Vehicle Name:** Ariane 5

**Nodal Period:** 1,435.8-1,436.4 minutes

**Inclination:** Uncontrolled inclination since 22/04/2014. Orbital inclination is therefore increasing over time and was 5.9 degrees on 10/08/2020

**Apogee:** 35,820 kilometers

**Perigee:** 35,752 kilometers

**Geostationary Position:** 57.25 degrees East since 05/03/2020

**General Function of Object:** Encrypted and unencrypted transmission of radio, television and multimedia data services

**Entry Date into National** 02/03/2021<sup>i</sup>

**Registry:**

## Annex 1: ASTRA 2D

### New Basic Orbital Parameters

<b>Nodal Period:</b>	1,435.8-1,436.4 minutes
<b>Inclination:</b>	Uncontrolled inclination since 22/04/2014. Orbital inclination is therefore increasing over time and was 6.74 degrees on 08/10/2021
<b>Apogee:</b>	35,820 kilometers
<b>Perigee:</b>	35,752 kilometers
<b>Geostationary Position:</b>	23,7 degrees East since 04/10/2021
<b>Entry Date into National Registry:</b>	09/10/2021



## Annex 2: ASTRA 2D

<b>Date of Decommissioning:</b>	19/01/2023
<b>Additional Information:</b>	The satellite is in a graveyard orbit, at a minimum perigee altitude of 358 km above the geostationary orbit. The propulsion is fully vented, batteries depleted and transmitters switched off
<b>Apogee:</b>	36,147 kilometers
<b>Perigee:</b>	36,144 kilometers
<b>Entry Date into National Registry:</b>	16/02/2023

## ASTRA 2C

**COSPAR International** 2001-025A

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.

**Launch Date and Time:** 16/06/2001

**Launch Location:** Baikonur, Kazakhstan

**Launch Vehicle Name:** Proton

**Nodal Period:** 1,435.8-1,436.4 minutes

**Inclination:** Uncontrolled inclination since 09/11/2016. Orbital inclination is therefore increasing over time and was 3.0 degrees on 10/08/2020

**Apogee:** 35,820 kilometers

**Perigee:** 35,752 kilometers

**Geostationary Position:** 23.7 degrees East since 23/05/2018

**General Function of Object:** Encrypted and unencrypted transmission of radio, television and multimedia data services

**Entry Date into National** 02/03/2021<sup>i</sup>

**Registry:**

## **Annex 1: ASTRA 2C**

### **New Basic Orbital Parameters**

<b>Nodal Period:</b>	1,435.8-1,436.4 minutes
<b>Inclination:</b>	Uncontrolled inclination since 09/11/2016. Orbital inclination is therefore increasing over time and was 3.85 degrees on 18/08/2021
<b>Apogee:</b>	35,820 kilometers
<b>Perigee:</b>	35,752 kilometers
<b>Geostationary Position:</b>	72.5 degrees West since 23/05/2018
<b>Entry Date into National Registry:</b>	30/08/2021

# ASTRA 3A

**COSPAR International** 2002-015B  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.  
**Launch Date and Time:** 29/03/2002  
**Launch Location:** Kourou, French Guiana  
**Launch Vehicle Name:** Ariane 4

**Nodal Period:** 1,435.8-1,436.4 minutes  
**Inclination:** Uncontrolled inclination since 29/03/2012.  
Orbital inclination is therefore increasing over time and was 6.0 degrees on 10/08/2020  
**Apogee:** 35,820 kilometers  
**Perigee:** 35,752 kilometers  
**Geostationary Position:** 86.85 degrees West since 06/12/2019

**General Function of Object:** Encrypted and unencrypted transmission of radio, television and multimedia data services; occasional-use services and very small aperture terminal (VSAT) services

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## **Annex 1: ASTRA 3A**

<b>Date of Decommissioning:</b>	21/11/2022
<b>Additional Information:</b>	The satellite is in a graveyard orbit, at a perigee greater than 334 km above GEO, propulsion fully vented, batteries depleted and transmitters switched off
<b>Apogee:</b>	36,125 kilometers
<b>Perigee:</b>	36,122 kilometers
<b>Entry Date into National Registry:</b>	16/02/2023

# ASTRA 1KR

**COSPAR International** 2006-012A  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A. (through its subsidiary  
SES ASTRA 1KR S.à r.l.)  
**Launch Date and Time:** 20/04/2006  
**Launch Location:** Cape Canaveral, United States of America  
**Launch Vehicle Name:** Atlas V

**Nodal Period:** 1,435.8-1,436.4 minutes  
**Inclination:** 0.10 degrees  
**Apogee:** 35,820 kilometers  
**Perigee:** 35,752 kilometers  
**Geostationary Position:** 19.2 degrees East

**General Function of Object:** Encrypted and unencrypted transmission of  
radio, television and multimedia data  
services

**Entry Date into National** 02/03/2021<sup>i</sup>  
**Registry:**

# ASTRA 1L

<b>COSPAR Designator:</b>	<b>International</b>	2007-016A
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>		SES ASTRA S.A. (through its subsidiary SES ASTRA 1L S.à r.l.)
<b>Launch Date and Time:</b>		04/05/2007
<b>Launch Location:</b>		Kourou, French Guiana
<b>Launch Vehicle Name:</b>		Ariane 5
<b>Nodal Period:</b>		1,435.8-1,436.4 minutes
<b>Inclination:</b>		0.10 degrees
<b>Apogee:</b>		35,820 kilometers
<b>Perigee:</b>		35,752 kilometers
<b>Geostationary Position:</b>		19.2 degrees East
<b>General Function of Object:</b>		Encrypted and unencrypted transmission of radio, television, multimedia data and broadband services
<b>Entry Date into National Registry:</b>		02/03/2021 <sup>i</sup>

