

The Exploration Company: Europe's Challenge of SpaceX

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Europe has long possessed almost all of the technological ingredients required for human spaceflight: launch vehicles, propulsion systems, spacecraft avionics, rendezvous and docking technology, life-support expertise, astronaut training and a sophisticated network of space agencies and industrial companies. What it has *lacked* is something much more fundamental—a ***European vehicle able to routinely carry people and cargo from Earth to an orbital destination and safely bring them home.***

That gap is precisely what ***The Exploration Company (TEC)*** is trying to close.

Founded in 2021 by former Airbus and European space-program engineers and led by co-founder and CEO *Hélène Huby*, the Franco-German company has evolved within only five years from a start-up developing an ambitious spacecraft concept into one of Europe's most closely watched commercial space companies. Its headquarters are in the Munich area, while its industrial footprint now extends across several European countries, the United States and the United Arab Emirates. The company describes its objective as building a ***“full-stack space transportation platform”***, beginning with the reusable *Nyx* spacecraft and expanding into high-thrust rocket propulsion with *Storm* engine. ([Exploration](#)).

And finally TEC announced during the ILA in June 2026 to be working on a reusable heavy lift rocket carrying twice as much payload as the European Ariane 6 rocket named *Yrene*.

The ultimate ambition is considerably larger than building a European version of SpaceX's Dragon. TEC wants to establish an ***independent, reusable transportation infrastructure capable ultimately of moving European—and international—crews and cargo between Earth, low Earth orbit, commercial space stations and, eventually, the Moon and beyond.***

Huby has explained that the motivation for founding the company was straightforward: Europe had no indigenous means of transporting cargo and people to space stations in Earth or lunar orbit and no convincing plan for creating such a capability. ([Deutsche Bank](#)).

That makes The Exploration Company one of the most consequential new entrants in the European space sector—not because it has already achieved human spaceflight, but because it is attempting to change the ***industrial architecture*** by which Europe reaches orbit.

From a spacecraft company to a transportation company

The Exploration Company was established in 2021 with an unusually ambitious philosophy. Rather than building a single government-funded spacecraft for one narrowly defined mission, TEC designed *Nyx* as a reusable transportation platform.

The basic concept is remarkably simple. A *Nyx* vehicle is launched on a heavy lift-off rocket, travels to an orbital destination, docks with a space station, transfers cargo, receives material for return, undocks, performs controlled atmospheric re-entry and lands in the ocean. The spacecraft is then recovered, refurbished and flown again. TEC says that the commercial *Nyx* architecture is intended for up to ten missions and can return as much as 3,000 kg of cargo, while remaining compatible with different heavy launch vehicles rather than being tied to one launcher provider. ([Exploration](#))

That launcher independence is strategically important. TEC's philosophy is explicitly one of interoperability rather than lock-in. *Nyx* is intended to be capable of using heavy launchers from different countries and providers, allowing, for example, European, American or other national launch capabilities to be combined with a European spacecraft. ([Deutsche Bank](#))

In this respect, TEC is attempting to solve a European problem in a distinctly European way. Rather than recreating an integrated vertically controlled system, it seeks to create a ***distributed transportation ecosystem*** in which spacecraft, launchers, stations and eventually in-space refuelling systems can interact through common interfaces.

The first step: proving that Nyx can survive space

TEC's development philosophy has been based on rapid, relatively inexpensive flight demonstrations rather than waiting for a fully mature operational spacecraft before going to orbit.

The first demonstrator, *Bikini*, provided an early test of ballistic atmospheric re-entry. TEC then developed *Mission Possible*, a significantly more sophisticated spacecraft designed to demonstrate orbital operations, autonomous navigation and controlled re-entry.

Mission Possible launched from Vandenberg Space Force Base on 23 June 2025. The spacecraft reached orbit, activated its 25 customer payloads—approximately 300 kg in total—performed attitude-control maneuvers and executed a controlled re-entry. It became the first privately developed European capsule to perform a controlled atmospheric re-entry under operational flight conditions. ([Exploration](#)).



