End dawns for Europe's space cargo delivery role

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Europe will close an important chapter in its space flight history Tuesday, launching the fifth and final robot ship it had pledged for lifeline deliveries to the International Space Station.

The 20-tonne Automated Transfer Vehicle (ATV) dubbed Georges Lemaitre, the size of a double-decker bus, is set to blast off from South America with fuel, water, oxygen, food, clean clothes and 50 kilogrammes (110 pounds) of coffee for six Earth-orbiting astronauts.

Named for the father of the Big Bang theory of how the Universe was formed, the heaviest ATV yet follows on the hi-tech trail of four others sent into space by the European Space Agency (ESA) since 2008.

"Georges Lemaitre may be the last ATV, but the programme is just the first important step in ESA's human space adventure," said the agency's director of human spaceflight and operations, Thomas Reiter.

"The ATV programme has helped to generate key technologies that will serve as a solid basis for future human space-transportation endeavours."

The 10-metre (33-foot) pressurised capsule will be the heaviest ATV yet launched by an Ariane 5 ES rocket.

It is scheduled to blast off from Kourou in French Guiana at 8:44 pm (2344 GMT) Tuesday.

The craft will carry nearly 6.6 tonnes of supplies for the orbital outpost and its occupants, including 850 litres of drinking water—the most ever, and three tonnes of fuel.

Some of the fuel will be used to boost the ISS—falling towards Earth at a rate of about 100 metres (330 feet) per day due to atmospheric resistance—to higher altitudes with the ATV's onboard engines.

Coffee and odour-proof shirts

Many of the 1,232 articles on board the vessel, the most complex spacecraft ever built in Europe, seek to bring home comforts to the astronauts who spend six months at a time in tough, weightless conditions.

They will receive bread pudding, orange and mango juice, cheese noodles, dental floss and crucially, 50 kilogrammes of coffee to "rejuvenate" the crew, said ATV-builder Airbus Defence and Space.

Since there is no washing machine in space, the robot craft will bring underwear, socks and clean clothes—including T-shirts made from a new, super-breathable, anti-odour fabric dubbed Spacetex.

There will also be scientific experiments on board. LIRIS, a laser infrared sensor, will take readings on the trip to be used to develop navigation systems that may one day allow spacecraft to latch on to "non-cooperative" targets like space debris or asteroids.

Last but not least, the ATV will add much-needed living, working and storage space for the six months it will remain docked to the space station.

Technology will live on

An hour after blastoff from Kourou, the ATV is scheduled to detach from the launcher and start its autonomous navigation to the ISS, powered by solar panels, and guided by starlight.

On August 12, it should dock with the station orbiting Earth at an altitude about 400 km (250 miles) and a speed of 28,800 km (18,000 miles) per hour.

At the end of its mission, the craft will undock filled with tonnes of garbage and human waste, de-orbit and self-destruct upon entry into the atmosphere over an uninhabited zone of the South Pacific.

The ATV programme formed part of Europe's contractual contribution to the ISS, a US-led multi-national collaboration.

"ATV has been an indispensable part of the ISS," said an ESA statement.

Since the US space shuttle was retired in 2011, the ATV had the largest cargo capacity of all vehicles resupplying the orbiting outpost.

Looking ahead, ATV-derived hardware will be included in the design for NASA's Orion spacecraft, which will take humans to the Moon and beyond, and is scheduled for a test flight in 2017.

The first four ATVs were also named for science gurus—the Jules Verne launched in 2008, the Johannes Kepler (2011), the Edoardo Amaldi (2012) and the Albert Einstein (2013).

All met their operational objectives, somewhat muting criticism of the programme's total 4.2 billion-euro ($5.6 billion) cost.

The ATV's cargo delivery tasks will be taken over by Russia's Progress shuttle and the Dragon and Cygnus craft built by two NASA-contracted private American firms—Space X and Orbital Sciences.