

OCTOBER 2023  
PRESS KIT  
VV23



# MISSION DESCRIPTION

Arianespace's **third launch of 2023** with the first Vega of the year will place its passengers into Sun-synchronous orbit. The launcher will be carrying a total payload of approximately **1 241.7 kg**.

The launch will be performed from **Kourou, French Guiana**.

## DATE AND TIME

Liftoff is planned on **6 October, 2023**, at exactly:

- 09:36 p.m. Washington, D.C. time,
- 10:36 p.m. Kourou time,
- 01:36 a.m. Universal time (UTC), October 7,
- 03:36 a.m. Paris time, October 7,
- 10:36 a.m. Tokyo time, October 7.



## MISSION DURATION

The nominal duration of the mission (from liftoff to separation of the satellites) is:  
**1 hour, 45 minutes and 58 seconds.**



## SATELLITES

### THEOS-2

Operator: Geo-Informatics and Space Technology Development Agency of Thailand (GISTDA)



### FORMOSAT-7R/TRITON

Operator: Taiwan Space Agency (TASA)



Auxiliary payloads: ANSER LEADER, ANSER FOLLOWER 1 & 2, CN3SS, CSC-1 & 2, ESTCUBE-2, MACSAT, PRETTY, PVCC.



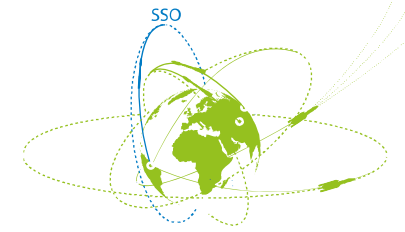
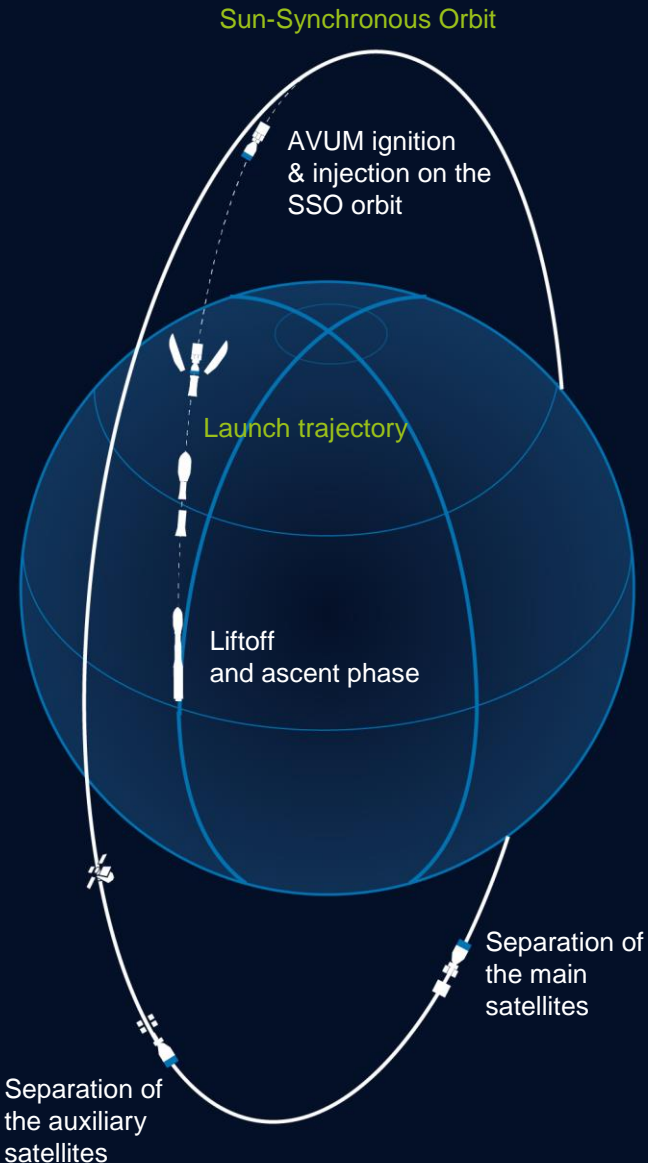
## TARGETED ORBIT