# ASTRA 1M

**COSPAR International** 2008-057A  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A. (through its subsidiary  
SES ASTRA 1M S.à r.l.)  
**Launch Date and Time:** 05/11/2008  
**Launch Location:** Baikonur, Kazakhstan  
**Launch Vehicle Name:** Proton-M/Breeze-M

**Nodal Period:** 1,435.8-1,436.4 minutes  
**Inclination:** 0.10 degrees  
**Apogee:** 35,820 kilometers  
**Perigee:** 35,752 kilometers  
**Geostationary Position:** 19.2 degrees East

**General Function of Object:** Encrypted and unencrypted transmission of  
radio, television and multimedia data  
services

**Entry Date into National** 02/03/2021<sup>i</sup>  
**Registry:**



# ASTRA 3B

<b>COSPAR Designator:</b>	<b>International</b>	2010-021A
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>		SES ASTRA S.A. (through its subsidiary SES 3B S.à r.l.)
<b>Launch Date and Time:</b>		21/05/2010
<b>Launch Location:</b>		Kourou, French Guiana
<b>Launch Vehicle Name:</b>		Ariane 5
<b>Nodal Period:</b>		1,435.8-1,436.4 minutes
<b>Inclination:</b>		0.10 degrees
<b>Apogee:</b>		35,820 kilometers
<b>Perigee:</b>		35,752 kilometers
<b>Geostationary Position:</b>		23.5 degrees East since 10/06/2010
<b>General Function of Object:</b>		Encrypted and unencrypted transmission of radio, television, multimedia data, VSAT and broadband services
<b>Entry Date into National Registry:</b>		02/03/2021 <sup>i</sup>

# ASTRA 1N

**COSPAR International** 2011-041A  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A. (through its subsidiary  
SES 1N S.à r.l.)  
**Launch Date and Time:** 06/08/2011  
**Launch Location:** Kourou, French Guiana  
**Launch Vehicle Name:** Ariane 5

**Nodal Period:** 1,435.8-1,436.4 minutes  
**Inclination:** 0.10 degrees  
**Apogee:** 35,820 kilometers  
**Perigee:** 35,752 kilometers  
**Geostationary Position:** 19.2 degrees East since 28/02/2014

**General Function of Object:** Encrypted and unencrypted transmission of  
radio, television, multimedia data, VSAT  
and broadband services

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

# Vesselsat 1

**COSPAR International** 2011-058C  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** LuxSpace S.à r.l.  
**Launch Date and Time:** 12/10/2011  
**Launch Location:** Sriharikota, India  
**Launch Vehicle Name:** PSLV-CA

**Nodal Period:** 102.10 minutes  
**Inclination:** 20 degrees  
**Apogee:** 867 kilometers  
**Perigee:** 847 kilometers

**Additional Information:** The object is still in orbit but is no longer operational

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## ASTRA 2F

<b>COSPAR Designator:</b>	<b>International</b>	2012-051A
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>		SES ASTRA S.A. (through its subsidiary SES ASTRA 2F S.à r.l.)
<b>Launch Date and Time:</b>		28/09/2012
<b>Launch Location:</b>		Kourou, French Guiana
<b>Launch Vehicle Name:</b>		Ariane 5
<b>Nodal Period:</b>		1,435.8-1,436.4 minutes
<b>Inclination:</b>		0.10 degrees
<b>Apogee:</b>		35,820 kilometers
<b>Perigee:</b>		35,752 kilometers
<b>Geostationary Position:</b>		28.2 degrees East
<b>General Function of Object:</b>		Encrypted and unencrypted transmission of radio, television, multimedia data, VSAT and broadband services
<b>Entry Date into National Registry:</b>		02/03/2021 <sup>i</sup>

## Vesselsat 2

**COSPAR International** 2012-001B

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** LuxSpace S.à r.l.

**Launch Date and Time:** 09/01/2012

**Launch Location:** Taiyuan LC-9, China

**Launch Vehicle Name:** Chang Zheng 4B Y26

**Additional Information:** The satellite has not been in orbit since 27/10/2016

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## ASTRA 2E

**COSPAR International** 2013-056A  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A. (through its subsidiary  
SES ASTRA 2E S.à r.l.)  
**Launch Date and Time:** 29/09/2013  
**Launch Location:** Baikonur, Kazakhstan  
**Launch Vehicle Name:** Proton-M/Breeze-M

**Nodal Period:** 1,435.8-1,436.4 minutes  
**Inclination:** 0.10 degrees  
**Apogee:** 35,820 kilometers  
**Perigee:** 35,752 kilometers  
**Geostationary Position:** 28.5 degrees East since 31/07/2015

**General Function of Object:** Encrypted and unencrypted transmission of  
radio, television, multimedia data, VSAT  
and broadband services

**Entry Date into National** 02/03/2021<sup>i</sup>  
**Registry:**

# ASTRA 5B

**COSPAR International** 2014-011B  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A. (through its subsidiary  
SES ASTRA 5B S.à r.l.)  
**Launch Date and Time:** 22/03/2014  
**Launch Location:** Kourou, French Guiana  
**Launch Vehicle Name:** Ariane 5

**Nodal Period:** 1,435.8-1,436.4 minutes  
**Inclination:** 0.10 degrees  
**Apogee:** 35,820 kilometers  
**Perigee:** 35,752 kilometers  
**Geostationary Position:** 31.5 degrees East

**General Function of Object:** Encrypted and unencrypted transmission of  
radio, television, multimedia data, VSAT  
and broadband services

**Entry Date into National** 02/03/2021<sup>i</sup>  
**Registry:**

## **Annex 1: ASTRA 3C (formerly ASTRA 5B)**

<b>Additional Information:</b>	Change of the name from ASTRA 5B to ASTRA 3C
<b>New Basic Orbital Parameters</b>	
<b>Nodal Period:</b>	1,436 minutes
<b>Inclination:</b>	0.10 degrees
<b>Apogee:</b>	35,820 kilometers
<b>Perigee:</b>	35,752 kilometers
<b>Geostationary Position:</b>	23,5 degrees East since 21/07/2023
<b>Entry Date into National Registry:</b>	21/07/2023



## ASTRA 2G

**COSPAR International** 2014-089A

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A. (through its subsidiary  
SES ASTRA 2G S.à r.l.)

