



NOVA EKA

Core Business

The core business of Novaeka is articulated in the following lines

- **Test Facilities for Rocket Engines**

Main Clients: AVIO, TEC, Pangea

- **Fluidic Ground Means for small launchers**

Main Clients: AVIO

- Fluidic Ground Support Systems for large satellites and spacecrafts (**FGSE**)

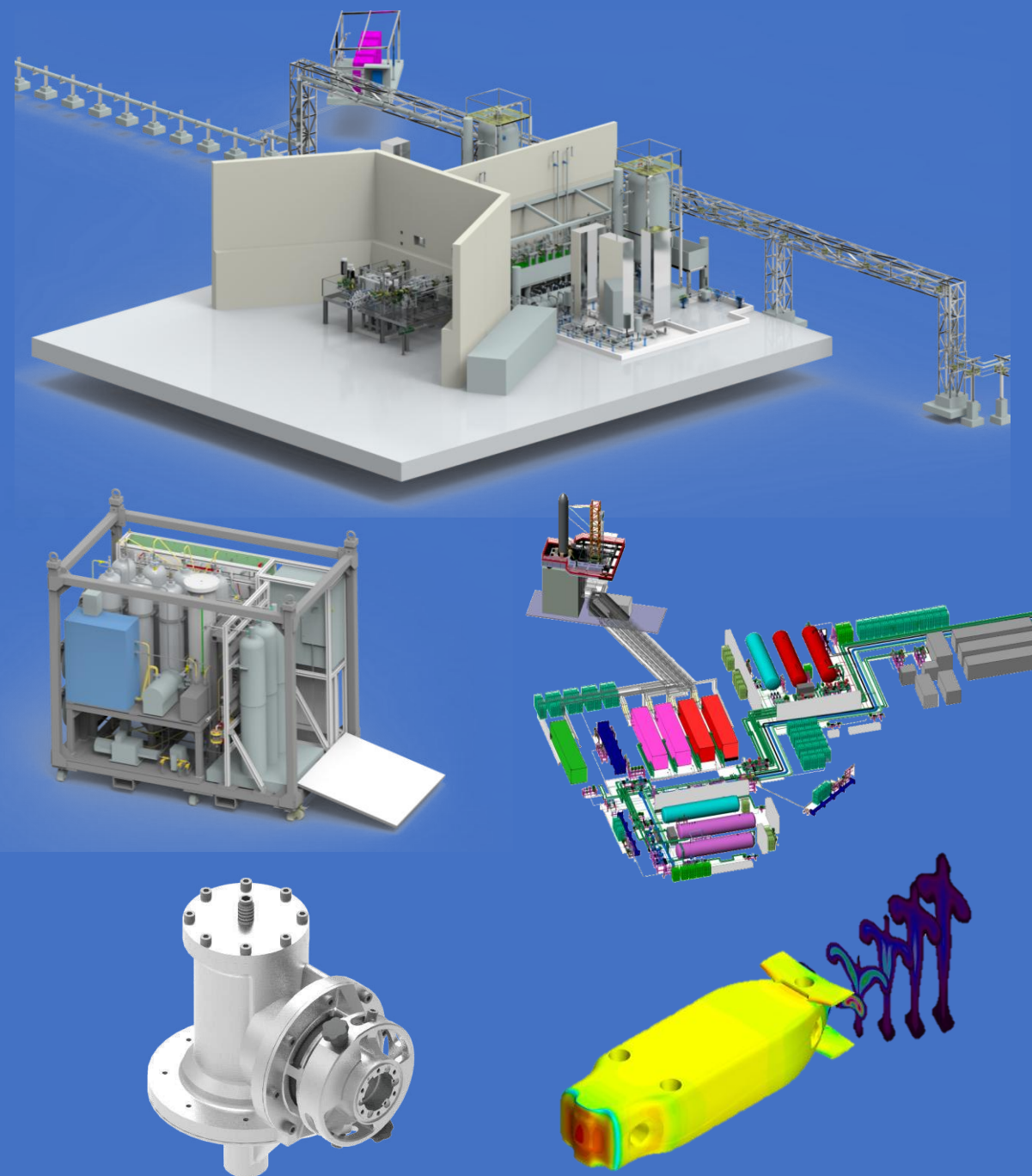
Main Clients: TASI, TASF

- **Flight components**

Main Clients: TASI

- **Mathematical Modeling and Software Tools**

Main Clients: CAREL, SAIPEM, AVIO, NOVAEKA





Test Facilities for Rocket Engines

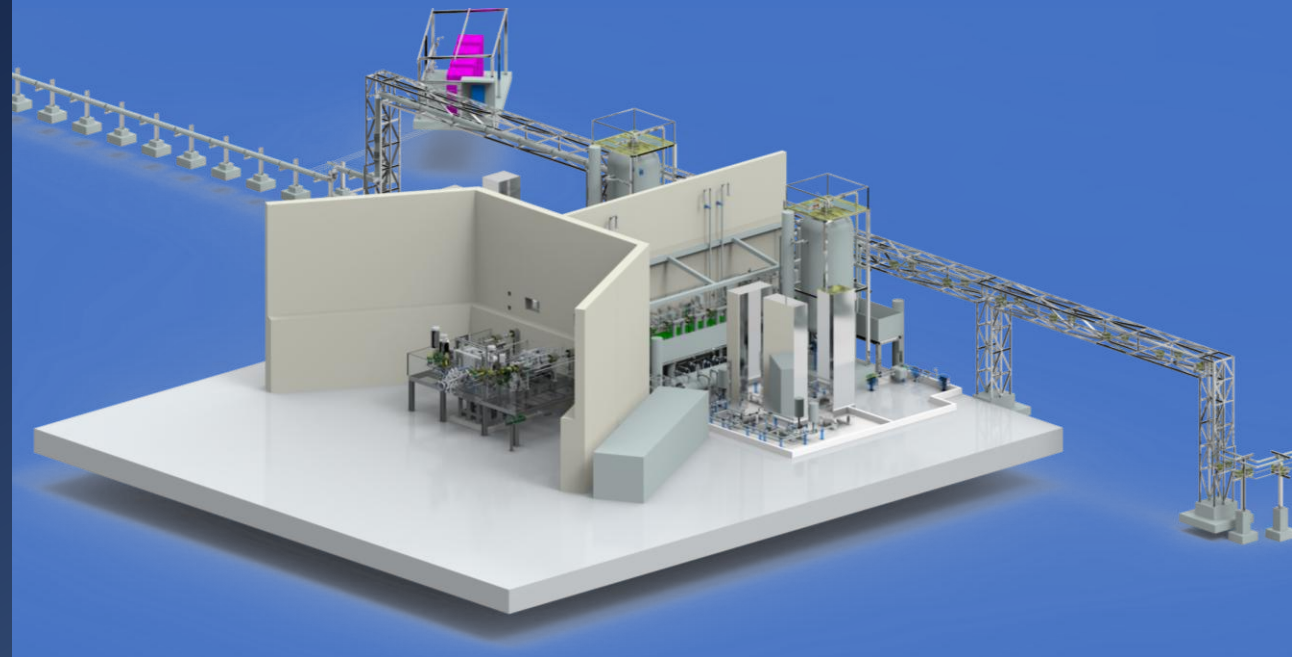
SPTF

Novaeka is the **designer** of the fluidic subsystem of the Space Propulsion Test Facility built by AVIO in Sardinia (IT) in 2021.

The facility is currently being used for the testing of a 100 kN LOX/LCH4 engine.

It is one of the largest test facilities in Europe for the testing of cryogenic liquid rocket engines.

Novaeka was responsible for the definition of the fluidic processes, the selection of the commercial components, the definition of the control logic, the assistance to the installation and commissioning.

