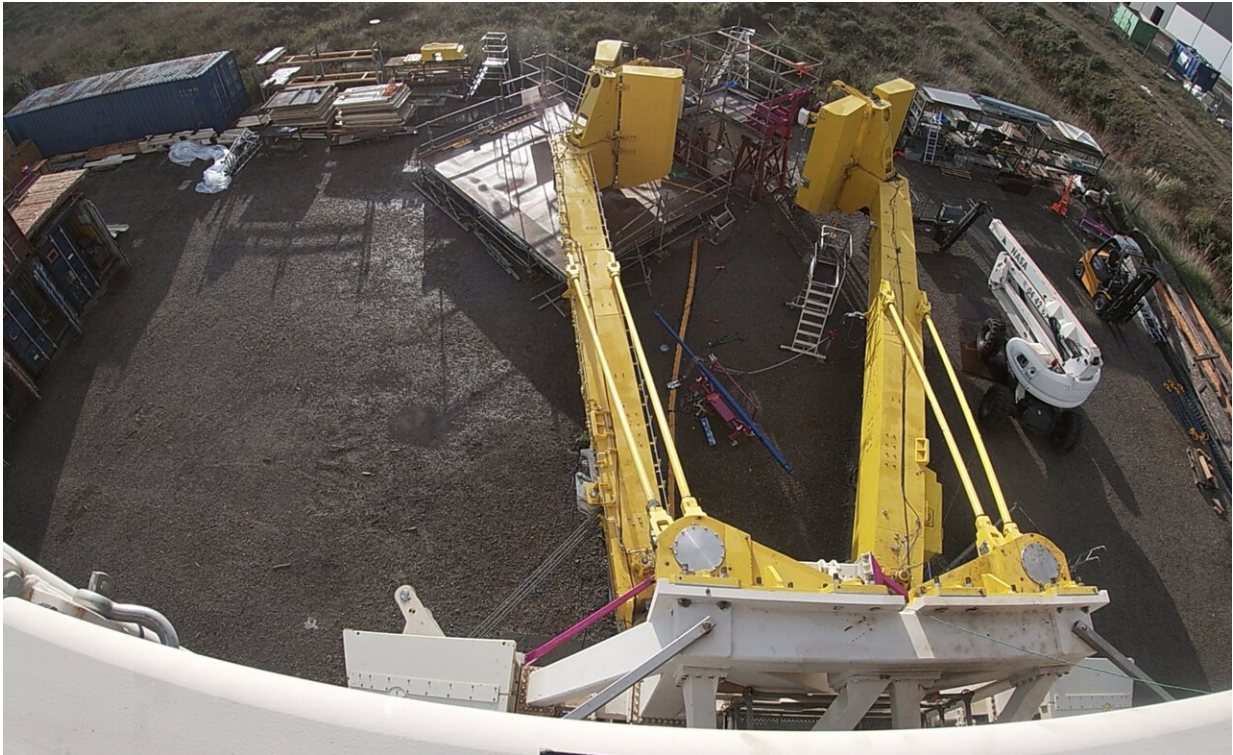


Early combined tests mimic Ariane 6 liftoff

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Ariane 6 upper stage cryogenic connection system undergoes tests. Credit: ESA/CNES/ArianeGroup

Ariane 6 early combined tests at Latesys in Fos-sur-Mer, in France, have simulated the moment of liftoff when the umbilicals separate from the launch vehicle.

These tests are part of the critical path towards the first flight of

Europe's new Ariane 6 launch [vehicle](#). They validate the interfaces and mechanical behavior during separation of this complex cryogenic connection system. More extensive combined tests will be carried out at Europe's Spaceport in Kourou, French Guiana which will include the fluidic supplies.

The cryogenic connection system sustains the launch vehicle on the launch pad during the countdown to launch.

Umbilicals supported by 'cryo-arms' on the main mast, supply Ariane 6 with top-up fuel, maintain the correct pressurization of Ariane 6's tanks, cool the engines before ignition and generally keep the launch vehicle in an optimal condition right up to the point of liftoff. The same umbilicals allow the fuel to be drained safely if a launch is aborted.

"At the moment of liftoff, it is paramount that the connections between launch vehicle and launch base are disconnected and pulled away quickly and safely," explained Luis Escudero, ESA's Core Future Launchers Preparatory Program Manager.

