

Press release

Successful second test firing for the P120C solid rocket motor for Ariane 6 and Vega-C

Kourou, 28 January 2018

- **A second P120C successful test firing of 135 seconds conducted in Kourou, French Guiana**
- **P120C – the largest monolithic carbon-fiber solid rocket motor (SRM) in the world – is loaded with 142 tons of propellant**
- **P120C will equip the boosters of both Ariane 62 and Ariane 64 and the Vega-C first stage**

The P120C was successfully tested for the second time on 28 January at the European Spaceport in French Guiana, on the BEAP test bench for solid rocket motors operated by the French space agency CNES. This second successful test of the P120C is a major step in the development of the future European launchers, Ariane 6 and Vega-C – the launch campaign for the first Vega-C flight will begin before the end of this year, and the maiden flight of Ariane 6 is scheduled for 2020. It is also a source of great pride: the P120C is a completely new solid rocket motor, and all its development stages have been achieved faultlessly. The first test firing was successfully carried out on 16 July 2018 on the same BEAP test bench at the European Spaceport.

The P120C, co-developed by ArianeGroup and Avio on behalf of their 50/50 joint venture Europropulsion, is the world's largest monolithic carbon fiber SRM. It is a real symbol of the fruitful collaboration between Avio and ArianeGroup, and exemplifies the strength of the 'European space team' made up of industrial companies, national space agencies, and ESA. The program for the development of Ariane 6 and Vega-C is managed by the European Space Agency (ESA).

One further test stand firing is planned to qualify this motor before the first flight of Ariane 6.

With major investments required for producing solid-propellant boosters, the P120C is a perfect example of rationalization, since it will equip both Ariane 6 (in both its two-booster Ariane 62 and its four-booster Ariane 64 versions) and the first stage of Vega-C. This allows making optimal use of industrial infrastructures on the European continent and in French Guiana, thus meeting the goals of the Ariane 6 and Vega-C programs: optimized costs, shorter cycles owing to a simplified design, and the application of innovative technologies and processes.

The P120C consists of two principal parts. The first is the structural casing, built by Avio and made of carbon fiber (filament-wound, automated fabric layup pre-impregnated epoxy sheets). The second part is the nozzle, built by ArianeGroup and made of various composite materials, including carbon/carbon; it allows very high speed ejection of the extremely hot gases (3,000°C) generated by the motor, thus creating thrust by transforming the combustion gas energy into kinetic energy. The latter can also pivot, which enables the launcher to be piloted. Propellant casting and motor final integration are both performed in French Guiana.

The P120C in figures:

- Motor length: 13.5 m
- Diameter: 3.4 m

Press release

- Propellant mass: 142 t
- Motor dry mass: 11t
- Motor case mass: 8.3 t
- Average thrust: 4,500 kN
- Maximum thrust: 4,650 kN
- Specific impulse: 278.5 s
- Combustion time: 135 s

ArianeGroup Press Contacts:

Astrid EMERIT - T. +33.6.86.65.45.02

astrid.emerit@ariane.group

Julien WATELET - T. +33.6 88.06.11.48

julien.watelet@ariane.group

Avio Press Contact:

Giuseppe COCCON – T. +393488558076

giuseppe.coccon@avio.com

Francesco DE LORENZO - T. +393355293206

francesco.delorenzo@avio.com

CNES Press Contacts:

Pascale BRESSON - T. +33.1.44.76.75.39

pascale.bresson@cnes.fr

Raphaël SART - T. +33.1.44.76.74.51

raphael.sart@cnes.fr

Sébastien MARTIGNAC - T. +33.1.44.76.78.35

sebastien.martignac@cnes.fr

ESA Press Contact:

media@esa.int

Tel: +33.1.53.69.72.99

About ArianeGroup

ArianeGroup develops and supplies innovative and competitive solutions for civil and military space launchers, with expertise in all aspects of state-of-the-art propulsion technologies. ArianeGroup is lead contractor for Europe's Ariane 5 and Ariane 6 launcher families, responsible for both design and the entire production chain, up to and including marketing by its Arianespace subsidiary, as well as for the missiles of the French oceanic deterrent force. ArianeGroup and its subsidiaries enjoy a global reputation as specialists in the field of equipment and propulsion for space applications, while their expertise also benefits other industrial sectors. The group is a joint venture equally owned by Airbus and Safran, and employs ca. 9000 highly qualified staff in France and Germany. Its 2017 revenues are €3.4 billion.

www.ariane.group

About 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 know-how 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 France Guyana with 5 facilities, employing approx. 850 highly-qualified personnel, of which approx. 30% involved in research and development. Avio is a prime contractor for the Vega programme and a sub-contractor for the Ariane programme, both financed by the European Space Agency ("ESA"), placing Italy among the limited number of countries capable of producing a complete spacecraft.

www.avio.com



Press release

About CNES

CNES is the government agency responsible for shaping France's space policy and executing it in Europe. Its task is to conceive and orbit satellites, invent the space systems of the future and nurture new services to aid us in our daily lives. Founded in 1961, it is the initiator of major space projects, launch vehicles and satellites, and the partner of choice for industry, supporting exports and fuelling innovation. CNES is working to further applications in five core areas of focus: Ariane, science, Earth observation, telecommunications and Defence. CNES is a key player driving technology research, economic development and industrial policy for the nation. It also fosters scientific collaborations and has forged numerous international partnerships. France, represented by CNES, is the leading contributor to the European Space Agency (ESA), which conducts Europe's space policy on behalf of its 22 member states.

www.cnes.fr

About the European Space Agency

ESA is an intergovernmental organisation, created in 1975, 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.

By coordinating the financial and intellectual resources of its members, ESA can undertake programmes and activities far beyond the scope of any single European country. It is working in particular with the EU on implementing the Galileo and Copernicus programmes as well as with Eumetsat for the development of meteorological missions.

ESA develops the launchers, spacecraft and ground facilities needed to keep Europe at the forefront of global space activities.

Today, it develops and launches satellites for Earth observation, navigation, telecommunications and astronomy, sends probes to the far reaches of the Solar System and cooperates in the human exploration of space. ESA also has a strong applications programme developing services in Earth observation, navigation and telecommunications.

www.esa.int