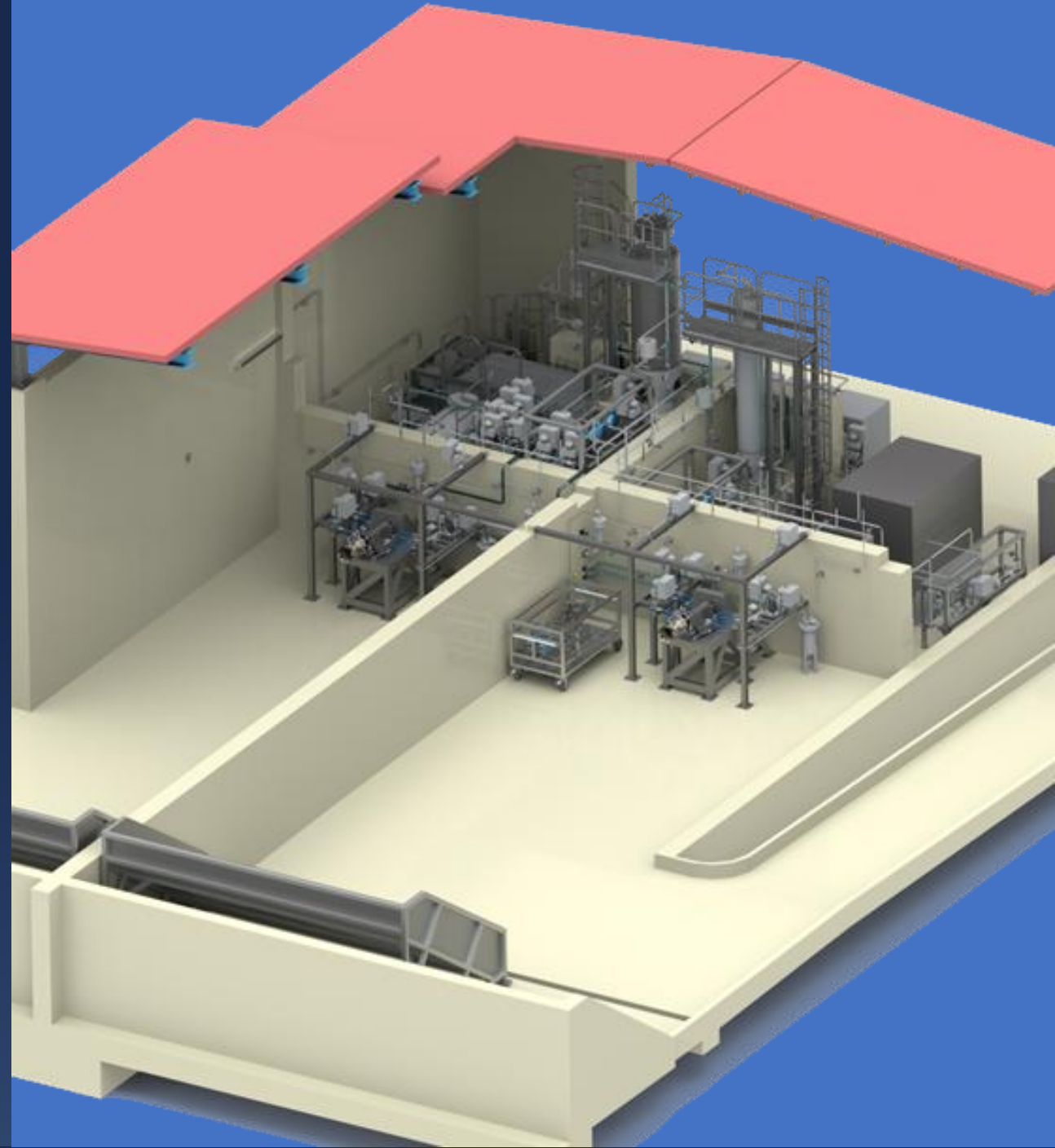


OPTF

Novaeka is the **general contractor for the design** of the Orbital Propulsion Test Facility built by AVIO in Rome (IT) in 2024.

The facility is currently being used for the testing of a 4 kN HTP/RPI engine for in-orbit propulsion.

Being general contractor means Novaeka was responsible for the design of all subsystems: fluidic, civil works, electric, automation, environmental analysis, permitting.

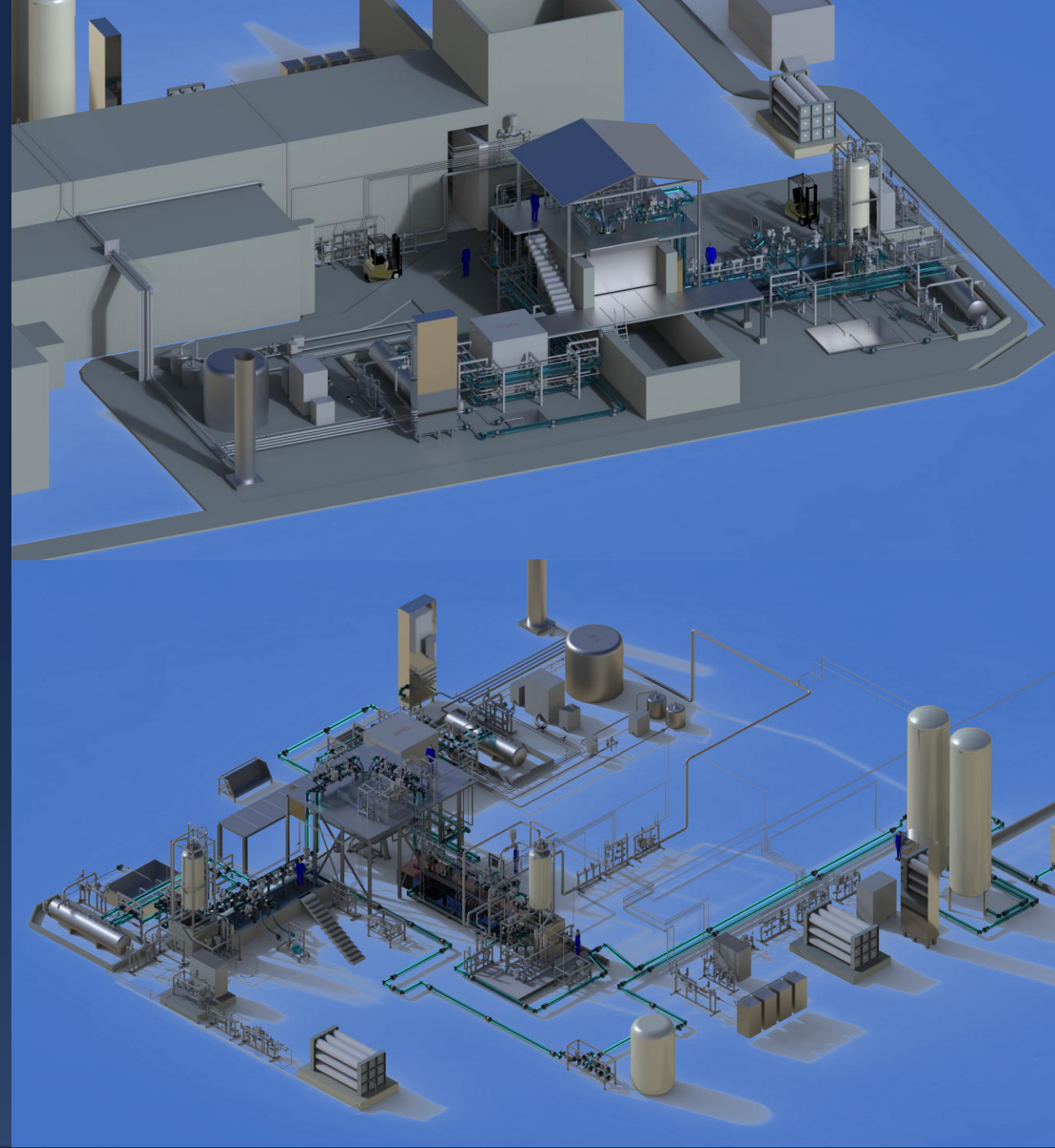


Huracan Test Bench

Novaeka is the **designer** of the fluidic subsystem of the Huracan Test Bench, that will be built in Bordeaux (FR) in 2025 by The Exploration Company.

The facility will be used for the testing of a 25 kN LOX/LCH₄ engine for the Nyx-Moon capsule by The Exploration Company. The Nyx-Moon will go back and forth between the Lunar Gateway and the Moon surface.

