

THEMIS ESA's Vertical Take Off and Landing Launch Vehicle

Themis is the first model of ESA's reusable rocket demonstrator. Themis is shown standing on its own legs at its launch pad in Kiruna, Sweden being prepared for flight testing..

This first European demonstration of a full-scale vertical take-off and landing rocket element that uses cryogenic propulsion and it is the first time the rocket stage demonstrator has had its four legs installed, presenting the fully assembled demonstrator.



• Themis T1H on the launch pad in Kiruna (Sweden), photo ESA

Themis T1H is 30 m tall standing on its legs and 3.5 m wide, holding the necessary technologies for the low-altitude take-off and landing tests it is set to perform. Themis uses the Prometheus engine,

almost as powerful as the Ariane 6 rocket's main engine – but Prometheus can restart in flight and throttle its thrust to ensure a soft and safe landing.

Themis was transported by truck over 3000 km from the ArianeGroup integration building in Les Mureaux, France, to the Swedish Space Corporation's Esrange Space Center in the north of Sweden.

After final check at a Kiruna assembly building, Themis was moved to the pad in August 2025 and hoisted onto a tool to allow the swift assembly of its four legs. This is the first time the rocket stage demonstrator has had its four legs installed, now the demonstrator is fully assembled and ready for its wet dress-rehearsal preparing for a first flight.

Themis, the first European reusable main stage's full-scale demonstrator, was developed by ESA's future Space Transportation preparation program, with ArianeGroup as prime contractor and multiple European industrial partners. Themis's first flight campaign with T1H, will be realized in the scope of Horizon Europe project [Salto](#), funded by the European Union. The Salto project is responding to the [EU Space Research and Innovation Program](#) and is implemented by 25 consortium partners from 12 European Union countries.

Eventually, lessons learned with Themis's development will pave the way for developing the European reusable launchers *Maia* and *Ariane Next*. Themis is distinct from a similar project *CALLISTO* under development by CNES, DLR, and JAXA. [2]

Reference

[1] https://www.esa.int/Enabling_Support/Space_Transportation/Future_space_transportation/Themis_stands_on_the_launch_pad#msdynmkt_trackingcontext=540a9029-bee2-4056-94e0-59c5c2430000

[2] https://en.wikipedia.org/wiki/Themis_programme