SIDEREUS SPACE DYNAMICS

ASI CubeSats Workshop

4TH July 2024

Agenzia Spaziale Italiana

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Audentes Fortuna Iuvat

TEAM

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OP. TEAM

ADVISORS

Roberto Battiston
Former President at ASI

Laura Crabtree
Senior Mission Operations Engineer at SpaceX

José Achache
Former Director of Earth Observation at ESA

Giuseppe Cataldo
Head of Planetary Protection at NASA

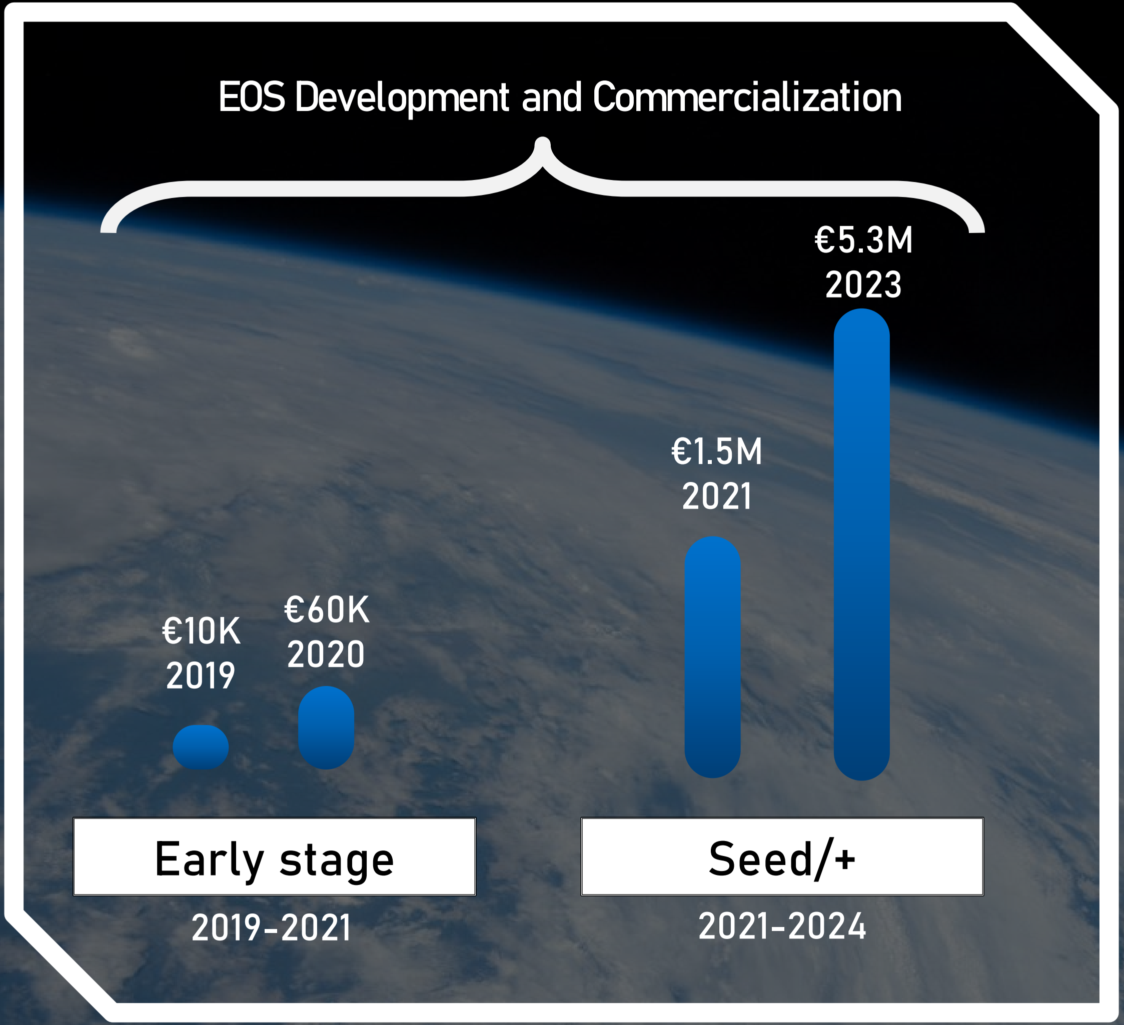
INVESTORS

Management Innovation
Pre-seed round

Primo Ventures
Lead investor seed round

CDP Ventures
Co-investor seed round

ENSURED INVESTMENTS



TIMELINE

Early stage

Prototypes, modus operandi and key technologies demonstration.

Seed and Seed+

Technological demonstration and commercialization.

Series A

New technologies and expanded vehicles development from Q4 2024.