The facility has been designed to be very flexible, allowing the testing of the engine at different stages of the development. It can handle the testing of the thrust chamber alone, of a cryogenic pump, of a bench-fed engine and of a fully integrated engine, complete of its own propellant and pressurization tanks.



FAST3 Test Facility

Novaeka is the **general contractor for the construction** the FAST3 facility which will be used by AVIO in Rome (IT).

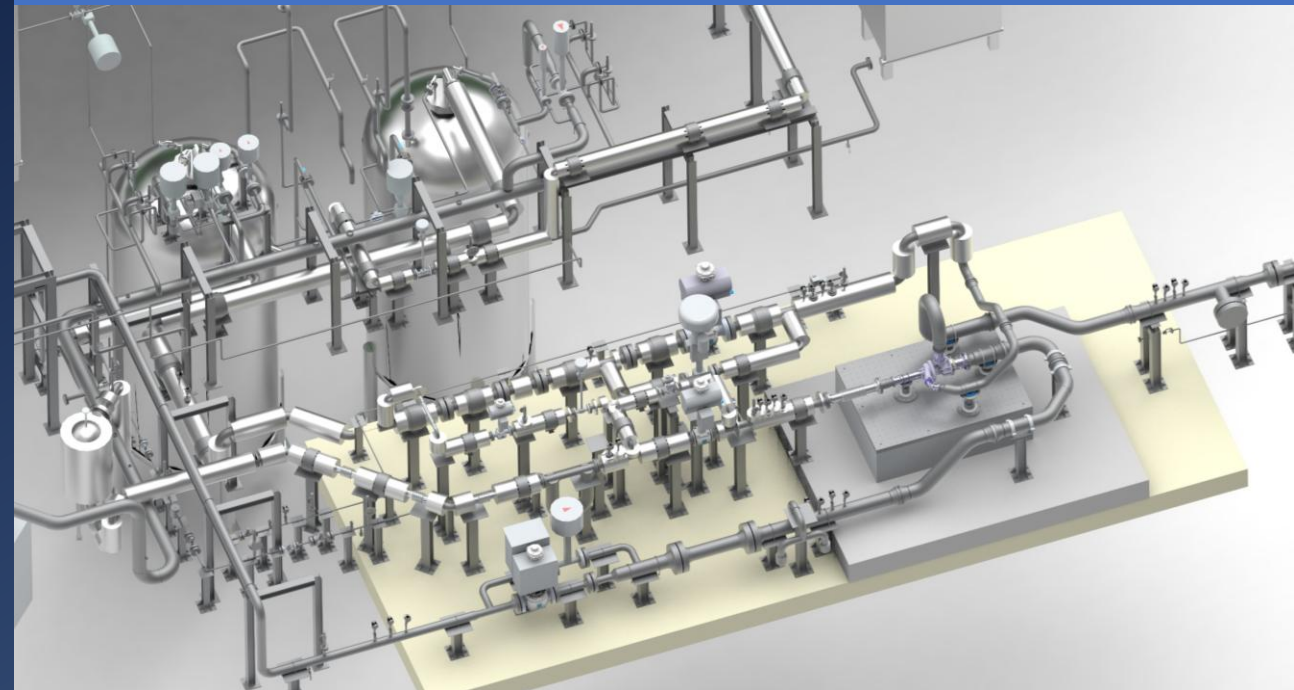
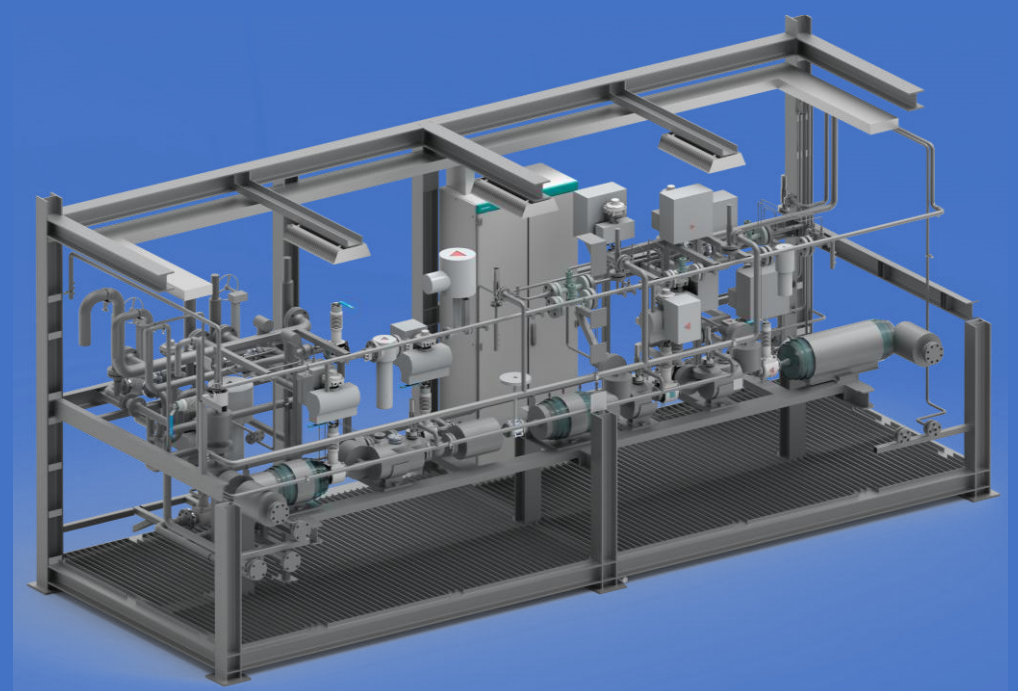
The facility comprises two different LN2 test stands to perform tests on

- fuel and oxidizer turbopumps for a 600 kN engine
- propellant tanks for a small orbital launcher

The test facility was entirely designed by Novaeka, it was then assembled on portable containers under Novaeka responsibility and supervision.

It will be delivered and installed at AVIO premises in 2025.

For the first time Novaeka was responsible for the whole project, including manufacturing, hence delivering the finished product to the client.