The mission was nevertheless only a partial success. Communications were lost at approximately 26 km altitude, just before the transonic parachute-deployment phase, and the capsule was subsequently lost before splashdown. TEC openly acknowledged the failure and described the mission as a step in a learning process rather than attempting to portray it as a complete success. ([Exploration](#)).

Technically, the significance of Mission Possible lies precisely in the data that preceded the loss. TEC demonstrated many of the difficult elements required by a reusable spacecraft: autonomous flight software, guidance-navigation-control, orbital attitude control, thermal protection and controlled re-entry.

Equally revealing was the company's development philosophy. Mission Possible was reportedly conceived, developed, qualified and launched in approximately three years at a total programme cost of about €30 million including launch, using 45 suppliers in 11 European countries. TEC consciously accepted certain engineering risks in order to shorten the development cycle—for example, single-string elements in some systems and limited propulsion qualification. ([Exploration](#)).

This is an important contrast with traditional European institutional programmes, where qualification processes, documentation and certification often dominate both schedule and cost. TEC is effectively testing whether a *commercial, iterative development model* can produce sufficiently reliable spacecraft substantially faster.

For a future human-rated system, however, that philosophy will have to evolve. Crew transportation requires considerably greater redundancy, fault tolerance, abort capability and certification than cargo transportation.

Nyx Earth: Europe's emerging ISS cargo capability

The next major step is *Nyx Earth*, the full-size commercial spacecraft.

The vehicle under development is approximately 4 m in diameter and 4.5 m in height, totaling 7 m height including the service module. The ESA-supported configuration is designed to carry approximately 2,600 kg of pressurized cargo to the ISS on its first mission, while the broader TEC specification advertises up to 3,000 kg of return mass. The spacecraft is intended to remain docked for extended periods and then perform autonomous departure and re-entry. ([Exploration](#)).

One particularly significant milestone came in August 2025, when Nyx Earth successfully passed Phase 1 of NASA/ESA's ISS safety review process, and in May 2026 a successful drop test was completed at the Mojave test site.

This is far from being an authorization to carry astronauts, but it is a meaningful indication that the basic architecture is being developed against the demanding safety requirements associated with visiting vehicles at the International Space Station. ([Exploration](#)).

The target is to demonstrate Nyx Earth at the ISS in 2028, under ESA's LEO Cargo Return Service (LCRS) program.

ESA selected The Exploration Company and Thales Alenia Space in 2024 for the first phase of this European competition and awarded €25 million to each company to develop their respective concepts.

ESA's objective is to establish a European commercial capability to transport cargo to and from low Earth orbit, initially targeting the ISS and ultimately the post-ISS commercial space-station environment. ([Europäische Weltraumorganisation](#)).

This is strategically important. ESA is not merely buying transportation. The LCRS programme is effectively being used as an industrial bridge from the ISS era to the commercial LEO era.

An emerging commercial market

TEC is trying to ensure that Nyx has customers before the spacecraft becomes operational.

The company has signed agreements for future cargo missions with several proposed commercial space-station operators. In 2024, for example, *Starlab Space*, developing a “next generation” space station, signed for three cargo missions, while *Vast*, building a commercial space station, signed an agreement for a Nyx mission to its future second *Haven-2* space station. TEC had earlier also announced an agreement with *Axiom Space*. ([Starlab - A New-Era Space Destination](#)).

This strategy is significant because it changes the classic European space-business model. Instead of developing a spacecraft first and searching for government missions afterward, TEC is attempting to establish an order book and customer ecosystem during development.

The transition from the ISS to commercial stations is central to the business case. The emerging commercial LEO market will require not only stations but also a complete logistical infrastructure: launchers, crew vehicles, cargo vehicles, servicing spacecraft and eventually orbital refuelling.

A spacecraft such as Nyx could therefore become something analogous to a commercial truck rather than a one-off government space vehicle.

Reusability is only half of the equation

The distinguishing feature of TEC's concept is not simply reusability. It is *reusability combined with interoperability and eventual in-space refuelling*.