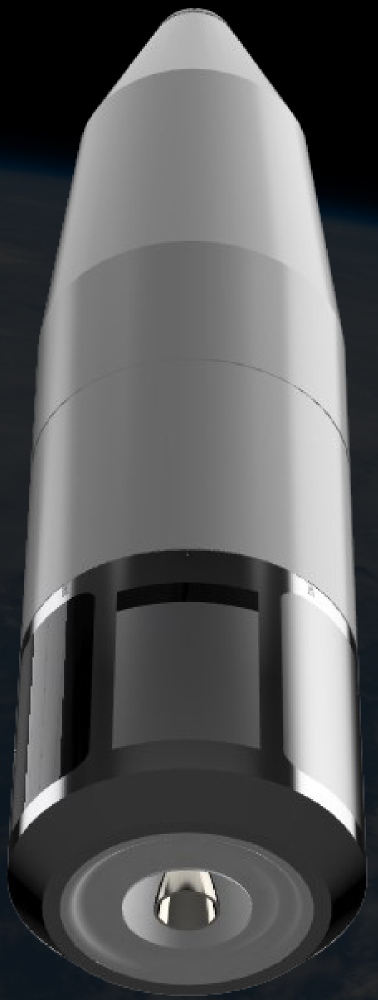
Sidereus HQ

Near Amalfi's coast

- +1100 sqm facility for vehicle manufacturing, assembly, and integration
- 10 min away from 4-hectare test range for engine test fires and vehicle-integrated tests
- 10 min away from sea access

EOS

REQUIREMENTS



- Up to 12 kg payload for SSO (e.g. 6U CubeSat);
- Designed to liftoff in the worst condition possible (equator 0° to retrograde 97,7°), with transportation capabilities to anywhere in a standard container;
- Fully reusable at least 10 time through guided parafoil (low terminal velocity, low pressures for material stress, radiative heat shield);
- Launch&recovery with no permanent infrastructures (no pads, in situ tanks, ground segments, etc,) and with 1 day of notification time for a launch (6 hours of preparation);
- Fully autonomous operations launch/in-orbit/return, with minimal human touch;
- Payload reentry capability from 12 hours to 1 month for commercial applications, commercial fast R&D;
- Integrated safe in-flight abort system and termination integrated (to be launched even from in land launch sites).

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EOS

Specs

FIRST FLIGHT
Q4 2025

Specifications

300 s ISP (AVERAGE)
Jet-A1 (Carbon Neutral)
AND LIQUID OXYGEN
2.5:1 O/F RATIO
SSTO
REUSABLE (10 TIMES)

UP TO 12KG SSO CONFIG.

1740 KG GLOW
30 KG DRY
41.4:1 MASS RATIO
HEIGHT 4.2 M
BASE DIAMETER 1 M
SEA LEVEL THRUST 25 KN
1 ENGINE CONFIG WITH GIMBAL
ISP AT SL 260 s AND VAC 310 s
250:1 THRUST-TO-WEIGHT RATIO