THEOS-2 & FORMOSAT-7R/TRITON

- Perigee altitude: 617 km
- Apogee altitude: 600 km
- Inclination: 97.9 degrees



## VEGA STANDARD SUN-SYNCHRONOUS ORBIT



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## PRESS CONTACTS

Damien ALBESSARD

[d.albessard@arianespace.com](mailto:d.albessard@arianespace.com)

+33 (0)6 71 98 41 96

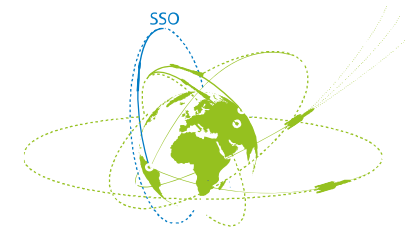
Francesco DE LORENZO

[francesco.delorenzo@avio.com](mailto:francesco.delorenzo@avio.com)

+39 (0)6 97285317

# THEOS-2

## End-to-end Geo-Information System for Thailand



### DID YOU KNOW?

As part of a whole end to end system, on Earth and in Space, THEOS-2 will be joined in orbit by its brother SmallSAT, a 100kg Earth Observation satellite built under a 4-year customer training programme by SSTL, an Airbus subsidiary in the UK.

THEOS-2 SmallSAT is a one meter resolution class Earth Observation satellite with both still and video imaging capability, an ADS-B aircraft identification payload, and an experimental payload developed by the customer.



<b>SATELLITES</b>	THEOS-2
<b>CUSTOMER</b>	Geo-Informatics and Space Technology Development Agency (GISTDA)
<b>MANUFACTURER</b>	Airbus Defence and Space
<b>MISSION</b>	Earth observation
<b>MASS AT LAUNCH</b>	417 kg
<b>PLATFORM</b>	AstroBus-S
<b>COVERAGE AREA</b>	Thailand
<b>LIFETIME</b>	10 years

**THEOS-2 (THailand Earth Observation System-2)** is a very-high-resolution Earth observation optical satellite, part of the next-generation national geo-information system provided by Airbus Defence and Space to support the Kingdom of Thailand's key development priorities. Delivering 0.5-meter ground resolution imagery, this end to end system will complement THEOS-1, launched in 2008 for Thailand, one of the few nations in the world able to fully exploit geo-information for societal benefits.

As an optical satellite system delivering 0.5-meter ground resolution imagery, THEOS-2 will secure the service continuity of THEOS-1, an Airbus-built satellite launched in 2008, which continues to deliver high-quality imagery nine years after its expected end of life. With the AstroBus-S satellite, Thailand is joining a small circle of nations with sovereign access to very high-resolution geostrategic information.

- THEOS-2 will be the 7<sup>th</sup> Thai satellite to be launched by Arianespace.
- THEOS-2 will be the 143<sup>rd</sup> Airbus Defence and Space satellite to be launched by Arianespace.



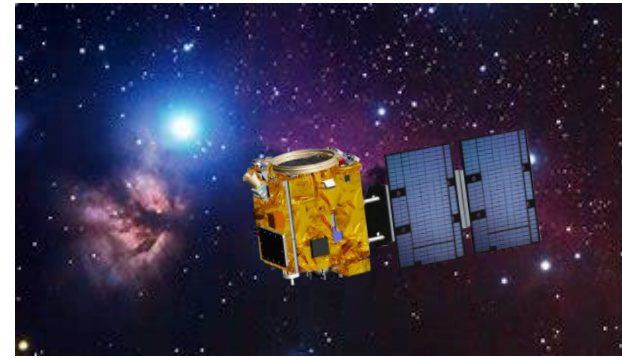


# FORMOSAT-7R/TRITON

## The Wind Hunter: Paving New Paths in Typhoon Forecasting

### DID YOU KNOW?

This marks Taiwan's first independently developed meteorological satellite. The satellite gathers the GNSS signals reflected by the surface of the oceans, enabling the calculation of wind speeds over it. It has the capacity to process up to 8 reflected signals per second simultaneously, generating over 70 thousand data sets daily. Following its launch, it will initially concentrate its signal collection efforts on the low-latitude regions of the Pacific Ocean, Atlantic Ocean, and Indian Ocean.