Nyx is designed around modular systems and open interfaces, with TEC developing its own avionics, flight software and guidance-navigation-control functions. The company sees the spacecraft as a platform that can eventually be refuelled in orbit and adapted for missions ranging from LEO logistics to lunar operations. ([Exploration](#)). This has major implications for the eventual human-transportation architecture. A conventional spacecraft is essentially a disposable expedition vehicle: launch, fly a mission, re-enter and retire. TEC's intended architecture is closer to a *transportation network* in which vehicles are repeatedly reused and progressively integrated with orbital infrastructure.

That is also why ESA's emerging European in-space transportation activities are relevant to TEC. In 2025, an ESA-led consortium headed by The Exploration Company was selected for the ESA

In Space Proof -of-Concepts (InSPoC-1) consolidation phase, intended to mature common approaches for rendezvous, docking and refueling. The objective is to create interoperable interfaces

that could eventually support a European in-space transportation ecosystem. ([ESA Commercialisation](#)). In other words, TEC's ambitions extend beyond "build a capsule". The company is positioning Nyx as one node in a future *space logistics network*.

From cargo to crew

The most consequential development came in 2025, when TEC publicly unveiled a *crewed version of Nyx*. The proposed vehicle is intended to accommodate *up to five astronauts*, with an initial operational target around **2035**, subject to European political decisions and funding. ([European Spaceflight](#)). That qualification—subject to political decisions—is critical.

Europe currently has astronauts and human-spaceflight expertise, but it does not possess an independently European crew transportation system. ESA astronauts reach the ISS through vehicles operated by other nations, primarily NASA's Crew Dragon program or, historically, Russian Soyuz. The result is that Europe participates in human spaceflight but does not control the complete Earth-to-orbit transportation chain. TEC's proposed crew Nyx is therefore much more than another spacecraft project. It would represent the creation of a *European crew transportation capability*. The technical transition from cargo to crew is substantial. A human-rated Nyx would require:

- life-support and environmental-control systems;
- substantially higher levels of avionics and propulsion redundancy;
- crew escape and launch-abort capability;
- enhanced structural and thermal qualification;
- human-rating of software and guidance systems;
- crew interfaces and cockpit/vehicle displays;
- more demanding parachute and recovery architecture;
- extensive certification and operational procedures.

TEC has already begun to address these issues. A particularly revealing development occurred in June–July 2026, when the company began recruiting specifically for its future Nyx crew programme in Houston and established a *Rapid Innovation Lab near NASA Johnson Space Center*. The Houston facility includes a full-scale mock-up of the future crew capsule for development of crew interfaces and human-system integration. ([European Spaceflight](#)).

This is more significant than it may initially appear. Houston gives TEC direct proximity to one of the world's largest concentrations of human-spaceflight knowledge, including NASA's astronaut corps, flight controllers, life-support specialists, human-factors engineers and commercial crew experience. The fact that TEC is investing in this capability *before the cargo Nyx has even flown its first operational mission* suggests that crew transportation is no longer merely a conceptual marketing exercise.

Why Europe needs more than a capsule

The most interesting aspect of TEC's strategy is that the company appears to understand that a human transportation system cannot be built from a spacecraft alone.

- A crew capsule needs a launcher.
- A launcher needs an operational infrastructure.
- A crew vehicle needs stations to visit.
- Stations require cargo logistics.
- Long-duration exploration requires in-space propulsion and refueling.

And all of these capabilities require a sustainable commercial market. This explains TEC's move toward *propulsion*.

The company is developing *Storm*, a high-thrust reusable rocket engine based on a full-flow staged-combustion cycle. ESA reported in August 2026 that TEC had completed ten oxygen-rich pre-burner hot-fire tests on DLR's P8 test bench in Lampoldshausen, accumulating *588 seconds of test time*, with individual tests exceeding 100 seconds. Storm is intended to support a future competitive reusable

launch architecture. TEC currently advertises a thrust capability of up to **180 tonnes** for the engine. ([Europäische Weltraumorganisation](#))

At the smaller end of the propulsion spectrum, TEC's *Huracan* programme is developing a reusable LOX-methane engine for lunar landers and cislunar transportation. In early 2026, 26 system-level hot-fire tests accumulated 375 seconds of operation, including throttling and multiple restarts.