"Pyrotechnic actuators detonate to burst hinges open allowing the umbilicals to safely separate from Ariane 6. The supporting cryo-arms that hold the upper umbilicals then move out horizontally away from the launch vehicle. A 50-ton counterweight inside the mast—as heavy as a humpback whale—speeds up this maneuver.

"At the same time, steel doors slam shut on the mini-masts at the base of Ariane 6 on the launch pad to shield the connectors from the rocket exhaust.

"This all happens in split seconds in a highly precise, synchronized sequence."

The launch base design is improved for Ariane 6. The disconnect time is now faster than it is for Ariane 5. This means the sequence can be triggered at the latest possible moment in the countdown reducing the chance of unnecessary disconnects on an aborted launch.



Mini-masts protect Ariane 6 lower-stage umbilicals. Credit: ESA/CNES/ArianeGroup

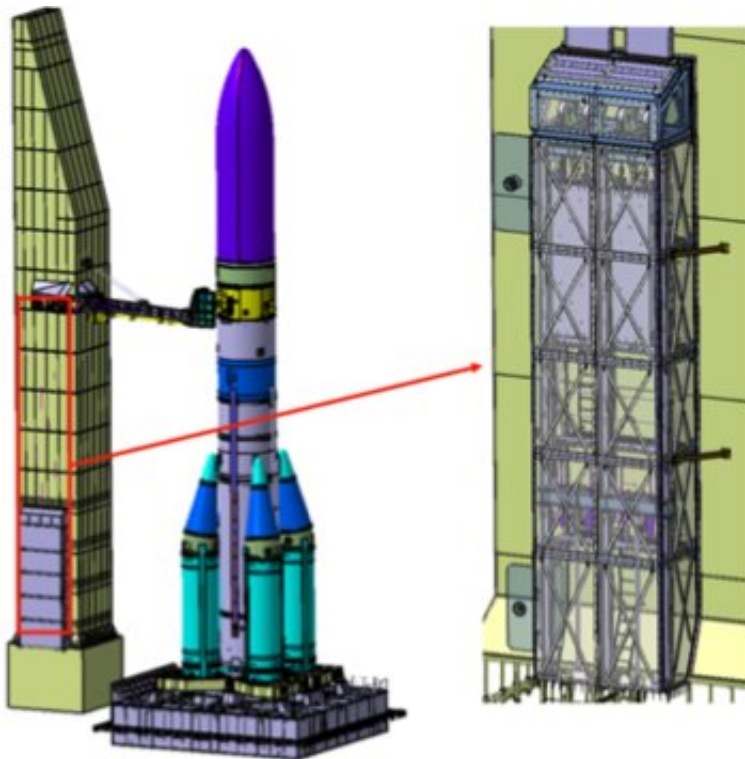
Over the last few months, Latesys under CNES responsibility and with the support of ArianeGroup, have performed tests to validate the disconnection and retraction functions of the launch pad mechanical

systems and the mounts between launch base and rocket, and verified mechanical loads.

These tests involved the cryo-arms which connect to the Ariane 6 [upper stage](#); mini-masts fixed to the launch table connected by umbilicals to the lower stage; and other Ariane 6 connections.

ESA has overseen these tests and analyzed the results to verify and validate the cryogenic connection system.

Following these tests, the components were dismantled and will be shipped to Kourou for integration on the [launch pad](#). Here they will be reassembled and further tested in combination with the cryogenic systems that will supply liquid oxygen and liquid hydrogen to the [launch vehicle](#).



Pyrotechnic actuators detonate to burst hinges open allowing the umbilicals to

safely separate from Ariane 6. The supporting cryo-arms that hold the upper umbilicals then move out horizontally away from the launch vehicle. A 50-tonne counterweight inside the mast – as heavy as a humpback whale – speeds up this manoeuvre. Credit: ESA/CNES/ArianeGroup



One of the mini-masts is installed on the Ariane 6 launch pad in preparation for combined tests with the cryogenic systems that will supply liquid oxygen and liquid hydrogen to the launch vehicle. Credit: ESA/CNES/Arianespace

A launch base technical qualification followed by combined tests at the Spaceport lasting several months will prepare for the launch system

technical qualification and debut flight of Ariane 6.

"These tests were a vital link in a chain of [test](#) campaigns that move us forward to further combined tests in French Guiana. This is a very positive step forward for Ariane 6," said Pier Domenico Resta, ESA's Ariane 6 Launch System Engineering Manager.

Provided by European Space Agency

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