**FORMOSAT-7R/TRITON** is equipped with the Global Navigation Satellite System-Reflectometry (GNSS-R), which collects signals that bounce off the sea surface. It helps scientists calculate the wind field over the oceans. This data will be shared with Taiwan's Central Weather Administration, contributing to the forecast of typhoon intensity and trajectory. Meteorological data often lacks sufficient information about oceanic wind fields. Conventionally, weather satellites rely on scatterometers to gauge wind field over the oceans. However, it is susceptible to cloud and rain, leading to data gaps in areas of high wind speeds. Using GNSS-R as an observation method is less affected by clouds and rain, allowing for a broader range of observable wind speeds. We can theoretically observe wind speeds ranging from 3m/s to 70m/s.

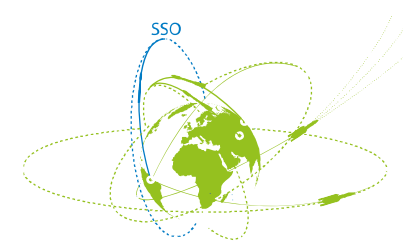
Triton will orbit the Earth at an altitude of approximately 600 km and capture signals from GPS and QZSS that reflected by the sea surface. This valuable data source will enhance severe weather forecasts and facilitate the study of sea-air interaction. It is called Triton in English, named after the son of the sea god Poseidon in Greek mythology. Triton had the power to control waves and winds. The satellite goes by the name "Wind Hunter" in Chinese, symbolizing the ambitious goals of the mission.

TASA have conducted five satellite programs. In 2023, the government officially renamed the National Space Organization (NSPO) as the Taiwan Space Agency (TASA) after 32 years of operation. With the new capacity, there is a prevailing anticipation for a broader spectrum of space missions in the future!

- **FORMOSAT-7R/TRITON** will be the 1<sup>st</sup> mission to be launched by Arianespace for TASA.

<b>SATELLITES</b>	FORMOSAT-7R/TRITON
<b>CUSTOMER</b>	Taiwan Space Agency (TASA)
<b>MANUFACTURER</b>	Taiwan Space Agency (TASA)
<b>MISSION</b>	Meteorology
<b>MASS AT LAUNCH</b>	241 kg
<b>PLATFORM</b>	Specific
<b>COVERAGE AREA</b>	Worldwide
<b>LIFETIME</b>	5 years

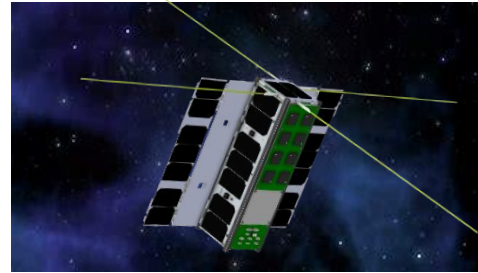
# AUXILIARY PAYLOADS



## DID YOU KNOW?

In order to address the needs of a growing number of smallsats projects, Arianespace is now offering a tailored, standardized launch service for smallsats and cubesats, with regular rideshare missions on Vega and Vega-C, in addition to some piggyback opportunities. A first "Proof of Concept" rideshare mission on Vega successfully took place on 02 September 2020 with a total of 53 smallsats/cubesats. Vega also orbited six smallsats earlier this year on 28 April 2021.

Funded by the European Space Agency (ESA), Arianespace's Small Spacecraft Mission Service (SSMS) will soon be joined by the Multiple Launch Service (MLS), a similar offering that uses the Ariane 6 launch vehicle. With these two services, Arianespace can offer a wide range of competitive launches solutions.



PRETTY on behalf of SAB-LS

**PRETTY** (Passive REflectTomeTry and dosimetrY) is a 3U Cubesat with two payloads:

- Primary Payload: passive reflectometer in the L5 Band (1176.45 MHz) for GPS and Galileo.
- Secondary Payload: radiation monitor for TID (Total Ionizing Dose) and SEE (Single Event Effect) measurements.

PRETTY uses the ESA OPS-SAT platform, which was first launched on Dec 18<sup>th</sup> 2019 on the Soyuz VS23 mission.

