The Exploration Company

Nyx Earth Simplified LCA

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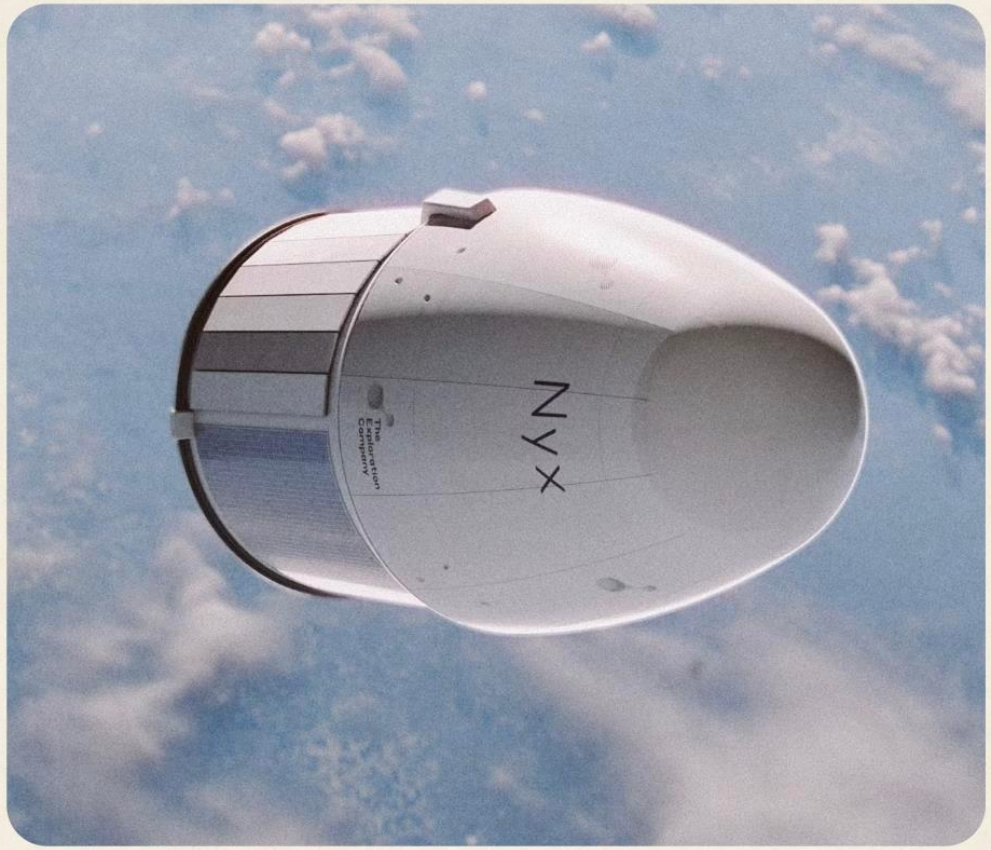
The Exploration Company

Ecodesign Days 2025, ESTEC

Our Space Vehicles



Nyx Earth

Earth to Low Earth Orbit and back.

Hilal

Earth to Lunar Gateway and back.

Nyx Earth - Europe's Space Logistics Solution

- Modular, reusable, sustainable capsule for orbital logistics
- Designed to support today's LEO missions and scale to tomorrow's lunar operations
- Enables a more competitive global space logistics ecosystem.