**Launch Date and Time:** 27/12/2014

**Launch Location:** Baikonur, Kazakhstan

**Launch Vehicle Name:** Proton-M/Breeze-M

**Nodal Period:** 1,435.8-1,436.4 minutes

**Inclination:** 0.10 degrees

**Apogee:** 35,820 kilometers

**Perigee:** 35,752 kilometers

**Geostationary Position:** 28.5 degrees East since 16/06/2015

**General Function of Object:** Encrypted and unencrypted transmission of  
radio, television, multimedia data and  
broadband services and of governmental  
and institutional communication services

**Entry Date into National** 02/03/2021<sup>i</sup>

**Registry:**

## **Govsat-1 (SES-16)**

**COSPAR International** 2018-013A

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** LuxGovSat S.A.

**Launch Date and Time:** 31/01/2018

**Launch Location:** Cape Canaveral, United States of America

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 1,435.8-1,436.4 minutes

**Inclination:** 0.05 degrees

**Apogee:** 35,820 kilometers

**Perigee:** 35,752 kilometers

**Geostationary Position:** 21.42 degrees East

**General Function of Object:** Provision of governmental and institutional communication services

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## FM91, LEMUR 2 REMY-COLTON

**COSPAR International** 2018-111J  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à r.l.  
**Launch Date and Time:** 27/12/2018  
**Launch Location:** Vostochny Cosmodrome, Russian Federation  
**Launch Vehicle Name:** Soyuz 2.1 a

**Nodal Period:** 96.2 minutes  
**Inclination:** 97.73 degrees  
**Apogee:** 576 kilometers  
**Perigee:** 576 kilometers  
**Longitude of the Ascending Node:** 139.3 degrees

**General Function of Object:** Earth exploration and meteorology ("Automatic Identification System" (AIS), "Automatic Dependent Surveillance-Broadcast" (ADS-B), "Global Navigation Satellite System Radio Occultation/Reflectometry" (GNSS-RO/R))

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## FM92, LEMUR 2 GUSTAVO

**COSPAR International** 2018-111K  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à r.l.  
**Launch Date and Time:** 27/12/2018  
**Launch Location:** Vostochny Cosmodrome, Russian Federation  
**Launch Vehicle Name:** Soyuz 2.1 a

**Nodal Period:** 96.2 minutes  
**Inclination:** 97.72 degrees  
**Apogee:** 577 kilometers  
**Perigee:** 577 kilometers  
**Longitude of the Ascending Node:** 139.3 degrees

**General Function of Object:** Earth exploration and meteorology (AIS, ADS-B, GNSS-RO/R)

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## FM93, LEMUR 2 CHRISTINAHOLT

<b>COSPAR Designator:</b>	<b>International</b>	2018-111G
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>	Spire Global Luxembourg S.à r.l.	
<b>Launch Date and Time:</b>	27/12/2018	
<b>Launch Location:</b>	Vostochny Cosmodrome, Federation	Russian
<b>Launch Vehicle Name:</b>	Soyuz 2.1 a	
<b>Nodal Period:</b>	96.2 minutes	
<b>Inclination:</b>	97.73 degrees	
<b>Apogee:</b>	574 kilometers	
<b>Perigee:</b>	574 kilometers	
<b>Longitude of the Ascending Node:</b>	139.3 degrees	
<b>General Function of Object:</b>	Earth exploration and meteorology (AIS, ADS-B, GNSS-RO/R)	
<b>Entry Date into National Registry:</b>	02/03/2021 <sup>i</sup>	

## FM94, LEMUR 2 ZO

<b>COSPAR Designator:</b>	<b>International</b>	2018-111L
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>	Spire Global Luxembourg S.à r.l.	
<b>Launch Date and Time:</b>	27/12/2018	
<b>Launch Location:</b>	Vostochny Cosmodrome,	Russian Federation
<b>Launch Vehicle Name:</b>	Soyuz 2.1 a	
<b>Nodal Period:</b>	96.2 minutes	
<b>Inclination:</b>	97.72 degrees	
<b>Apogee:</b>	579 kilometers	
<b>Perigee:</b>	579 kilometers	
<b>Longitude of the Ascending Node:</b>	139.3 degrees	
<b>General Function of Object:</b>	Earth exploration and meteorology (AIS, ADS-B, GNSS-RO/R)	
<b>Entry Date into National Registry:</b>	02/03/2021 <sup>i</sup>	

## FM95, LEMUR 2 TINYKEV

<b>COSPAR Designator:</b>	<b>International</b>	2018-111H
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>	Spire Global Luxembourg S.à r.l.	
<b>Launch Date and Time:</b>	27/12/2018	
<b>Launch Location:</b>	Vostochny Cosmodrome,	Russian Federation
<b>Launch Vehicle Name:</b>	Soyuz 2.1 a	
<b>Nodal Period:</b>	96.2 minutes	
<b>Inclination:</b>	97.73 degrees	
<b>Apogee:</b>	575 kilometers	
<b>Perigee:</b>	575 kilometers	
<b>Longitude of the Ascending Node:</b>	139.3 degrees	
<b>General Function of Object:</b>	Earth exploration and meteorology (AIS, ADS-B, GNSS-RO/R)	
<b>Entry Date into National Registry:</b>	02/03/2021 <sup>i</sup>	