The PRETTY consortium comprises: ESA IOD (In Orbit Demonstrator), Beyond Gravity (Wien, Austria) as Prime Contractor, the Technische Universität Graz (Austria) for Satellite Bus development and AIT (based on ESA OPS-SAT satellite bus) and Seibersdorf Laboratories (Austria) for the Secondary Payload Dosimeter.

- PRETTY will be the 1<sup>st</sup> satellite to be launched by Arianespace for Graz University of Technology (as customer and manufacturer)



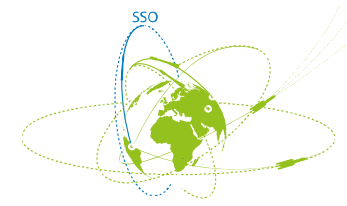
MACSAT on behalf of SAB-LS

**MACSAT** is an In-orbit demonstration (IoD) mission to demonstrate IoT communication over 5G (6U). The space segment is based on the M6P platform from NanoAvionics, who are also responsible for LEOP. Mission Ground Segment for routine operations will be located in Luxembourg.

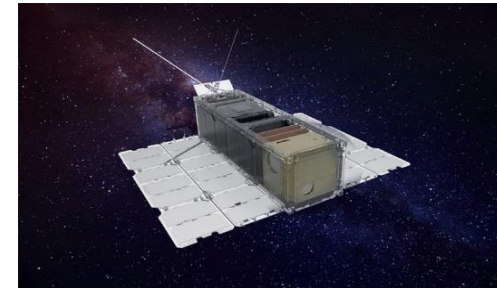
The MACSAT mission team comprises OQTech as mission prime & NanoAvionics as platform provider and integrator.

- MACSAT will be the 1<sup>st</sup> satellite to be launched by Arianespace for OQ Technology
- It will be the 2<sup>nd</sup> satellite manufactured by NanoAvionics launched by Arianespace

# AUXILIARY PAYLOADS



CSC-1 and CSC-2 on behalf of ISL



ANSER LEADER, ANSER FOLLOWER 1 & 2 on behalf of INTA

**CSC-1** is a 6UXL multi-payload IOD Cubesat, enabling operations of four payloads:

- Miniature star tracker for attitude determination provided by Solar MEMS Technologies (ES).
- High-accuracy CubeSat Attitude Determination and Control System provided by KU Leuven University (BE).
- Arc second accurate CubeSat star tracker provided by KU Leuven University (BE).
- Radiation effects during In Orbit Flight eXperiment provided by KU Leuven University (BE).

**CSC-2** is also a similar 6UXL multi-payload IOD Cubesat, enabling operations of three payloads:

- Spacepix Radiation Monitor provided by esc Aerospace s.r.o (CZ).
- In-orbit low frequency noise characterization towards the magnetic measurement system for LISA Arc second accurate CubeSat star tracker provided by Universidad de Cádiz (ES).
- Plasma Jet Pack provided by COMAT (FR).

The two cubesats comprise a single cold-gas propulsion system (IzT5) from ThrustMe, based on a solid propellant (390 g of Iodine), stored in a non-pressurized tank.

- CSC-1 and CSC-2 will be the 1<sup>st</sup> and 2<sup>nd</sup> satellites to be launched by Arianespace for ISISPACE/ISL, in the frame of the European Union IOD/IOV program.
- CSC-1 and CSC-2 will be the 2<sup>nd</sup> and 3<sup>rd</sup> satellites manufactured by ISISPACE to be launched by Arianespace.

**ANSER LEADER / ANSER FOLLOWER 1 / ANSER FOLLOWER 2** (Advanced Nanosatellite Systems for Earth observation Research) is a cluster of 3 Cubesats working together on a common Earth Observation mission with both scientific and technological objectives:

- Study and monitor the quality of inland (reservoirs) water over Iberian Peninsula.
- Develop key technologies to efficiently address Complex Space Missions based on clusters.

ANSER "Leader" is commanding the cluster and carrying a miniature panchromatic camera. ANSER "Follower1" and "Follower2" are carrying a Fragmented Cinclus hyperspectral camera (400nm-850nm).

The ANSER mission led by INTA (Instituto Nacional de Tecnica Aeroespacial) is supported by the European Union IOD/IOV program.

