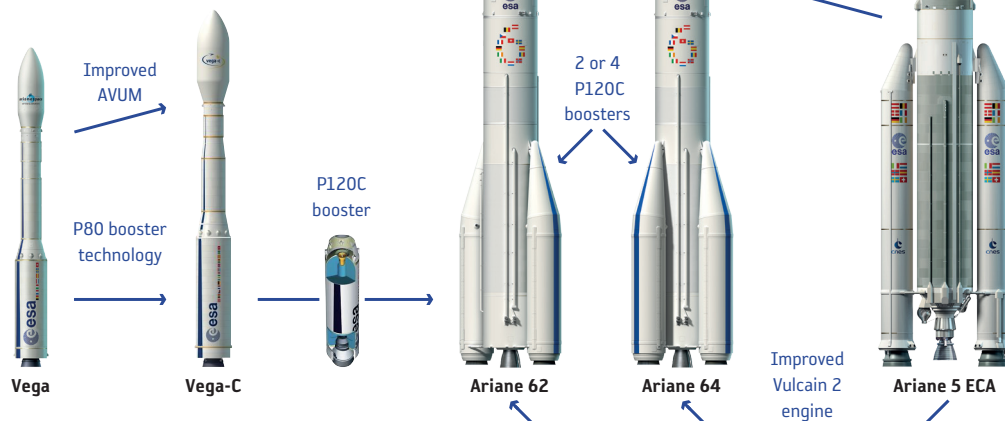


ariane 6 & vega-c

**→ NEW GENERATION OF
EUROPEAN LAUNCHERS**

ariane 6 & vega-c



Ariane 6 and Vega-C

Flexible, adaptable and competitive

A balance between our heritage and the use of new technologies

We use space-based services every day.

Global communication, broadcasting, weather forecast, Earth observation, and positioning and navigation systems all need guaranteed access to space with reliable and cost-effective launch systems. Today, Europe's access to space relies on the successful Ariane 5 and Vega launch vehicles.

To remain competitive, the European space transportation sector must evolve, innovate and adapt to market needs.

With more than 50 years of experience conceiving and implementing the most successful and inspiring space projects, ESA, its Member States and European industry in 2014 embarked on the development of Ariane 6 and Vega-C: a family of new competitive, versatile and reliable launch systems.

Ariane 6 and Vega-C are ESA programmes with the participation of 13 ESA Member States.



In line with ESA's Space 4.0 concept, the decision in December 2014 to develop Ariane 6 and Vega-C marked a fundamental and visionary change in the European launcher sector:

- A new family of launch systems able to deliver satellites into any orbit;
- A new division of responsibilities between the public and private sectors;
- Reduced costs, while maintaining Ariane 5 and Vega proven top-level reliability;
- Sharing of technology between Ariane 6 and Vega-C, particularly the P120C booster.

Vega-C is in development. The system's Preliminary Design Review is complete and the Critical Design Review is planned for the end of 2018. The maiden flight is scheduled for 2019.

Ariane 6 is also on track in its development phase. During 2016, it passed a major milestone in the Programme Implementation Review. Manufacturing of the elements to perform ground tests has started while the building of elements for the maiden flight will begin at the end of 2017. The validation phase is planned to start in October 2018, when the launch complex is built. The first flight is scheduled for 2020.

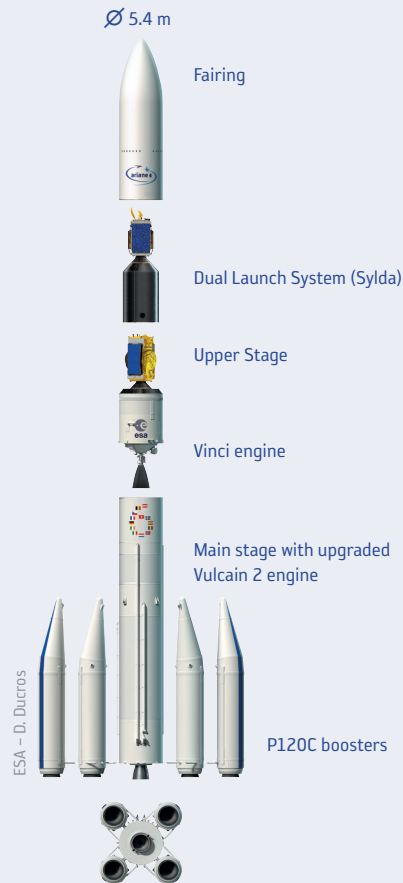
Development of P120C is under way. Its ground qualification firing tests are scheduled for 2018 for Vega-C and at the end of 2019 for Ariane 6.