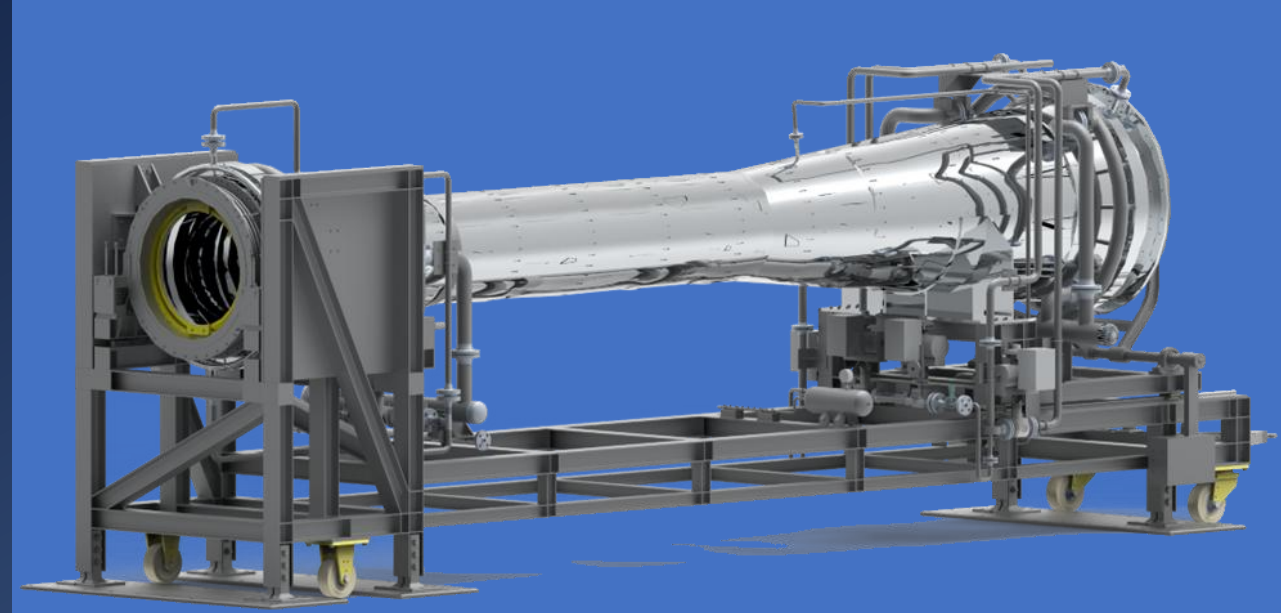
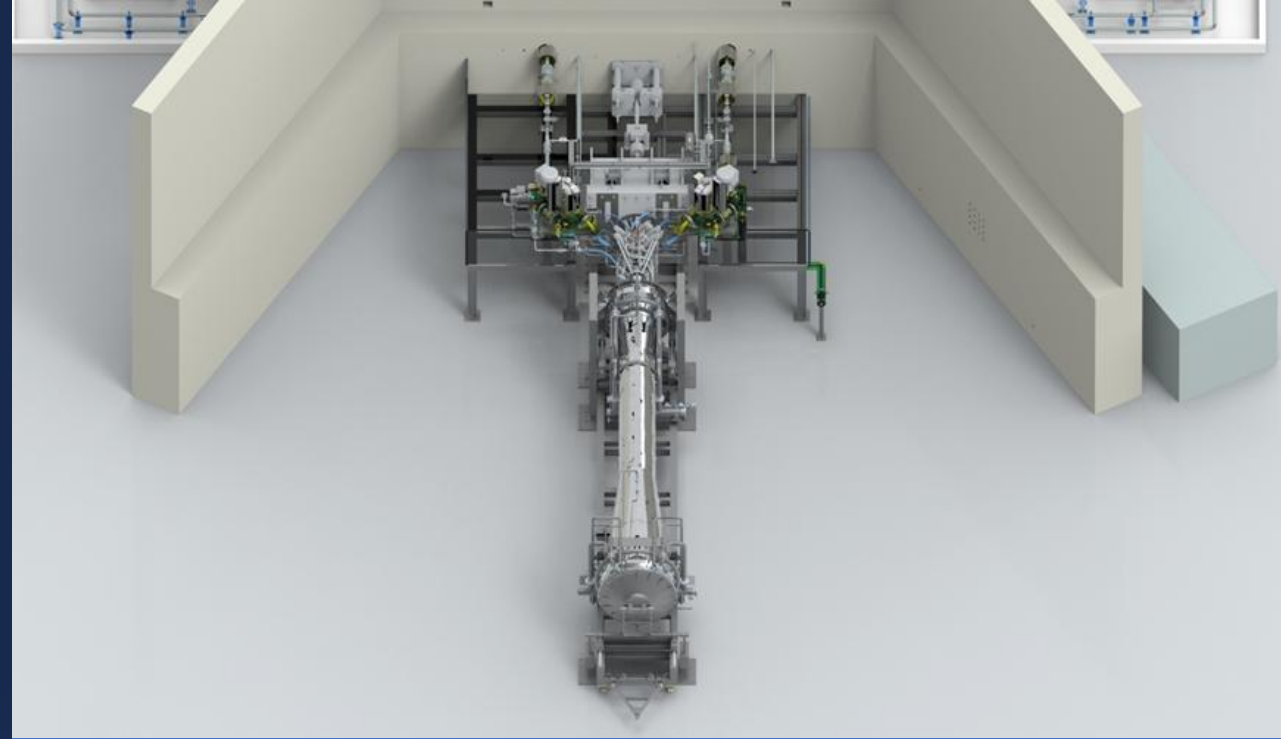
HATF

Novaeka is the **designer** of the High Altitude Test Facility that AVIO will use to perform tests under vacuum conditions for a 100 kN engine inside the SPTF plant.

This second-throat ejector was entirely designed by Novaeka: very detailed fluid-dynamic, thermal and structural analyses were carried out to ensure the correct operation of the system.

A subscale version of the ejector was built and tested by AVIO in Rome to validate the design methodology.

The ejector was manufactured under the supervision of Novaeka and will be installed in the SPTF plant in 2025 to be used in the next testing campaigns.



A view of Earth from space, showing the curvature of the planet and a bright sun rising over the horizon, creating a lens flare effect. The text "Ground Means for Small Launchers" is overlaid in white.

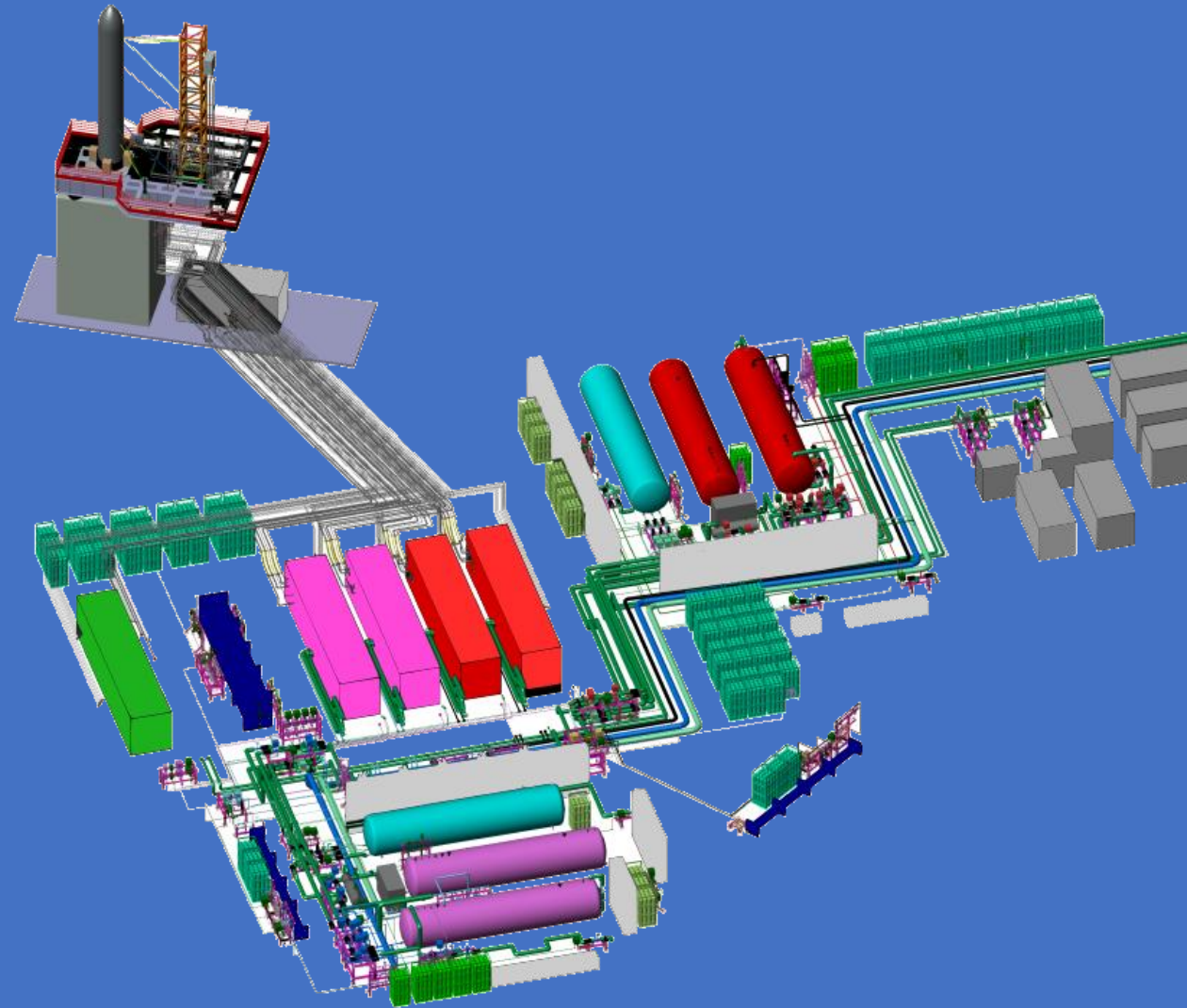
Ground Means for Small Launchers

F-GSM & F-GPM

Novaeka is the **designer** of the Fluidic Ground Means for two small orbital launchers that AVIO will test from the Wallops Island spaceport in Virginia (US).