## FM96, LEMUR 2 SARAHBETTYBOO

<b>COSPAR Designator:</b>	<b>International</b>	2018-111N
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>	Spire Global Luxembourg S.à r.l.	
<b>Launch Date and Time:</b>	27/12/2018	
<b>Launch Location:</b>	Vostochny Cosmodrome,	Russian Federation
<b>Launch Vehicle Name:</b>	Soyuz 2.1 a	
<b>Nodal Period:</b>	96.2 minutes	
<b>Inclination:</b>	97.72 degrees	
<b>Apogee:</b>	582 kilometers	
<b>Perigee:</b>	582 kilometers	
<b>Longitude of the Ascending Node:</b>	139.3 degrees	
<b>General Function of Object:</b>	Earth exploration and meteorology (AIS, ADS-B, GNSS-RO/R)	
<b>Entry Date into National Registry:</b>	02/03/2021 <sup>i</sup>	



## FM97, LEMUR 2 NATALIEMURRAY

<b>COSPAR Designator:</b>	<b>International</b>	2018-111M
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>	Spire Global Luxembourg S.à r.l.	
<b>Launch Date and Time:</b>	27/12/2018	
<b>Launch Location:</b>	Vostochny Cosmodrome,	Russian Federation
<b>Launch Vehicle Name:</b>	Soyuz 2.1 a	
<b>Nodal Period:</b>	96.2 minutes	
<b>Inclination:</b>	97.72 degrees	
<b>Apogee:</b>	580 kilometers	
<b>Perigee:</b>	580 kilometers	
<b>Longitude of the Ascending Node:</b>	139.3 degrees	
<b>General Function of Object:</b>	Earth exploration and meteorology (AIS, ADS-B, GNSS RO/R)	
<b>Entry Date into National Registry:</b>	02/03/2021 <sup>i</sup>	

## FM98, LEMUR 2 DAISY-HARPER

<b>COSPAR Designator:</b>	<b>International</b>	2018-111P
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>	Spire Global Luxembourg S.à r.l.	
<b>Launch Date and Time:</b>	27/12/2018	
<b>Launch Location:</b>	Vostochny Cosmodrome,	Russian Federation
<b>Launch Vehicle Name:</b>	Soyuz 2.1 a	
<b>Nodal Period:</b>	96.2 minutes	
<b>Inclination:</b>	97.72 degrees	
<b>Apogee:</b>	584 kilometers	
<b>Perigee:</b>	584 kilometers	
<b>Longitude of the Ascending Node:</b>	139.3 degrees	
<b>General Function of Object:</b>	Earth exploration and meteorology (AIS, ADS-B, GNSS-RO/R)	
<b>Entry Date into National Registry:</b>	02/03/2021 <sup>i</sup>	

## FM99, LEMUR 2 JOHANLORAN

**COSPAR International** 2019-018G

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à r.l.

**Launch Date and Time:** 01/04/2019

**Launch Location:** Sriharikota, Andhra Pradesh, India

**Launch Vehicle Name:** PSLV

**Nodal Period:** 94.6 minutes

**Inclination:** 97.4 degrees

**Apogee:** 512.4 kilometers

**Perigee:** 495.8 kilometers

**Longitude of the Ascending Node:** 140.7 degrees

**General Function of Object:** Earth exploration and meteorology (AIS, ADS-B, GNSS-RO/R)

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## FM100, LEMUR 2 BEAUDACIOUS

<b>COSPAR Designator:</b>	<b>International</b>	2019-018H
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>		Spire Global Luxembourg S.à r.l.
<b>Launch Date and Time:</b>		01/04/2019
<b>Launch Location:</b>		Sriharikota, Andhra Pradesh, India
<b>Launch Vehicle Name:</b>		PSLV
<b>Nodal Period:</b>		94.6 minutes
<b>Inclination:</b>		97.4 degrees
<b>Apogee:</b>		513.1 kilometers
<b>Perigee:</b>		496.1 kilometers
<b>Longitude of the Ascending Node:</b>		140.7 degrees
<b>General Function of Object:</b>		Earth exploration and meteorology (AIS, ADS-B, GNSS-RO/R)
<b>Entry Date into National Registry:</b>		02/03/2021 <sup>i</sup>

## FM101, LEMUR 2 ELHAM

**COSPAR International** 2019-018J

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à r.l.

**Launch Date and Time:** 01/04/2019

**Launch Location:** Sriharikota, Andhra Pradesh, India

**Launch Vehicle Name:** PSLV

**Nodal Period:** 94.5 minutes

**Inclination:** 97.4 degrees

**Apogee:** 511.8 kilometers

**Perigee:** 495.1 kilometers

**Longitude of the Ascending Node:** 140.7 degrees

**General Function of Object:** Earth exploration and meteorology (AIS, ADS-B, GNSS-RO/R)

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## FM102, LEMUR 2 VICTOR-ANDREW

<b>COSPAR Designator:</b>	<b>International</b>	2019-018K
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>		Spire Global Luxembourg S.à r.l.
<b>Launch Date and Time:</b>		01/04/2019
<b>Launch Location:</b>		Sriharikota, Andhra Pradesh, India
<b>Launch Vehicle Name:</b>		PSLV
<b>Nodal Period:</b>		94.5 minutes
<b>Inclination:</b>		97.4 degrees
<b>Apogee:</b>		511.6 kilometers
<b>Perigee:</b>		495.1 kilometers
<b>Longitude of the Ascending Node:</b>		140.7 degrees
<b>General Function of Object:</b>		Earth exploration and meteorology (AIS, ADS-B, GNSS-RO/R)
<b>Entry Date into National Registry:</b>		02/03/2021 <sup>i</sup>

## FM144, LEMUR 2 SUSURRUS

**COSPAR International** 2020-068S

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à r.l.

**Launch Date and Time:** 28/09/2020

**Launch Location:** Plesetsk, Russian Federation

**Launch Vehicle Name:** Soyuz-2.1 b/Fregat

**Nodal Period:** 96.0 minutes

**Inclination:** 97.66 degrees

**Apogee:** 575 kilometers

**Perigee:** 475 kilometers

**Longitude of the Ascending Node:** 28.38 degrees

**General Function of Object:** Earth exploration and meteorology, Inter-Satellite Link experimentation

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## FM145, LEMUR 2 SLICERS

**COSPAR International** 2020-068Q

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à r.l.