Technical Overview

Thermal Protection System (TPS)

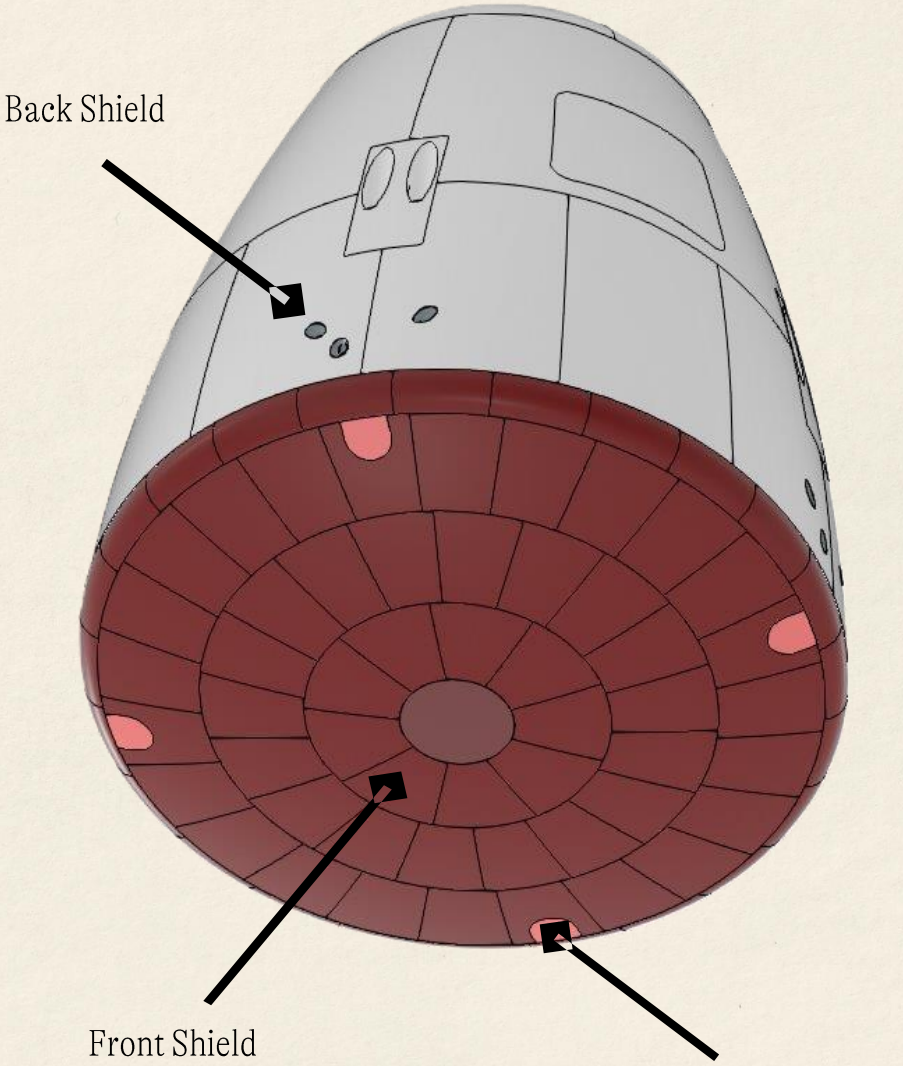
- Hybrid TPS using Zuram + P50 materials

Modular Payload Bay

- Both pressurized and unpressurized options
- Flexible design supports science payloads, cargo, and satellites