The system is used to load all the fluids into the launchers before take off. This includes the cryogenic propellants (LOX/LCH4) and the various gasses used in the launcher (GOX, GH2, GN2, GHe).

Part of the system is built on portable containers that will be tested in Sardinia and shipped to the final launch location.



A wide-angle photograph of Earth from space, showing the curvature of the planet and the thin blue atmosphere. The sun is rising over the horizon, creating a bright orange and yellow glow. The text 'FGSE' is overlaid in white, bold, sans-serif font in the center of the image.

FGSE

Orion – MPCV

Novaeka is the **designer** of the fluidic skid for loading the refrigerant fluid (HFE) in the thermal control system of the Orion spacecraft for Thales-Alenia Space (IT).

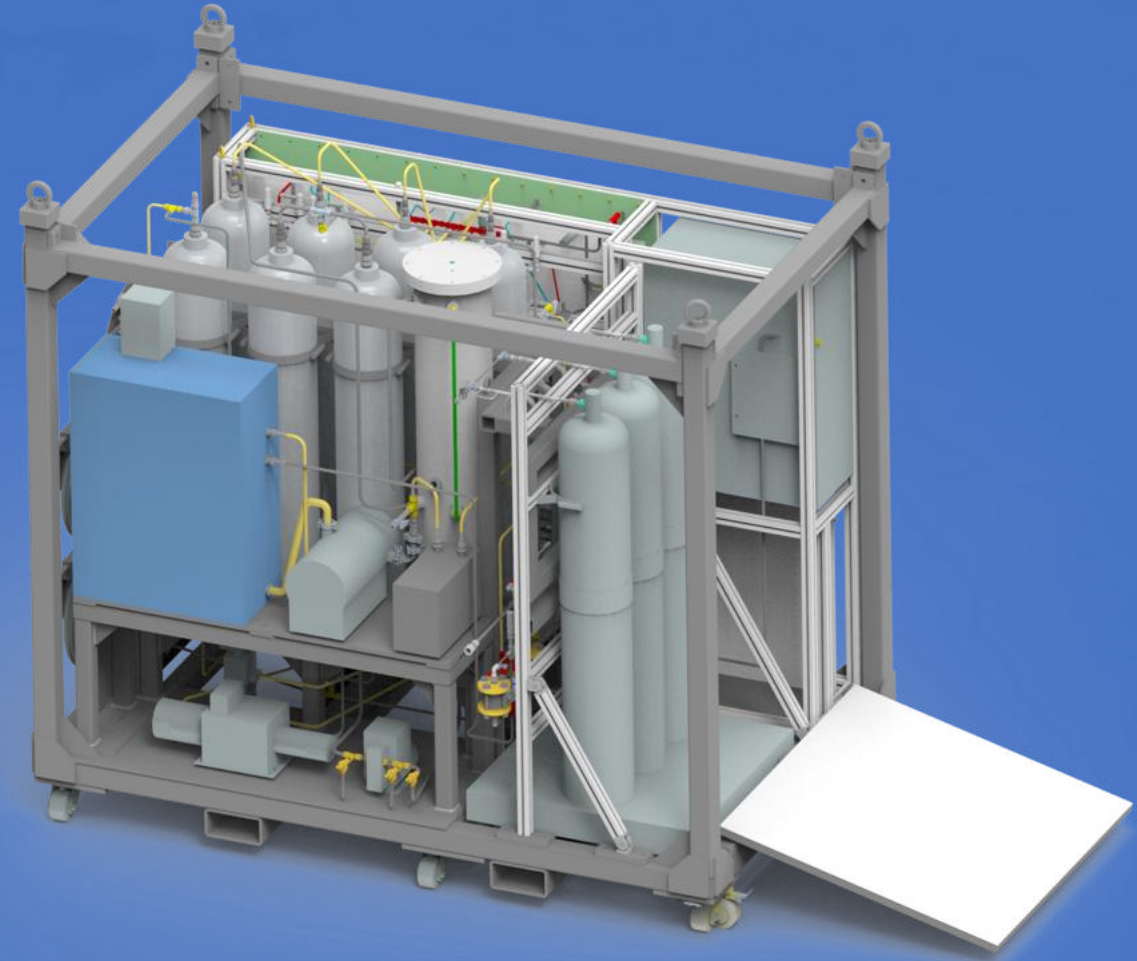
The FGSE was built by a Prime Contractor for Thales-Alenia Space and was used at Cape Canaveral for operations on the Orion.



NEOSAT

Novaeka is the **designer** of the fluidic skid for filling and draining the refrigerant fluid (Ammonia) in thermal control system of the NEOSAT satellite by Thales-Alenia Space (FR).

In this occasion, Novaeka successfully devised an innovative method to cut down the time required to fill the spacecraft from days to hours.



HFE Servicer FGSE

Novaeka is the **general contractor for the construction** of the fluidic skid for filling and draining the refrigerant fluid (HFE) in thermal control system of the I-HAB module for the Lunar Gateway by Thales-Alenia Space (IT)



Pressurization FGSE

Novaeka is the **general contractor for the construction** of three FGSE to provide high and low pressure GN2 and GHe for testing activities on AVIO M60 engine.



A view of Earth from space, showing the curvature of the planet and the blue atmosphere. A bright sun is rising over the horizon, creating a lens flare effect. The text "Flight Components" is overlaid in white.