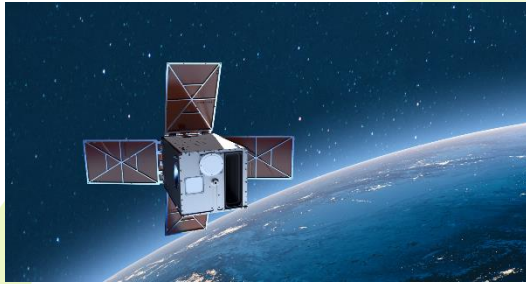
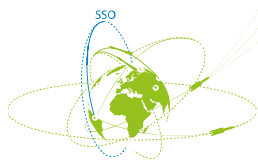
- ANSER LEADER, ANSER FOLLOWER 1 & 2 will be the 3<sup>rd</sup> to 5<sup>th</sup> satellites to be launched by Arianespace for INTA.

## DID YOU KNOW?

CSC-1, CSC-2, ESTCUBE-2, ANSER LEADER, ANSER FOLLOWER 1 and ANSER FOLLOWER 2 are part of the European Union program "*In-Orbit Demonstration and Validation*" (IOD/IOV) that aims at allowing new technologies to be tested in orbit by providing aggregation, if needed, launch services and operations.

It allows academia, research organizations, SMEs and larger industrial companies to effectively test new technologies in orbit, reducing the time it would otherwise take to bring them to market. In providing flight heritage, it provides a major boost to start-ups in the EU and accelerates their time to market.

# AUXILIARY PAYLOADS



PVCC/Tyvak on behalf of Aerospacelab & ESA

The **PVCC** (Proba-V Companion Cubesat) 12U Cubesat is an Earth Observation in orbit demonstration mission. The purpose is to test the performance of the payload on a CubeSat platform in order to provide data to support the calibration of CubeSat Earth observation missions.

The payload is the spare model of the Spectral Imagers developed for the VEGETATION instrument on PROBA-V satellite launched on VV02 in 2013. It is composed of one TMA (Three-Mirror-Anastigmat) telescope with two focal planes in SWIR (Short-Wave InfraRed) band and in VNIR (Visible and Near-InfraRed) bands.

PVCC is an ESA mission lead by ESA/TEC for the design, launch and commissioning phases and by ESA/ESRIN and ESA/REDU for the operational and end-of-life phases.

The consortium is composed by Aerospacelab (ASL) as Prime contractor, VITO as subcontractor responsible for user segment (PDGS, Payload Data Ground Segment in ESA/ESRIN) and the Swedish Space Corporation, for ground station network in X and S bands.

- PVCC will be the 1<sup>st</sup> satellite to be launched by Arianespace for Aerospacelab and the 8<sup>th</sup> satellite to be launched by Arianespace for ESA.



N3SS on behalf of CNES

The **N3SS** (Nanosat 3U pour la Surveillance du Spectre) project is a demonstration system for detecting and localize radio-frequency jammers on civil spectrum. The flight segment is based on a 3U Cubesat with strong heritage from the EyeSat platform launched on Dec 18<sup>th</sup> 2019 on the VS23 Soyuz mission. It is equipped with a miniaturized prototype payload instrument. CNES is responsible for the system and satellite development and also in charge of the in-flight operations of the satellite. U-Space is the prime contractor for the platform development and the satellite AIT/AIV.

- N3SS will be the 31<sup>st</sup> satellite to be launched by Arianespace for CNES.



ESTCUBE-2 on behalf of the University of Tartu

The **ESTCUBE-2** is a technology demonstration mission for multiple scientific payloads:

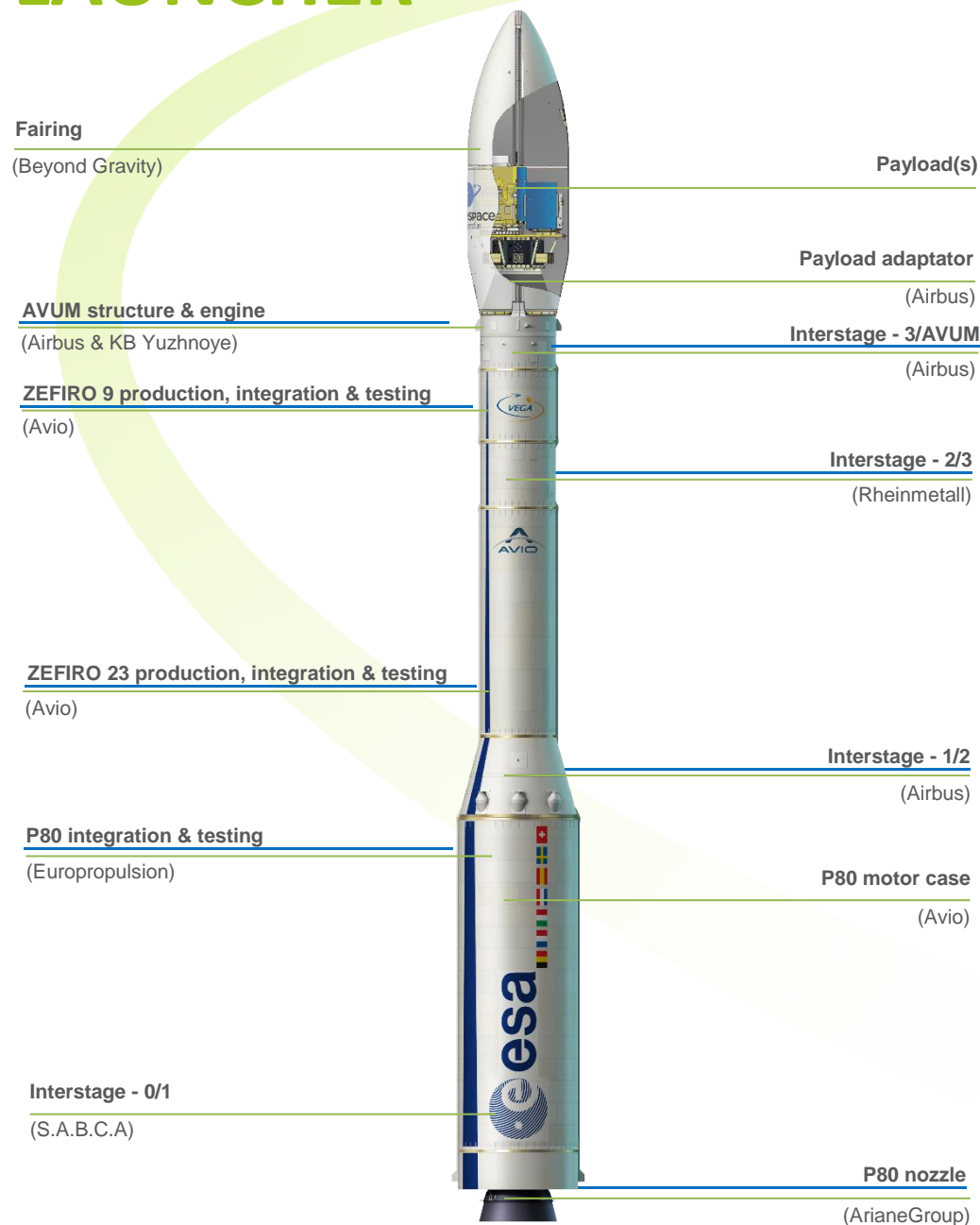
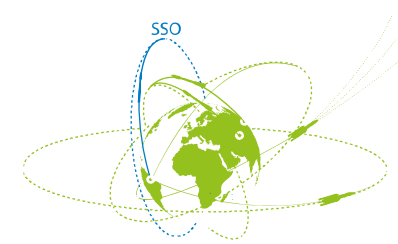
- Plasma brake / E-sail module developed by Finnish Meteorological Institute. The module will test out active fuelless satellite end-of-mission deorbiting using interaction with ionospheric plasma.
- Dual Earth Observation cameras with Sentinel-2 wavelength filters allowing to test out auxiliary NDVI (Normalized Difference Vegetation Index) data gathering capabilities with CubeSat-sized mass-producible payloads.
- Radio amateur band support with digipeater and spectral analysis services

Satellite platform also hosts cold gas propulsion, star tracker and multiple sets of reaction wheels to demonstrate the capabilities of the platform in deep space, away from Earth's magnetosphere. Satellite also hosts a number of smaller science experiments.

The ESTCUBE-2 mission is supported by the European Union IOD/IOV program.