Docked Operations

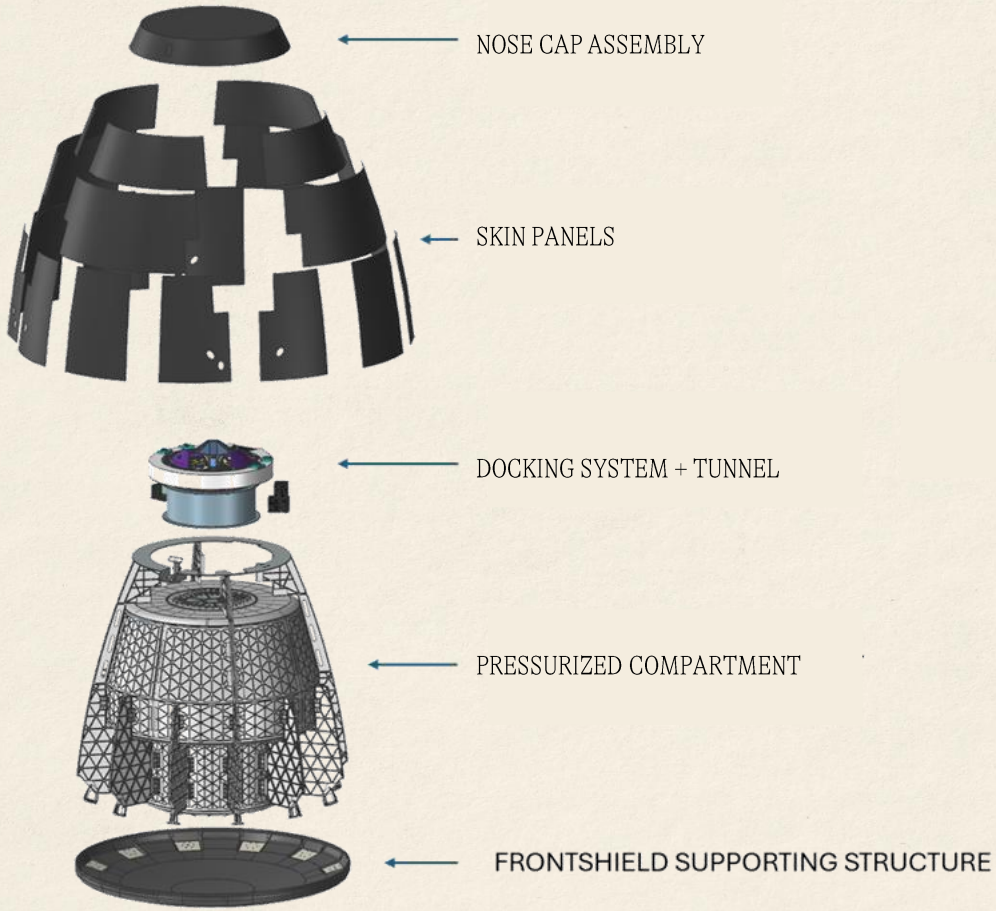
- Remains docked in orbit for up to 50 days with design life extensible to 210 days.
- Supports long-duration missions and on-orbit servicing