**Launch Date and Time:** 28/09/2020

**Launch Location:** Plesetsk, Russian Federation

**Launch Vehicle Name:** Soyuz-2.1 b/Fregat

**Nodal Period:** 96.0 minutes

**Inclination:** 97.66 degrees

**Apogee:** 575 kilometers

**Perigee:** 475 kilometers

**Longitude of the Ascending Node:** 28.38 degrees

**General Function of Object:** Earth exploration and meteorology, Inter-Satellite Link experimentation

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>



## FM137, LEMUR 2 BAXTER-OLIVER, LEMUR 2 V4.7

<b>COSPAR International Designator:</b>	1998-067RV
<b>National Designation No.:</b>	/
<b>Owner / Operator Name:</b>	Spire Global Luxembourg S.à r.l.
<b>Launch Date and Time:</b>	03/10/2020
<b>Launch Location:</b>	Wallops, Virginia, United States
<b>Launch Vehicle Name:</b>	Antares
<b>Nodal Period:</b>	93.1 minutes
<b>Inclination:</b>	51.6 degrees
<b>Apogee:</b>	421 kilometers
<b>Perigee:</b>	409 kilometers
<b>Longitude of the Ascending Node:</b>	8.25 degrees (RAAN, M50)
<b>General Function of Object:</b>	Earth exploration and meteorology, Inter-Satellite Link experimentation
<b>Additional Information:</b>	The satellite was deployed from the International Space Station (ISS) on 05/11/2020
<b>Entry Date into National Registry:</b>	02/03/2021 <sup>i</sup>

# **Annex 1: FM137, LEMUR 2 BAXTER-OLIVER, LEMUR 2 V4.7**

<b>Date of Decommissioning:</b>	19/12/2021
<b>Additional Information:</b>	The satellite re-entered Earth's atmosphere on 19/12/2021, burning up completely with no material reaching the Earth's surface.
<b>Entry Date into National Registry:</b>	01/02/2022

## FM142, LEMUR 2 DJARA, LEMUR 2 V4.8

<b>COSPAR Designator:</b>	<b>International</b>	1998-067RW
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>		Spire Global Luxembourg S.à r.l.
<b>Launch Date and Time:</b>		03/10/2020
<b>Launch Location:</b>		Wallops, Virginia, United States
<b>Launch Vehicle Name:</b>		Antares
<b>Nodal Period:</b>		93.1 minutes
<b>Inclination:</b>		51.6 degrees
<b>Apogee:</b>		421 kilometers
<b>Perigee:</b>		409 kilometers
<b>Longitude of the Ascending Node:</b>		8.57 degrees (RAAN, M50)
<b>General Function of Object:</b>		Earth exploration and meteorology (AIS, ADS-B, GNSS-RO/R)
<b>Additional Information:</b>		The satellite was deployed from the International Space Station (ISS) on 05/11/2020
<b>Entry Date into National Registry:</b>		02/03/2021 <sup>i</sup>

## **Annex 1: FM142, LEMUR 2 DJARA, LEMUR 2 V4.8**

**Date of Decommissioning:**

03/01/2022

**Additional Information:**

The satellite re-entered Earth's atmosphere on 03/01/2022, burning up completely with no material reaching the Earth's surface.

**Entry Date into National Registry:**

01/02/2022

## KSM1-A

**COSPAR International** 2020-081H  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** Kleos Space S.A.  
**Launch Date and Time:** 07/11/2020  
**Launch Location:** Sriharikota, Andhra Pradesh, India  
**Launch Vehicle Name:** PSLV C49

**Nodal Period:** 96 minutes  
**Inclination:** 37 degrees  
**Apogee:** 576.60 kilometers  
**Perigee:** 569.97 kilometers  
**Longitude of the Ascending Node:** 99.44 degrees (RAAN)

**General Function of Object:** Passive geolocation of radio transmissions for the purpose of supplying Radio Frequency (RF) reconnaissance data to the maritime situation awareness domain

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## **Annex 1: KSM1-A**

### **New Basic Orbital Parameters**

#### **Additional Information:**

The satellite finished Launch and Early Orbit Phase (LEOP) and has new basic orbital parameters

**Inclination:**

36.9 degrees

**Apogee:**

577 kilometers

**Perigee:**

572.6 kilometers

**Entry Date into National  
Registry:**

23/09/2021

## Annex 2: KSM1-A

<b>Date when no longer functional:</b>	27/06/2023
<b>Date of Reentry:</b>	Predicted 07/02/2035
<b>Additional Information:</b>	The predicted orbit decay indicates that the spacecraft will re-enter the Earth atmosphere on the 07/02/2035
<b>Entry Date into National Registry:</b>	31/07/2023

## KSM1-B

<b>COSPAR Designator:</b>	<b>International</b>	2020-081K
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>		Kleos Space S.A.
<b>Launch Date and Time:</b>		07/11/2020
<b>Launch Location:</b>		Sriharikota, Andhra Pradesh, India
<b>Launch Vehicle Name:</b>		PSLV C49
<b>Nodal Period:</b>		96 minutes
<b>Inclination:</b>		37 degrees
<b>Apogee:</b>		576.60 kilometers
<b>Perigee:</b>		569.97 kilometers
<b>Longitude of the Ascending Node:</b>		99.44 degrees (RAAN)
<b>General Function of Object:</b>		Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain
<b>Entry Date into National Registry:</b>		02/03/2021 <sup>i</sup>



## **Annex 1: KSM1-B**

### **New Basic Orbital Parameters**

#### **Additional Information:**

The satellite finished Launch and Early Orbit Phase (LEOP) and has new basic orbital parameters.