- ESTCUBE-2 will be the 2<sup>nd</sup> satellite to be launched by Arianespace for the University of Tartu (as customer and manufacturer).

# VEGA LAUNCHER



## DID YOU KNOW ?

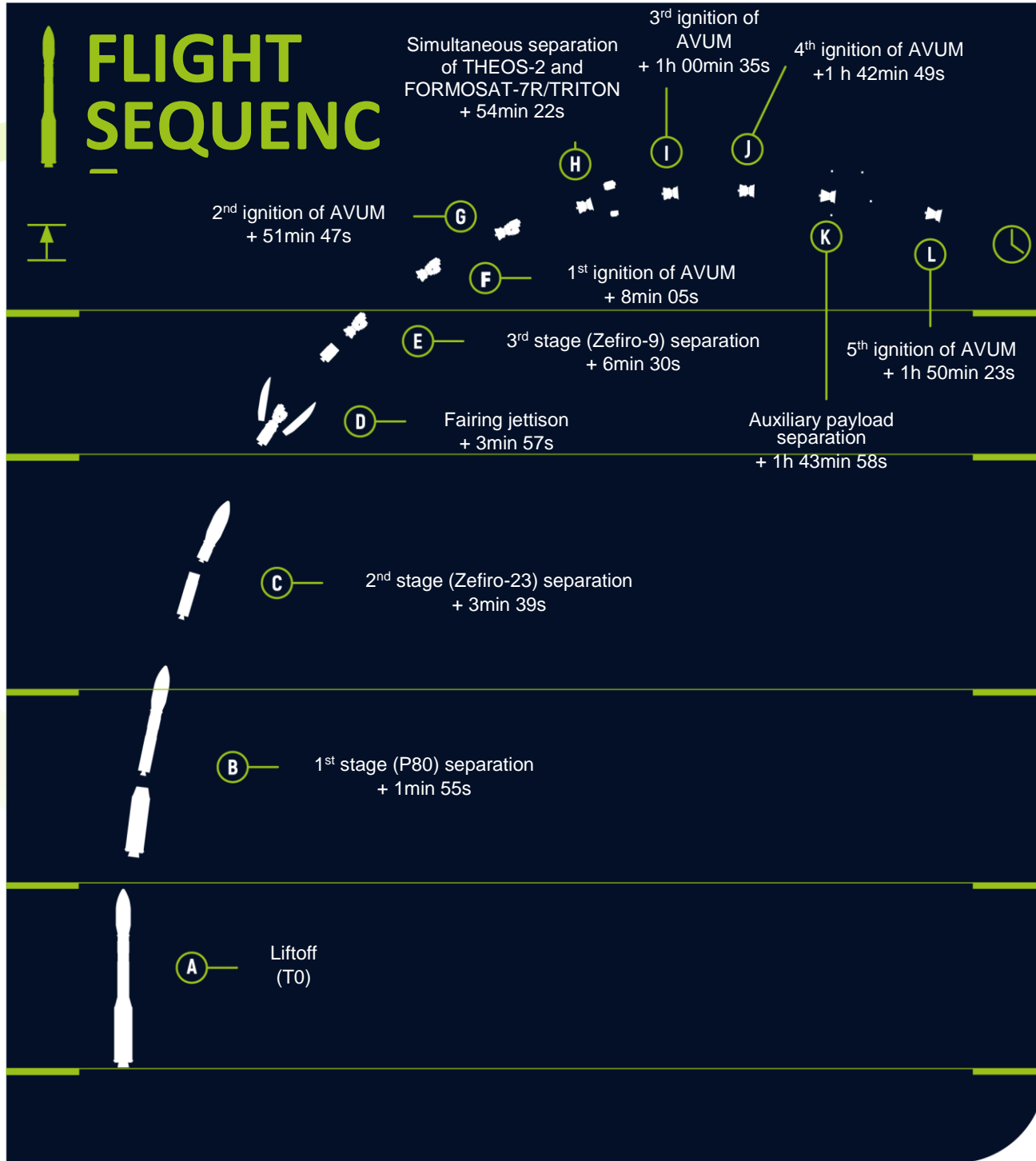
Vega is the Arianespace launch vehicle designed to send small satellites into Low Earth Orbit (LEO). It provides great flexibility of mission at an affordable cost. Together with the Ariane launcher family, it represents the European solution for space accessibility.