ARIANE 6 LAUNCH SYSTEM

Versatility and modularity are key design features of Ariane 6. This Launch System will serve commercial and institutional markets launching to the most common orbits:

- Commercial: DTH television, Internet, telecommunications and Earth observation;
- Institutional: Earth observation and surveillance, space weather, meteorology, navigation and exploration missions.

Design-to-operations has driven the definition of an operational concept that drastically reduces launch campaign duration. Customer needs are the first priority, with special attention paid to the payload.



Ariane 6 will be available in two configurations:

Ariane 62, with two P120C boosters, optimised for a single payload launch, mostly serving institutional missions;

- Target performance is over 4.5 t to Sun-synchronous orbit at 800 km altitude;
- Liftoff total mass 530 t, total thrust 8000 kN.

Ariane 64, with four P120C boosters, enables dual launches of medium-class satellites, mainly for commercial market opportunities.

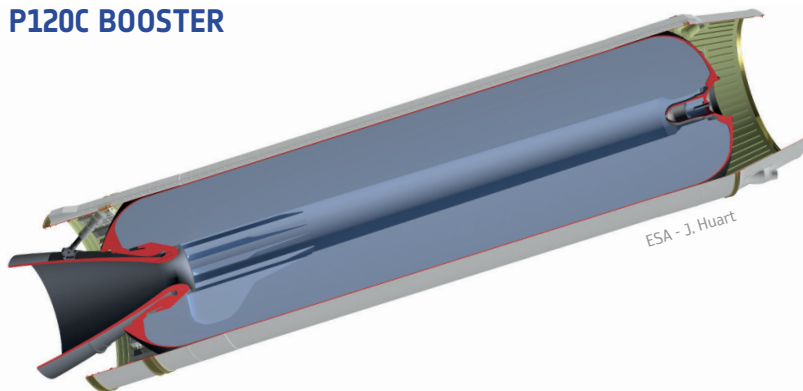
- Will lift a payload of 10.5 t into equivalent geostationary transfer orbit;
- Liftoff total mass 860 t, total thrust 15 000 kN.

Both configurations share the same central core of the main and upper stage:

- The new main stage is powered by an upgraded version of Ariane 5's Vulcain 2 engine and contains about 150 t of propellant;
- The upper stage will contain about 30 t of propellant. It is powered by the new Vinci engine, providing 180 kN thrust and multiple restart capabilities, enabling direct deorbiting features to mitigate space debris;
- Both stages will be 5.4 m in diameter and will burn liquid hydrogen and liquid oxygen.

Once assembled, the vehicle will be almost 62 m high.

P120C BOOSTER



The P120C, designed as boosters on Ariane 6 and as the first stage for Vega-C, is the largest single-unit, carbon fibre solid rocket motor ever built.

Its development relies on innovative technologies derived from the P80, Vega's current first stage motor.

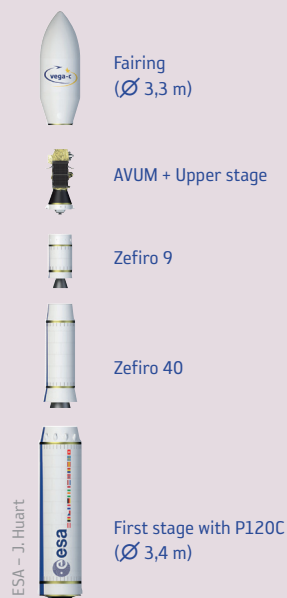
Main Characteristics

- Motor length: 13.5 m
- Diameter: 3.4 m
- Propellant mass: 141.6 t
- Motor dry mass: 11.3 t
- Motor case mass: 8.3 t
- Average thrust (vacuum): 3000 kN

VEGA-C LAUNCH VEHICLE

Vega-C is a new configuration of the Vega launch vehicle with modifications that will provide recurrent cost reduction.