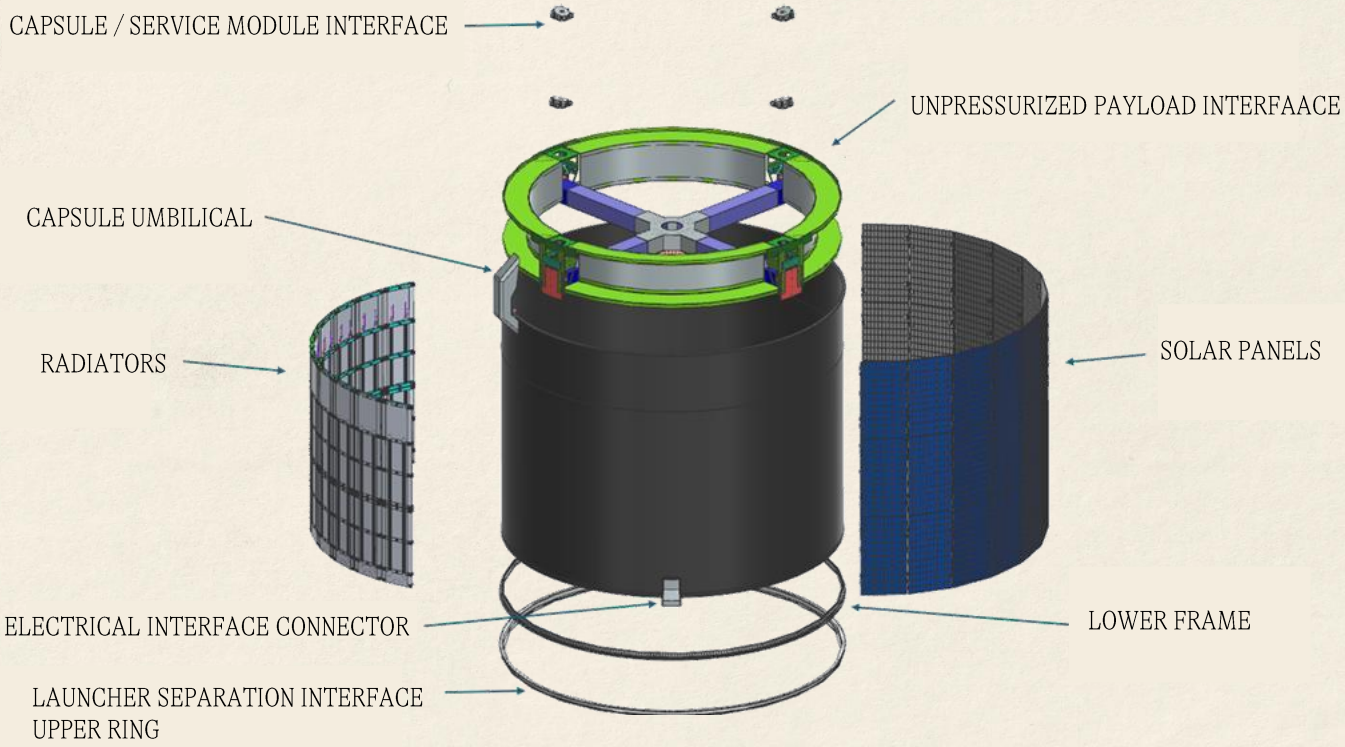
TEC - PUBLIC

Vehicle Architecture

Capsule high-level architecture



Service Module high-level architecture



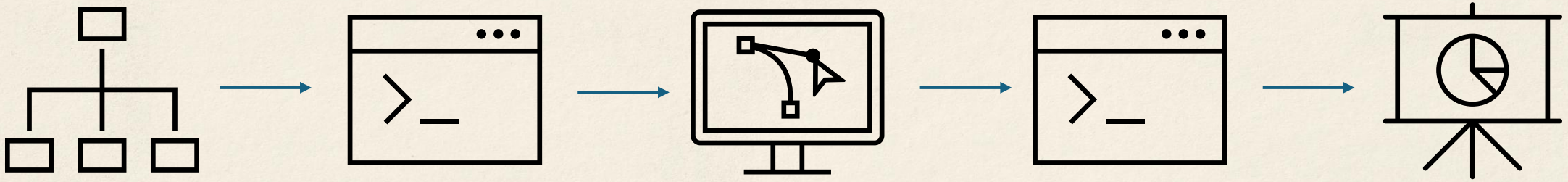
MBSE implementation

- In-house development of MBSE tools
- Quick adaptations and tailored solutions
- Single source of truth, no duplication of data

MBSE enables LCA

- Python scripts for processing of data
- Single source of truth is upheld
- Reduction of mistakes
- Interconnectivity for fast assessments
- Easy assessment of changes and trade-off impacts

PBS – LCA Workflow



Post-processing in the PBS creates ready-to-go Excel file with all necessary data on TRL & mass.

Python script takes PBS data & creates all necessary flows & processes in LCA software, based on standard datasets as much as possible.
Python script also contains an additional file for general assumptions (reuse, logistics, infrastructure, etc).

Data is fed into the LCA software through the scripts. Everything can be controlled through python, without the need to do anything by hand in the software.

After calculation is triggered through the scripts, the LCA software hands results back over to python where post-processing scripts are triggered.

Results are shown in standardized graphs that enable comparison with previous LCA runs. Sankey Graphs enable deeper understanding of where impacts come from.

Trade-off and change assessment

- Excel and assumption file can be manipulated easily without affecting original data
- Quick re-run of LCA through the standardized process
- Iterations of various changes calculated with a few clicks

Thank you for your Attention

Questions Welcome

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