**Inclination:** 36.9 degrees

**Apogee:** 581.3 kilometers

**Perigee:** 568.3 kilometers

**Entry Date into National Registry:**

23/09/2021

## Annex 2: KSM1-B

<b>Date when no longer functional:</b>	27/06/2023
<b>Date of Reentry:</b>	Predicted 08/04/2035
<b>Additional Information:</b>	The predicted orbit decay indicates that the spacecraft will re-enter the Earth atmosphere on the 08/04/2035
<b>Entry Date into National Registry:</b>	31/07/2023

## KSM1-C

**COSPAR International** 2020-081C

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Kleos Space S.A.

**Launch Date and Time:** 07/11/2020

**Launch Location:** Sriharikota, Andhra Pradesh, India

**Launch Vehicle Name:** PSLV C49

**Nodal Period:** 96 minutes

**Inclination:** 37 degrees

**Apogee:** 576.60 kilometers

**Perigee:** 569.97 kilometers

**Longitude of the Ascending Node:** 99.44 degrees (RAAN)

**General Function of Object:** Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain

**Entry Date into National Registry:** 02/03/2021<sup>i</sup>

## **Annex 1: KSM1-C**

**New COSPAR International Designator:** 2020-081B

**New Basic Orbital Parameters Additional Information:**

The satellite finished Launch and Early Orbit Phase (LEOP) and has new basic orbital parameters.

**Inclination:** 36.9 degrees

**Apogee:** 578.8 kilometers

**Perigee:** 570.7 kilometers

**Entry Date into National Registry:** 23/09/2021

## Annex 2: KSM1-C

<b>Date when no longer functional:</b>	27/06/2023
<b>Date of Reentry:</b>	Predicted 29/08/2035
<b>Additional Information:</b>	The predicted orbit decay indicates that the spacecraft will re-enter the Earth atmosphere on the 29/08/2035
<b>Entry Date into National Registry:</b>	31/07/2023

## KSM1-D

<b>COSPAR Designator:</b>	<b>International</b>	2020-081B
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>		Kleos Space S.A.
<b>Launch Date and Time:</b>		07/11/2020
<b>Launch Location:</b>		Sriharikota, Andhra Pradesh, India
<b>Launch Vehicle Name:</b>		PSLV C49
<b>Nodal Period:</b>		96 minutes
<b>Inclination:</b>		37 degrees
<b>Apogee:</b>		576.60 kilometers
<b>Perigee:</b>		569.97 kilometers
<b>Longitude of the Ascending Node:</b>		99.44 degrees (RAAN)
<b>General Function of Object:</b>		Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain
<b>Entry Date into National Registry:</b>		02/03/2021 <sup>i</sup>

## Annex 1: KSM1-D

**New COSPAR International Designator:** 2020-081C

**New Basic Orbital Parameters Additional Information:**

The satellite finished Launch and Early Orbit Phase (LEOP) and has new basic orbital parameters.

**Inclination:** 36.9 degrees

**Apogee:** 579.8 kilometers

**Perigee:** 569.9 kilometers

**Entry Date into National Registry:** 23/09/2021

## Annex 2: KSM1-D

<b>Date when no longer functional:</b>	27/06/2023
<b>Date of Reentry:</b>	Predicted 15/03/2035
<b>Additional Information:</b>	The predicted orbit decay indicates that the spacecraft will re-enter the Earth atmosphere on the 15/03/2035
<b>Entry Date into National Registry:</b>	31/07/2023



## FM136, LEMUR-2 NEVA

**COSPAR International** 2021-006AP  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.  
**Launch Date and Time:** 24/01/2021  
**Launch Location:** Cape Canaveral, United States  
**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.2 minutes  
**Inclination:** 97.5 degrees  
**Apogee:** 525 kilometers  
**Perigee:** 528 kilometers

**General Function of Object:** Earth exploration and meteorology, Inter-Satellite Link experimentation

**Entry Date into National Registry:** 03/03/2021

## FM139, LEMUR-2 JACKSON

**COSPAR International** 2021-059G

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 30/06/2021, 19:31:00

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.2 minutes

**Inclination:** 97.5 degrees

**Apogee:** 543.8 kilometers

**Perigee:** 531 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 30/08/2021

## FM140, LEMUR-2 ANNABANANA

**COSPAR International** 2021-059AW

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 30/06/2021, 19:31:00

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.2 minutes

**Inclination:** 97.5 degrees

**Apogee:** 543.7 kilometers

**Perigee:** 525.3 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National** 30/08/2021

**Registry:**

## FM143, LEMUR-2 JOHN-TREIRES

**COSPAR International** 2021-059AY

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 30/06/2021, 19:31:00

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.2 minutes

**Inclination:** 97.5 degrees

**Apogee:** 544.3 kilometers

**Perigee:** 522.2 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 30/08/2021

## FM148, LEMUR-2 AC-CUBED

<b>COSPAR Designator:</b>	<b>International</b>	2021-059BA
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>		Spire Global Luxembourg S.à. r.l.
<b>Launch Date and Time:</b>		30/06/2021, 19:31:00
<b>Launch Location:</b>		Cape Canaveral, United States
<b>Launch Vehicle Name:</b>		SpaceX Falcon 9
<b>Nodal Period:</b>		95.1 minutes
<b>Inclination:</b>		97.5 degrees
<b>Apogee:</b>		545.1 kilometers
<b>Perigee:</b>		519.9 kilometers
<b>General Function of Object:</b>		Earth exploration and meteorology
<b>Entry Date into National Registry:</b>		30/08/2021