Its performance will increase from Vega's current 1.5 tonnes to about 2.2 tonnes in a 700 km polar orbit, thus consolidating Vega's position in the market and responding better to commercial and institutional user's needs.



The architecture of Vega-C is based on the existing Vega and consists of four stages (three based on solid propulsion and one on liquid propulsion):

- The first stage powered by the P120C booster;
- The second stage using the new Zefiro-40 solid-propellant motor will contain about 36 t of propellant and will have an average thrust of 1100 kN;
- The Zefiro-9 third stage, currently used on Vega, burns 10 t of solid propellant;
- The AVUM+ upper stage, derived from the current Vega AVUM for orbital positioning and attitude control has a propellant mass of 0.74 t, with the main engine providing an average thrust of 2.45 kN.

Once assembled, the launch vehicle will have a total height close to 35 m and a liftoff mass of 210 t.

LAUNCH COMPLEXES

Ariane 6 and Vega-C will be launched from the Guiana Space Centre, Europe's Spaceport in Kourou, French Guiana, benefiting from the performance and flight safety provided by the location for trajectories towards the east and north.



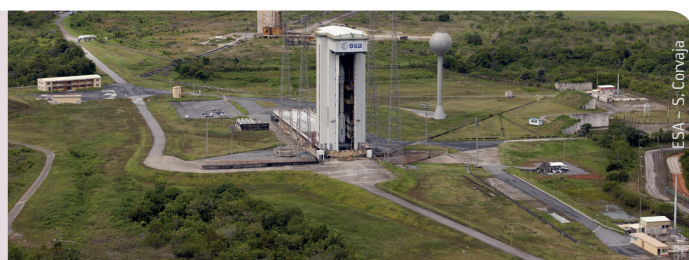
Ariane 6 launch complex

The new Ariane 6 launch complex covers 170 ha (about 255 football fields). The central core stages are integrated and prepared horizontally in the 92 000 m³ Launcher Assembly Building, 1 km from the launch zone. The central core is then moved to the pad and erected vertically in the mobile gantry.

There, the boosters, payloads and fairing are added. This 90 m-high mobile structure of 6000 t rolls on rails and is equipped with platforms to access the different levels on the pad. The gantry is moved shortly before launch.

Vega-C will be launched from the same pad already used for Vega, with the pad and infrastructure adapted to Vega-C's specific requirements.

Launcher integration and preparation will take place on the pad inside the mobile gantry. The 50 m-high gantry weighs more than 1000 t.



Vega/Vega-C launch zone

ORGANISATION

A new organisational approach has been put in place for the development and future exploitation of Ariane 6 and Vega-C:

- **ESA** is responsible for the launch system requirements of the institutional missions and for the architecture of the overall Ariane 6 and Vega-C development. During development, ESA oversees procurement of the launcher systems and launch base segments;
- **Airbus Safran Launchers** is the industrial prime contractor and design authority for the Ariane 6 Launcher System. ASL is responsible for identifying commercial market requirements, and for the launcher design, development and manufacturing and manages the industrial organisation;
- **CNES**, the French space agency, is the prime contractor for the Ariane 6 Launch Base development;
- **ELV SpA** is the industrial prime contractor and design authority for the Vega-C launch vehicle, is responsible for the launcher design, development and manufacturing and manages the relevant industrial organisation;
- **Europropulsion** is the industrial prime contractor for the development of the P120C booster;
- **Arianespace** is the Launch Service Provider, responsible for operating and commercialising both systems.

Kourou (Lower Right) and the Guiana Space Center

Ariane 6 and Vega C: European agencies and private industries working together as one team.

Different cultures and backgrounds with a common goal: guaranteeing Europe's access to space

For more information:

✉ contactesa@esa.int

🌐 esa.int

🐦 [@esa](https://twitter.com/esa)

📺 See Ariane 6 in action by scanning this QR code