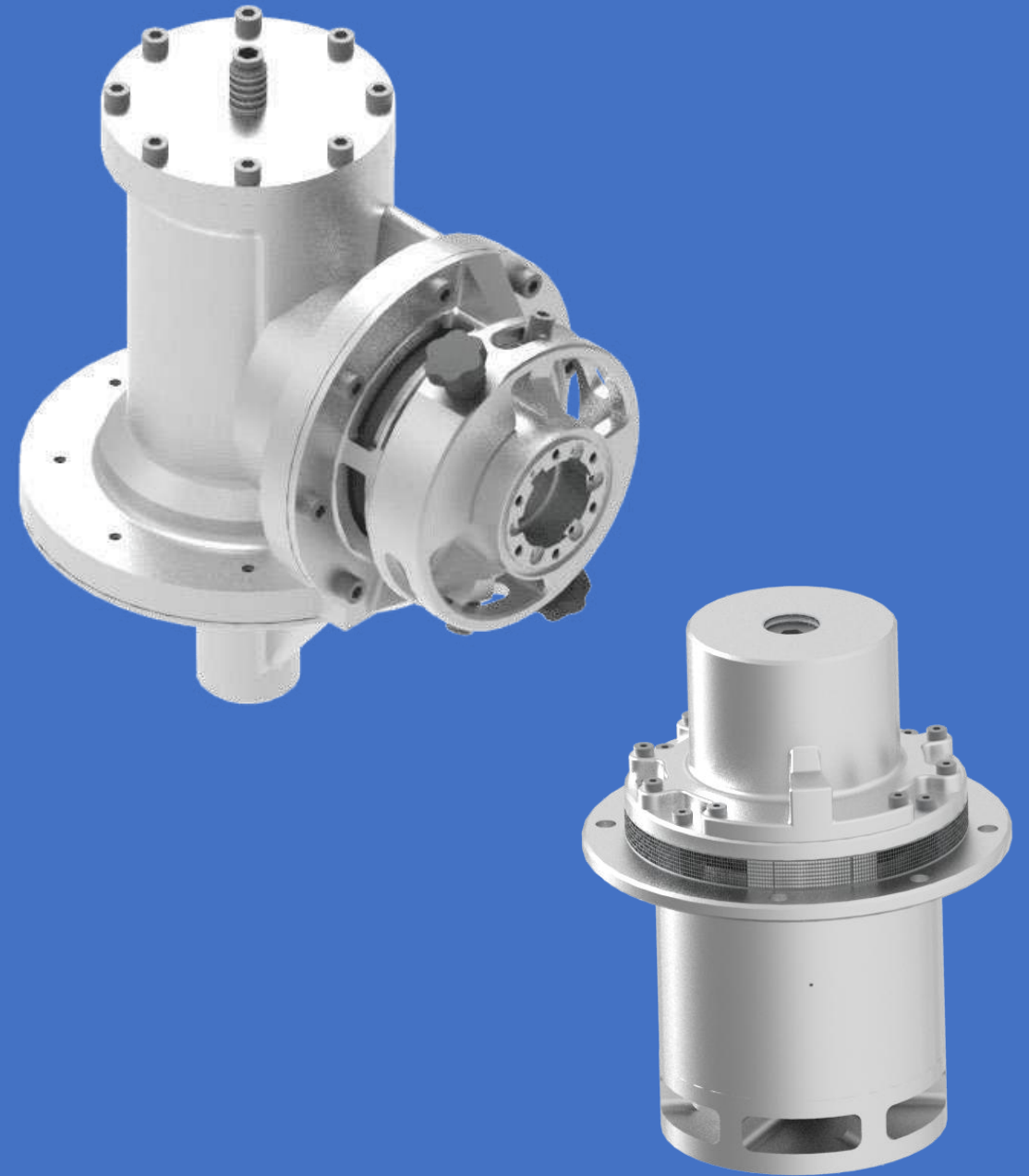
Flight Components

PPRV

Novaeka is the **designer** and **manufacturer** of a Positive Pressure Relief Valve (PPRV) for the pressure control inside a living module for the lunar orbiting space station (Lunar Gateway) for Thales Alenia Space (IT).

A first Breadboard prototype for ground testing was designed and manufactured.

The design of the actual flight component is ongoing, and eventually Novaeka will be the supplier of this component for Thales.



A view of Earth from space, showing the curvature of the planet and the blue atmosphere. A bright sun is rising over the horizon, creating a lens flare effect. The text "Modeling and Software" is overlaid in white.

Modeling and Software

Hardware in the Loop

Novaeka develops together with CAREL Industries a software to perform hardware in the loop testing of PLCs for HVAC units.

The physical hardware is connected to the digital simulation of the cooling machine, controlling it in real-time.

The software includes configurable transient models of different types of cooling machines: heat pumps, air conditioners, chillers, etc.

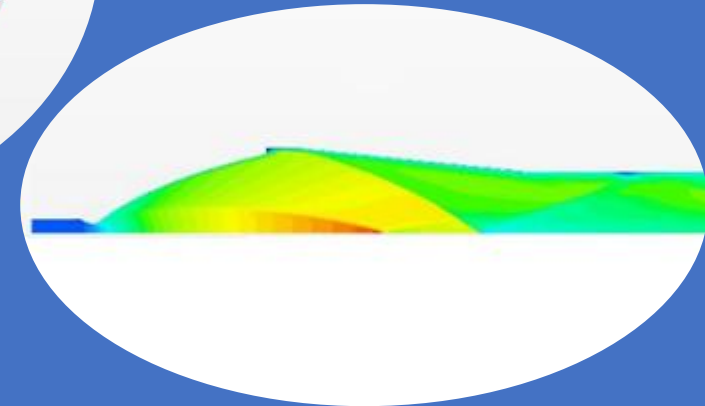
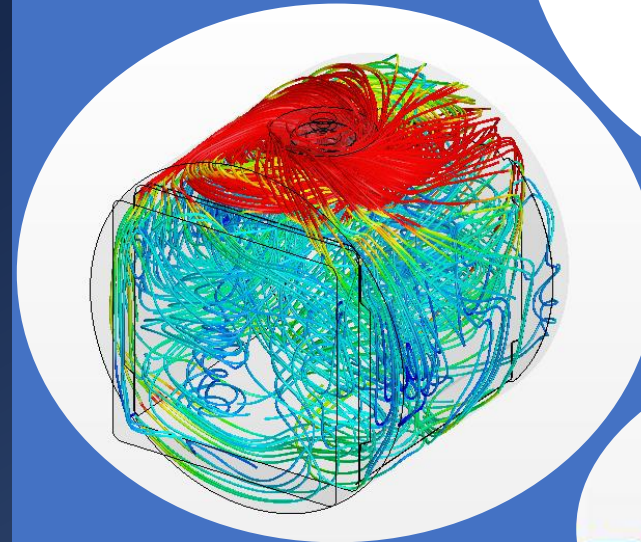
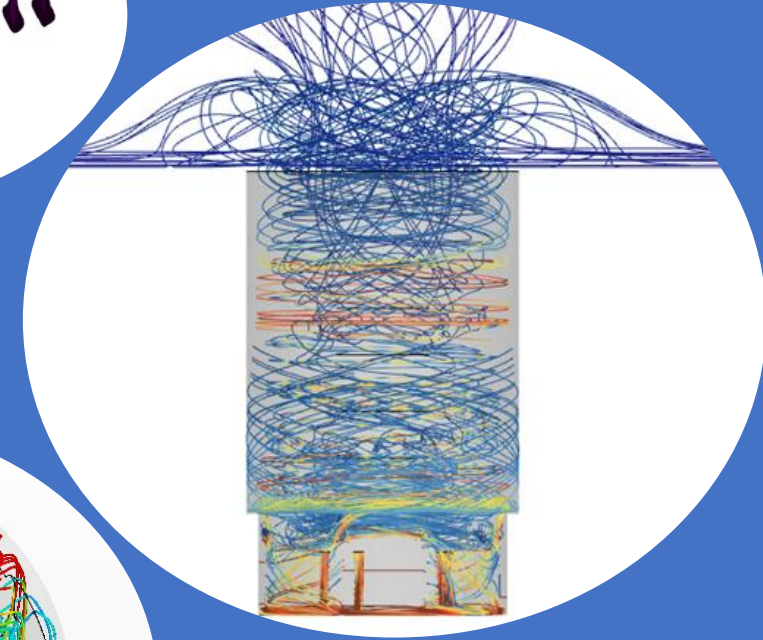
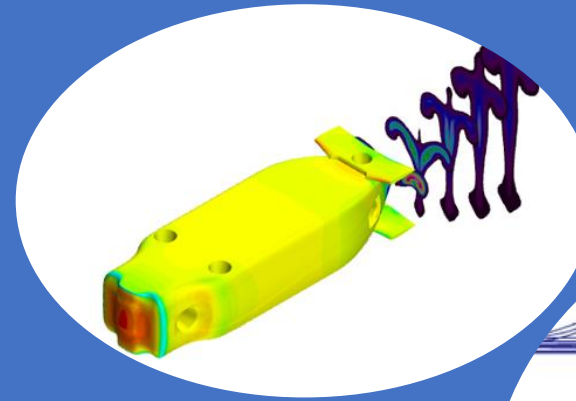


CFD

Novaeka performs Computational Fluid Dynamics (CFD) simulations to support its internal design processes and as a service for its clients.

Simulations done in the past include:

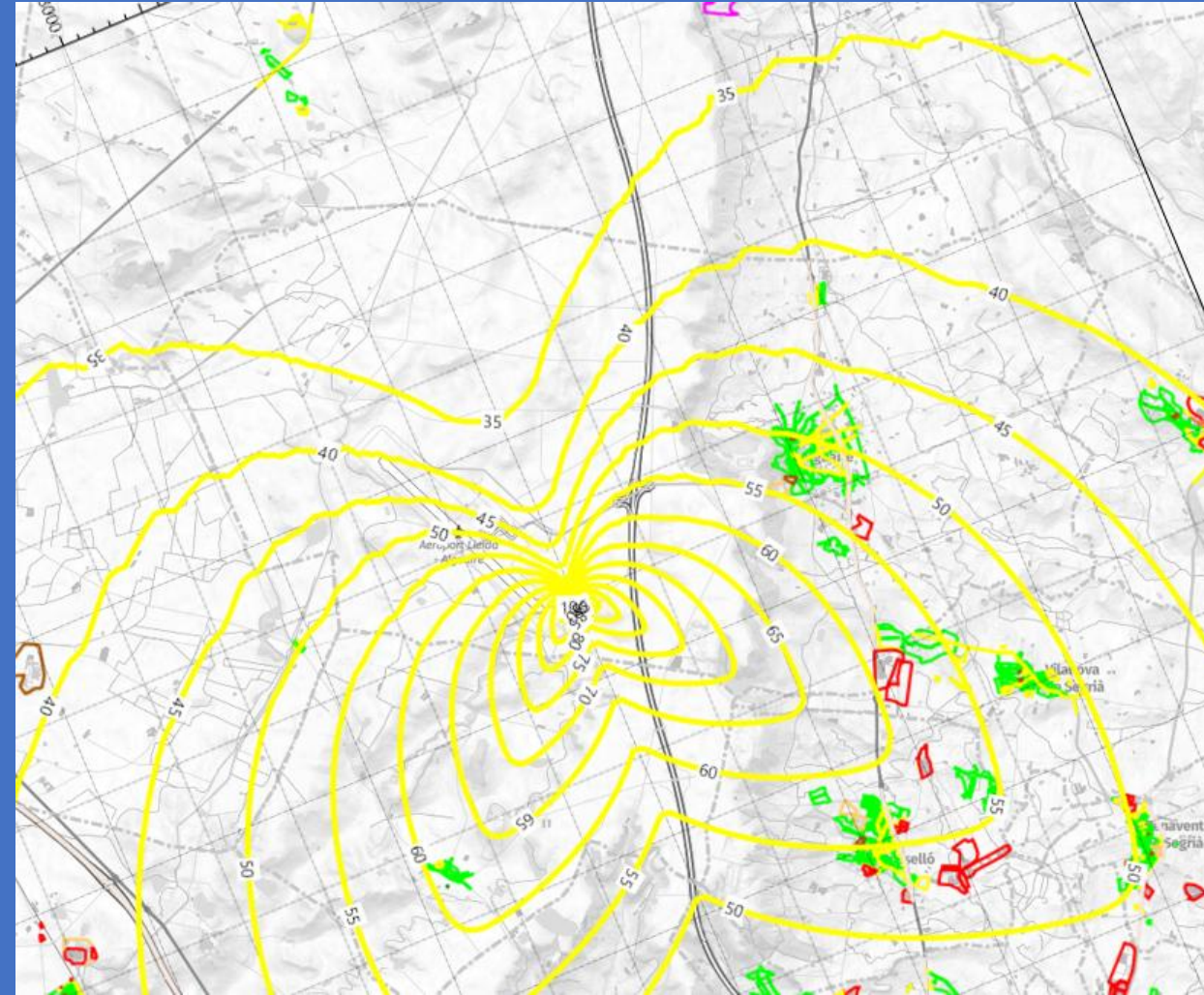
- Determination of the hydrodynamic characteristics of underwater autonomous vehicles, for thrusters sizing and operative range maximization
- Study of the flow characteristics inside an underwater drilling shaft for soil stability analysis
- Design of centrifugal and axial fans to optimize the distribution of molecules dispersed in the air stream inside an industrial sterilization autoclave
- Coupled CFD and Thermal simulation of HATF



Rocket Engines Noise

Novaeka developed a custom model based on NASA standards to estimate the noise emissions generated by the testing of a rocket engine, including noise reduction due to the presence of a water deluge system, containment walls and other environmental attenuations.

The model is used as part of the environmental analysis that must be provided to the authorities to get the construction of a test facility approved.



A view of Earth from space, showing the curvature of the planet and a bright sun rising over the horizon, creating a lens flare effect. The text "What's Next?" is overlaid in white.

What's Next?

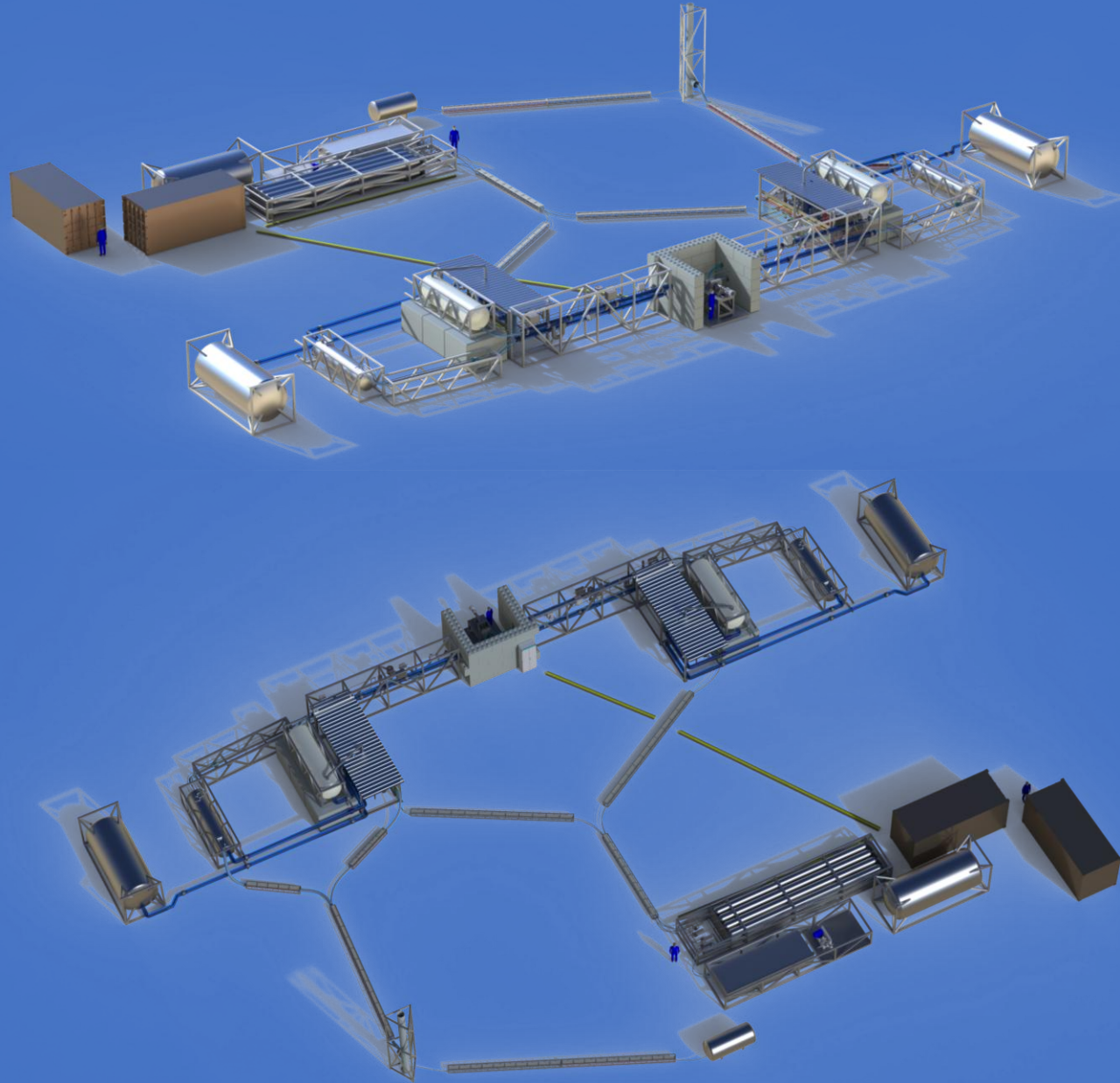
Novaeka Product

Novaeka is working on an innovative product: a **portable, modular, configurable** test facility that can be rented only for the time it is really needed, deployed and commissioned in a few days at the client site of choice.

The client can choose the test modules that are needed based on the maturity level of the engine to be tested, quickly iterate through different designs, and rent additional modules only when the development schedule requires additional testing capabilities.

Strict confidentiality on test results is guaranteed by the fact that Novaeka personnel will set up the facility and hand it over entirely to the client for the whole duration of the test campaign.