## FM150, LEMUR-2 CARLSANTAMARI

**COSPAR International** 2021-059CJ

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 30/06/2021, 19:31:00

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.1 minutes

**Inclination:** 97.5 degrees

**Apogee:** 543.4 kilometers

**Perigee:** 519.2 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 30/08/2021

## FM151, LEMUR-2 KRYWE

**COSPAR International** 2022-003F

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:**

Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:**

13/01/2022

**Launch Location:**

Mojave Air and Space Port, United States

**Launch Vehicle Name:**

Virgin Orbit LauncherOne

**Nodal Period:**

95.22 minutes

**Inclination:**

45 degrees

**Apogee:**

500 kilometers

**Perigee:**

500 kilometers

**General Function of Object:**

Earth exploration and meteorology

**Entry Date into National Registry:**

08/02/2022

## FM141, LEMUR-2 KING-JULIEN

**COSPAR International** 2022-002AQ

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 13/01/2022

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.22 minutes

**Inclination:** 97.5 degrees

**Apogee:** 525 kilometers

**Perigee:** 525 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 08/02/2022



## FM149, LEMUR-2 RAMONAMAE

**COSPAR International** 2022-002AP

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 13/01/2022

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.23 minutes

**Inclination:** 97.5 degrees

**Apogee:** 525 kilometers

**Perigee:** 525 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 08/02/2022

## FM152, LEMUR-2 MIRIWARI

**COSPAR International** 2022-002BY

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 13/01/2022

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.23 minutes

**Inclination:** 97.5 degrees

**Apogee:** 525 kilometers

**Perigee:** 525 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 08/02/2022

## FM153, LEMUR-2 DJIRANG

**COSPAR International** 2022-002CC

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 13/01/2022

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.23 minutes

**Inclination:** 97.5 degrees

**Apogee:** 525 kilometers

**Perigee:** 525 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 08/02/2022

## FM154, LEMUR-2 ROHOVITHSA

**COSPAR International** 2022-002BE

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 13/01/2022

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 94.52 minutes

**Inclination:** 97.5 degrees

**Apogee:** 525 kilometers

**Perigee:** 525 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 08/02/2022

## SES-17

**COSPAR International** 2021-095A  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** SES ASTRA S.A.  
**Launch Date and Time:** 24/10/2021  
**Launch Location:** Kourou, French Guiana  
**Launch Vehicle Name:** Ariane 5

**Nodal Period:** 1,435.8-1,436.4 minutes  
**Inclination:** 0.10 degrees  
**Apogee:** 35,820 kilometers  
**Perigee:** 35,752 kilometers  
**Geostationary Position:** 292.9 degrees East

**General Function of Object:** Encrypted and unencrypted transmission of radio, television, multimedia data, VSAT and broadband services

**Entry Date into National Registry:** 05/05/2022

## FM162, LEMUR-2 TENNYSONLILY

**COSPAR International** 2022-057A

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 25/05/2022

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.26 minutes

**Inclination:** 97.5 degrees

**Apogee:** 538 kilometers

**Perigee:** 524 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 27/06/2022

## FM155, LEMUR-2 VANDENDRIES

**COSPAR International** 2022-057B

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 25/05/2022

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.25 minutes

**Inclination:** 97.5 degrees

**Apogee:** 537 kilometers

**Perigee:** 525 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 27/06/2022

## FM163, LEMUR-2 KAREN\_B

**COSPAR International** 2022-057E

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 25/05/2022

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.24 minutes

**Inclination:** 97.5 degrees

**Apogee:** 536 kilometers

**Perigee:** 524 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 27/06/2022



## FM161, LEMUR-2 HANCOM-1

**COSPAR International** 2022-057J

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 25/05/2022

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.23 minutes

**Inclination:** 97.5 degrees

**Apogee:** 538 kilometers

**Perigee:** 522 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 27/06/2022

## FM156, LEMUR-2 MIMI1307

**COSPAR International** 2022-057AP  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.  
**Launch Date and Time:** 25/05/2022  
**Launch Location:** Cape Canaveral, United States  
**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.14 minutes  
**Inclination:** 97.5 degrees  
**Apogee:** 536 kilometers  
**Perigee:** 515 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 27/06/2022

## KSF1-A

**COSPAR International** 2021-059BD

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Kleos Space S.A

**Launch Date and Time:** 30/06/2021

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 94.3 minutes

**Inclination:** 97.6 degrees

**Apogee:** 501.8 kilometers

**Perigee:** 484.2 kilometers

**General Function of Object:** Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain

**Entry Date into National Registry:** 16/02/2023

## KSF1-B

**COSPAR International** 2021-059AZ

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Kleos Space S.A

**Launch Date and Time:** 30/06/2021

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 94.3 minutes

**Inclination:** 97.6 degrees

**Apogee:** 505.1 kilometers

**Perigee:** 480.7 kilometers

**General Function of Object:** Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain

**Entry Date into National Registry:** 16/02/2023

## KSF1-C

**COSPAR International** 2021-059BR

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Kleos Space S.A

**Launch Date and Time:** 30/06/2021

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 94.5 minutes

**Inclination:** 97.6 degrees

**Apogee:** 510.2 kilometers

**Perigee:** 490.3 kilometers

**General Function of Object:** Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain

**Entry Date into National Registry:** 16/02/2023

## KSF1-D

**COSPAR International** 2021-059BZ

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Kleos Space S.A.

**Launch Date and Time:** 30/06/2021

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 94.2 minutes

**Inclination:** 97.6 degrees

**Apogee:** 501.6 kilometers

**Perigee:** 473.7 kilometers

**General Function of Object:** Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain

**Entry Date into National Registry:** 16/02/2023

## KSF2-A

<b>COSPAR</b>	<b>International</b>	2022-033AP
<b>Designator:</b>		
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>		Kleos Space S.A.
<b>Launch Date and Time:</b>		01/04/2022
<b>Launch Location:</b>		Cape Canaveral, United States
<b>Launch Vehicle Name:</b>		SpaceX Falcon 9
<b>Nodal Period:</b>		94.2 minutes
<b>Inclination:</b>		97.4 degrees
<b>Apogee:</b>		494.5 kilometers
<b>Perigee:</b>		480.2 kilometers
<b>General Function of Object:</b>		Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain
<b>Entry Date into National Registry:</b>		16/02/2023