The rocket consists of four stages, the first three equipped with solid propellant motors and the last one using liquid propulsion. It can carry multiple payloads at a time in any orbit up to 1,500 kg on missions to a 700-km circular orbit.

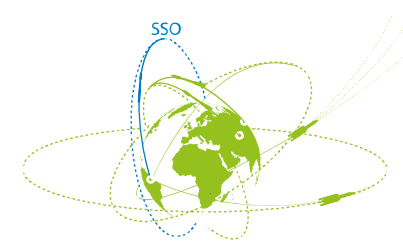
The Vega's maiden flight took place in February 2012. Following the success of this first launch, the project has grown in importance and the launcher has gained a very good track record of successful flights, putting various types of cargo into orbit, including numerous smallsats for various private, institutional and government customers.



# FLIGHT SEQUENC



# STAKEHOLDERS OF A



## ARIANESPACE

Arianespace uses Space to make life better on Earth by providing launch services for all types of satellites into all orbits, since 1980.

Arianespace is responsible for operating the new-generation Ariane 6 and Vega C launchers, developed by ESA, with respectively ArianeGroup and Avio as industrial primes. Arianespace is headquartered in Evry, near Paris, and has a technical facility at the Guiana Space Center in French Guiana, plus local offices in Washington, D.C., Tokyo and Singapore.

Arianespace is a subsidiary of ArianeGroup, which holds 74% of its share capital, with the balance held by 15 other shareholders from the Ariane and Vega European launcher industry, and ESA and CNES as sponsors.

Press contact: [d.albessard@arianespace.com](mailto:d.albessard@arianespace.com)

## AVIO

Avio is a leading international group engaged in the construction and development of space launchers and solid and liquid propulsion systems for space travel. The experience and knowhow built up over more than 50 years puts Avio at the cutting edge of the space launcher sector, solid, liquid and cryogenic propulsion and tactical propulsion. Avio operates in Italy, France and French Guiana with five facilities, employing approx. 1,000 highly-qualified personnel, of which approx. 30% involved in research and development.

Avio is a prime contractor for the Vega program and a sub-contractor for the Ariane programme, both financed by the European Space Agency, placing Italy among the limited number of countries capable of producing a complete spacecraft. Avio also manufactures the Vega C launcher and participates in the development of the Ariane 6 launcher thanks to its new solid propellant engines P120C and the Vinci and Vulcain liquid oxygen turbopumps.

Press contact: [francesco.delorenzo@avio.com](mailto:francesco.delorenzo@avio.com)

## EUROPEAN SPACE AGENCY

The European Space Agency (ESA) is an intergovernmental organization with the mission to shape the development of Europe's space capability and ensure that investment in space delivers benefits to the citizens of Europe and the world. With 22 member states, ESA coordinates the financial and intellectual resources of its members, ESA can undertake programs and activities far beyond the scope of any single European country.

ESA has established formal cooperation with the European Union (EU) on implementing the Galileo and Copernicus programs as well as with Eumetsat for the development of meteorological missions.

ESA manages Europe's space transportation programs Ariane, Vega, Space Rider and Boost!

Press contact: [media@esa.int](mailto:media@esa.int)

## CNES

French space agency CNES (Centre National d'Etudes Spatiales) defines national space policy and proposes it to public authorities. CNES oversees the application of this policy in five main areas: Ariane, science, observation, telecommunications and defense. ESA chose CNES as prime contractor for the Ariane 6 launch base in French Guiana, including the construction of a new launch pad. CNES also supports ESA, as the contracting authority, and ArianeGroup, as prime contractor for launcher development, and is responsible for applying the French law on space operations. As the owner of the Guiana Space Center (CSG), CNES has a dual mission: maintaining the operational condition of the CSG and modernizing its facilities in anticipation of the arrival of Ariane 6, Vega C and other future vehicles. At the CSG, CNES manages operations at the launch base, the reception of satellites, launch vehicle monitoring and tracking, range security and environmental protection.

Press contact: [cnes-presse@cnes.fr](mailto:cnes-presse@cnes.fr)