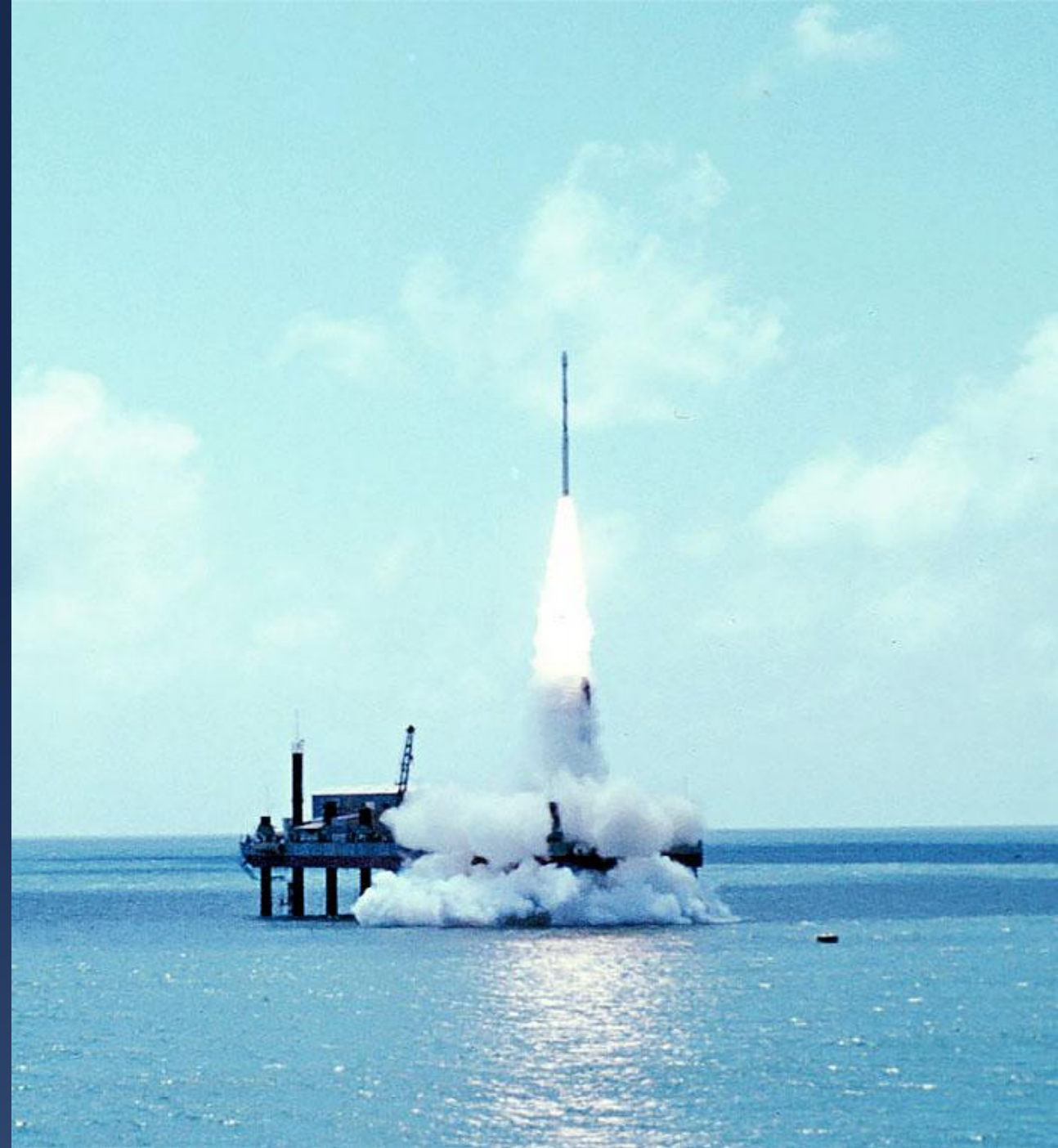
This requires a training of the client personnel, which can be done in advance thanks to a Digital Twin that simulates the entire facility and its control system. This allows also the client to perform virtual tests to optimize sequences and settings for their specific tests.



Malindi

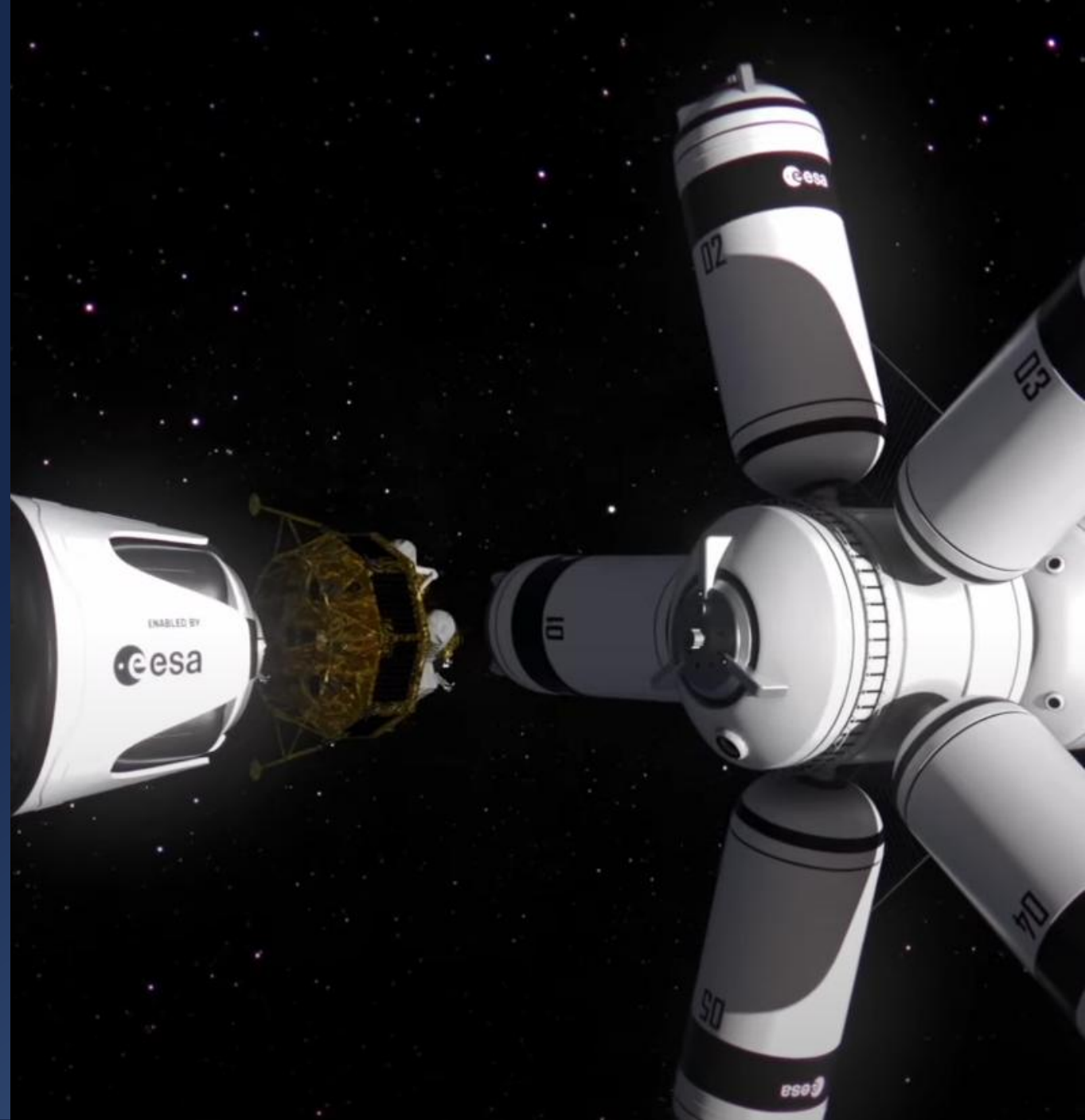
Novaeka is part of the consortium to leverage the Italian base of Malindi (Kenya) and reactivate the offshore launchpad.

The final goal is to have a new European spaceport at favorable latitude.



In-Orbit Refueling

Novaeka is part of the consortium to devise solutions to enable the In-Orbit refueling of spacecraft, to enable an In-Space ecosystem.





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Novaeka srl – www.novaeka.com
Italy – Padova

Rif. Marino Moro CEO
email: m.moro@novaeka.com