## KSF2-B

**COSPAR International** 2022-033AN

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Kleos Space S.A

**Launch Date and Time:** 01/04/2022

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 94.2 minutes

**Inclination:** 97.4 degrees

**Apogee:** 496.4 kilometers

**Perigee:** 481.8 kilometers

**General Function of Object:** Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain

**Entry Date into National Registry:** 16/02/2023



## KSF2-C

**COSPAR International** 2022-033AJ

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Kleos Space S.A

**Launch Date and Time:** 01/04/2022

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 94.2 minutes

**Inclination:** 97.4 degrees

**Apogee:** 491.3 kilometers

**Perigee:** 479.8 kilometers

**General Function of Object:** Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain

**Entry Date into National Registry:** 16/02/2023

## KSF2-D

**COSPAR International** 2022-033AK

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Kleos Space S.A

**Launch Date and Time:** 01/04/2022

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 94.1 minutes

**Inclination:** 97.4 degrees

**Apogee:** 486.7 kilometers

**Perigee:** 475.1 kilometers

**General Function of Object:** Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain

**Entry Date into National Registry:** 16/02/2023

## FM164, LEMUR-2 EMMACULATE

<b>COSPAR</b>	<b>International</b>	2023-001AE
<b>Designator:</b>		
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>		Spire Global Luxembourg S.à. r.l.
<b>Launch Date and Time:</b>		03/01/2023
<b>Launch Location:</b>		Cape Canaveral, United States
<b>Launch Vehicle Name:</b>		SpaceX Falcon 9
<b>Nodal Period:</b>		95.10 minutes
<b>Inclination:</b>		97.5 degrees
<b>Apogee:</b>		541.5 kilometers
<b>Perigee:</b>		518 kilometers
<b>General Function of Object:</b>		Earth exploration and meteorology
<b>Entry Date into National Registry:</b>		16/02/2023

## FM165, LEMUR-2 DISCLAIMER

**COSPAR International** 2023-001F

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 03/01/2023

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.19 minutes

**Inclination:** 97.5 degrees

**Apogee:** 542.8 kilometers

**Perigee:** 525.7 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National** 16/02/2023

**Registry:**

# FM166, LEMUR-2 PHILARI

**COSPAR International** 2023-001E  
**Designator:**  
**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.  
**Launch Date and Time:** 03/01/2023  
**Launch Location:** Cape Canaveral, United States  
**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.19 minutes  
**Inclination:** 97.5 degrees  
**Apogee:** 542.4 kilometers  
**Perigee:** 526.8 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National Registry:** 16/02/2023

## FM167, LEMUR-2 MMOLO

**COSPAR International** 2023-001AF

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 03/01/2023

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.10 minutes

**Inclination:** 97.5 degrees

**Apogee:** 541.8 kilometers

**Perigee:** 517.4 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National** 16/02/2023

**Registry:**

## FM168, LEMUR-2 STEVEALBERS

**COSPAR International** 2023-001J

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 03/01/2023

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.19 minutes

**Inclination:** 97.5 degrees

**Apogee:** 542.7 kilometers

**Perigee:** 526.3 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National** 16/02/2023

**Registry:**

## FM169, LEMUR-2 FUENTETAJA-01

**COSPAR International** 2023-001CH

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Spire Global Luxembourg S.à. r.l.

**Launch Date and Time:** 03/01/2023

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95.11 minutes

**Inclination:** 97.5 degrees

**Apogee:** 542.4 kilometers

**Perigee:** 518.4 kilometers

**General Function of Object:** Earth exploration and meteorology

**Entry Date into National** 16/02/2023

**Registry:**



## KSF3-A

**COSPAR International** 2023-001CF

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Kleos Space S.A

**Launch Date and Time:** 03/01/2023

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 94.9 minutes

**Inclination:** 97.5 degrees

**Apogee:** 532.4 kilometers

**Perigee:** 509.3 kilometers

**General Function of Object:** Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain

**Entry Date into National Registry:** 22/05/2023

## KSF3-B

**COSPAR International** 2023-001L

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Kleos Space S.A

**Launch Date and Time:** 03/01/2023

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 94.9 minutes

**Inclination:** 97.5 degrees

**Apogee:** 531.4 kilometers

**Perigee:** 514.4 kilometers

**General Function of Object:** Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain

**Entry Date into National Registry:** 22/05/2023

## KSF3-C

**COSPAR International** 2023-001K

**Designator:**

**National Designation No.:** /

**Owner / Operator Name:** Kleos Space S.A

**Launch Date and Time:** 03/01/2023

**Launch Location:** Cape Canaveral, United States

**Launch Vehicle Name:** SpaceX Falcon 9

**Nodal Period:** 95 minutes

**Inclination:** 97.5 degrees

**Apogee:** 532.4 kilometers

**Perigee:** 516.1 kilometers

**General Function of Object:** Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain

**Entry Date into National Registry:** 22/05/2023

## KSF3-D

<b>COSPAR</b>	<b>International</b>	2023-001CE
<b>Designator:</b>		
<b>National Designation No.:</b>		/
<b>Owner / Operator Name:</b>		Kleos Space S.A
<b>Launch Date and Time:</b>		03/01/2023
<b>Launch Location:</b>		Cape Canaveral, United States
<b>Launch Vehicle Name:</b>		SpaceX Falcon 9
<b>Nodal Period:</b>		94.9 minutes
<b>Inclination:</b>		97.5 degrees
<b>Apogee:</b>		532.7 kilometers
<b>Perigee:</b>		508.9 kilometers
<b>General Function of Object:</b>		Passive geolocation of radio transmissions for the purpose of supplying RF reconnaissance data to the maritime situation awareness domain
<b>Entry Date into National Registry:</b>		22/05/2023

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<sup>i</sup> This is a formal date of the entry into the National Registry created following Article 15 of the Law on Space Activities. The information was already furnished by Luxembourg to UNOOSA in conformity with General Assembly resolution 1721 B (XVI)