([Exploration](#)).

The company announced during ILA 2026 it is also developing the heavy-lift rocket *Yrene*, it was described as an “*affordable and reusable heavy launcher*” and was shown together with the company's new *Storm* rocket engine

Taken together, these programs indicate a transition from *spacecraft manufacturer to transportation-system developer*.

The NASA connection

The relationship with NASA is another strategically important element. TEC describes itself as the *first European company to sign a NASA Space Act Agreement*. NASA's published register confirms an active international Space Act framework with The Exploration Company, including a reimbursable agreement associated with NASA's SCIFLI airborne/optical observation activities for reusable spacecraft flight testing. ([Exploration](#)).

The Houston expansion therefore has a logic beyond access to the US market. Human-spaceflight certification and operational expertise is concentrated heavily in the United States, and TEC is deliberately inserting itself into that ecosystem. This could ultimately lead to an interesting reversal of the traditional European relationship with NASA.

Instead of Europe being primarily a supplier of modules, scientific instruments and astronauts to American-led human-spaceflight programmes, a European commercial company could become an *international service provider for human spaceflight itself*.

TEC's real challenge is organizational, not purely technical

From an engineering perspective, the most fascinating feature of The Exploration Company may ultimately be its development methodology.

The company is consciously attempting to shorten the traditional European space-development cycle by increasing iteration speed, accepting carefully managed development risks and using commercial technologies wherever possible. Mission Possible demonstrated both the advantages and the limits of this approach. For cargo transportation, the model may prove highly effective.

For human transportation, however, the organization will have to evolve again. Human spaceflight rewards neither the risk tolerance of a start-up nor the bureaucratic conservatism of a traditional institutional program. It requires an intermediate model: *rapid development combined with an uncompromising safety culture*.

That transition will probably be one of TEC's greatest managerial challenges.

It is one thing to build a €30 million demonstrator quickly. It is quite another to operate a vehicle carrying five astronauts.

Outlook

As of September 2026, The Exploration Company has crossed an important threshold. It is no longer simply a start-up proposing a reusable spacecraft. It has flown two demonstrators, achieved a controlled re-entry with Mission Possible, entered ESA's LEO Cargo Return Service program, passed the first phase of ISS safety review for Nyx Earth, secured commercial customers, developed flight and propulsion technology in-house, established a US human-spaceflight development presence and begun building an industrial base capable of supporting recurring spacecraft production. ([Exploration](#)). Yet the decisive milestones are still ahead.

The *2028 Nyx Earth demonstration* will be the real test of whether TEC can turn its development philosophy into a reliable operational transportation service. The next question will be whether the vehicle can fly repeatedly, economically and safely enough to support a commercial business.

Only then will the much larger objective—human transportation—become credible. The ultimate significance of The Exploration Company therefore extends well beyond one spacecraft. Europe is entering a new phase of human spaceflight in which commercial space stations, reusable spacecraft, private capital, public anchor customers and international partnerships are beginning to replace the traditional government-owned programme architecture. TEC is betting that Europe can build its own place in that new ecosystem.

TEC's vision is ambitious: not simply to build a European spacecraft, but to create a European transportation system for people and cargo in space—one capable of operating between Earth, orbital stations and eventually the Moon, using reusable vehicles and interoperable infrastructure. Whether that vision becomes reality will depend as much on European political will and sustained investment as on engineering.

But for the first time in decades, Europe has a private company attempting to turn the missing link in European human spaceflight from a strategic discussion into a ***flight programme***.

And that may prove to be the most important contribution of The Exploration Company.

References (selected)

This article was composed with the assistance of ChatGPT, reviewed edited, verified and augmented by JSOC's Editor Joachim J. Kehr. Additional reliable sources are inserted in the text.

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