



Customer Case Story:

Rocketeers of the future: Step inside Isar Aerospace's test site at Esrange



In the heart of northern Sweden, the Arctic silence is broken only by the roar of rocket engines – one of countless propulsion tests conducted at Esrange Space Center. As the global space industry accelerates its pursuit to meet soaring demand, a new generation of rocket makers is taking the stage – driven by the urgent need for reliable access to space. At the forefront stands Isar Aerospace.

As society's reliance on space-based technologies accelerates at unprecedented speed, one critical challenge threatens to hold back progress: launch capacity. With satellite numbers projected to surge from 10,000 to more than 500,000 within two decades – supporting everything from climate research to global communications and security – the world faces a stark reality. Access to space has become the defining bottleneck of our era for commercial and governmental customers alike.

Enter [Isar Aerospace](#), a pioneering European space company that's not just meeting this challenge, but revolutionizing how we approach it entirely.

Vertical integration meets world-class infrastructure

Since 2020, Isar Aerospace has partnered with SSC Space at their Esrange Space Center to build one of Europe's most technologically advanced rocket testing ecosystems.

The partnership recently unveiled a second test facility at Esrange – accelerating the development of Isar Aerospace's orbital launch vehicle [Spectrum](#).

"Scaling reliable access to space requires not only advanced launch vehicle design but also the right infrastructure to support rapid development and production," explains Can Araz, Vice President 'Spectrum' at Isar Aerospace. "At Esrange Space Center, we have built one of Europe's most technologically advanced and capable test rigs and now we're unlocking new capabilities and accelerating our progress by opening a second test site."

At the new facility, Isar Aerospace has the capacity to test more than 30 engines per month, along with expanded integrated stage testing capabilities, increasing testing capacity and enabling faster development – leveraging unmatched flexibility for complex rocket engine testing at Esrange Space Center.



True technological sovereignty

What sets Isar Aerospace apart is their approach to vertical integration – controlling nearly every aspect of the value chain in-house.

At the heart of the ‘Spectrum’ launch vehicle lies the ‘Aquila’ engine that uses a gas-generator cycle with cryogenic liquid oxygen and propane, offering a clean, efficient burn. A high degree of vertical integration in engine design and manufacturing allows the team to quickly iterate and optimize while testing.

The first stage of the company’s launch vehicle is powered by nine ‘Aquila’ engines, while the second stage is propelled by a single vacuum engine.

“By vertically integrating every step, from initial design to production, testing, integration, and operation of our launch vehicles, we are uniquely positioned to achieve true technological sovereignty,” says Can Araz. “This approach includes in-house development of the ‘Aquila’ engine, which is tested at the Esrange Space Center.”

The infrastructure: Where vision meets execution

The two test facilities at Esrange Space Center are fully tailored to Isar Aerospace’s own requirements, supporting the company’s approach of vertically integrating launch vehicle development – enabling greater flexibility and capability to meet growing market demand for launch services.

Operated by Isar Aerospace, they are designed to accommodate a wide variety of engine tests:

- *Development tests* explore the full envelope of engine performance, including extended duration and life cycle tests, hardware limit determination, and verification with new hardware and software configurations.
- *Acceptance testing* comprises a series of predefined procedures aimed at tuning the engines and verifying their readiness for flight. This includes full duration hot-fire tests of all flight engines that expose the propulsion system to the full spectrum of operational stresses.
- *Qualification testing* evaluates engines against specified standards, such as those set by the European Space Agency (ESA) or individual customers, to demonstrate conformity with established performance, reliability, and safety benchmarks. This supports Isar Aerospace’s commitment to technological excellence and vertical integration in launch vehicle development.

“This rigorous testing regime allows us to push the limits of our designs, iterate new hardware and software configuration fast. It is testament to our commitment of technological excellence in launch vehicle development,” says Can Araz.



Data-driven innovation

Each engine test generates gigabytes of critical data from sophisticated sensor networks measuring temperature, pressure, vibration, and thrust. Real-time monitoring combined with advanced analytics safeguards that all parameters remain within expected limits and enables continuous optimization.

“Fast iteration is part of our success. We develop, test, iterate, and test again at speed and scale that is unmatched in Europe,” says Can Araz.

Both test stands enable all stages of engine development, from individual components to full integration testing, including full-duration engine firings. The test facilities provide Isar Aerospace with the flexibility to operate year-round, both on-site and fully remote.

This includes fuel and oxidizer supplies maintained on-site, along with gases for pressurization and purging, a standalone thrust chamber and powerpack testing, a cleanroom for integration, as well as a control room.

The partnership: Building Europe's space future together

As the range owner, SSC Space is responsible for the permanent structures and maintenance of the [testbed](#), along with the permits and infrastructure necessary for rocket engine testing. SSC Space also ensures that the activities can be conducted safely without unduly affecting the public, the environment, and other Esrange Space Center assets and personnel.

“Having these two facilities at Esrange Space Center strengthens Europe’s path toward scalable and reliable access to space, and it reflects the trust placed in the experience of the SSC Space team when it comes to advanced rocket testing. Together, we are building the infrastructure that will enable a new generation of launch services and support the growing needs of the European space market,” says Mats Tyni, Director Business Development and Customer Operations, SSC Space.

“We’re excited to continue our work together with Isar Aerospace in supporting their engine tests. These are tangible milestones which bring them closer to orbit and bring Europe closer to independent access to space. Knowing that SSC Space plays a vital role here is both exciting and honoring,” says Ilham Ibrahim, Operations Coordinator for the Vertical Test Stand (VTS) activities at Esrange Space Center, SSC Space.

The impact: Accelerating toward orbit

While Isar Aerospace is scaling up production of its launch vehicle ‘Spectrum’ with a new 40,000 m² facility near Munich, Germany, expanding engine test capabilities represents another key step in advancing critical capabilities. The remote Arctic location of Esrange Space Center offers just the right conditions for high-energy tests at minimal risk, while SSC Space’s experienced team and robust infrastructure enable operations at an unprecedented pace.

Read more about the testbed services offered at Esrange Space Center:

<https://sscspace.com/services/satellite-launch-and-rocket-test-services/testbed/>