EOS dimensions compared to modern vehicles

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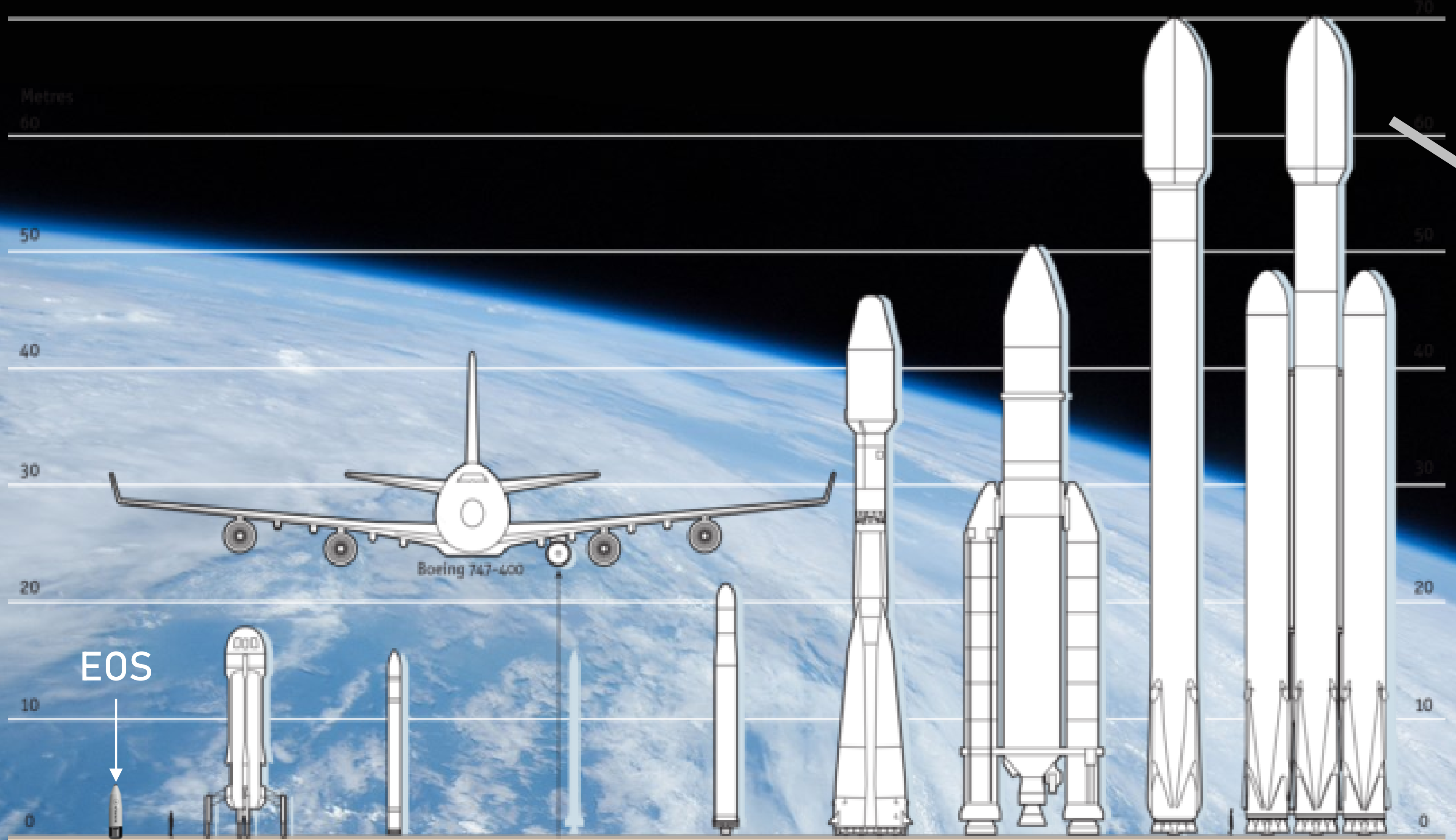
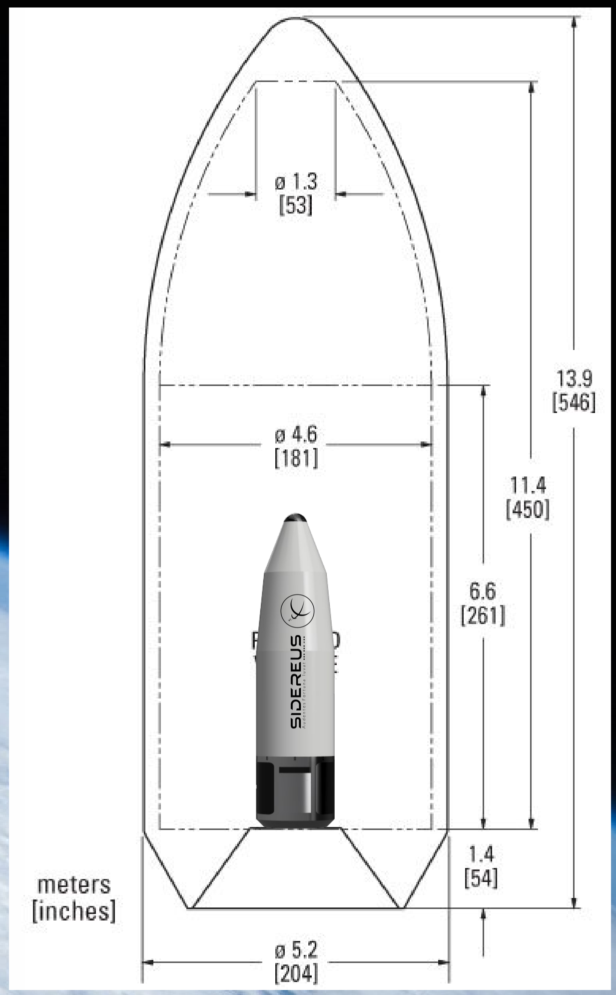


Carrier rocket	New Shepard	Electron	LauncherOne	Alpha	Soyuz-2.1a	Ariane 5	Falcon 9	Falcon Heavy
Organisation	Blue Origin	Rocket Lab	Virgin Galactic	Firefly	Russia	ArianeSpace	SpaceX	SpaceX
Height, metres	18.0*	16.0	16.0*	21.6*	46.1	50.5	70.0	70.0
Payload to LEO†, kg	n/a	150	500	200	7,800	20,000	22,800	54,400

*Estimated †Low-Earth orbit



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PAYLOAD CAPACITY

PAYLOAD VOLUME 22 cm X 30 cm, 40 cm (h)
(3U X 3U X 2U)
12 KG PAYLOAD TO SSO 550 KM

FULLY CUSTOMIZABLE MISSION

Position your CubeSat with extreme precision without using a space tug.

LAUNCH ANYTIME YOU WANT

Just few days of mission preparation needed & a high launch frequency.

NO DEPLOYER DEPENDENCY

No need of an external deployer. The payload bay is built on fit.

PAYLOAD REENTRY

Recover your payload from orbit safely.

ADVANCED MISSIONS

CONSTELLATION POSITIONING & REPLENISHMENT

Accurate constellation positioning and fast replenishment in case of satellite failure.

VEHICLE AS A TESTPLATFORM

On board payload integration to eliminate satellite bus costs.

YOUR ITERATIVE R&D

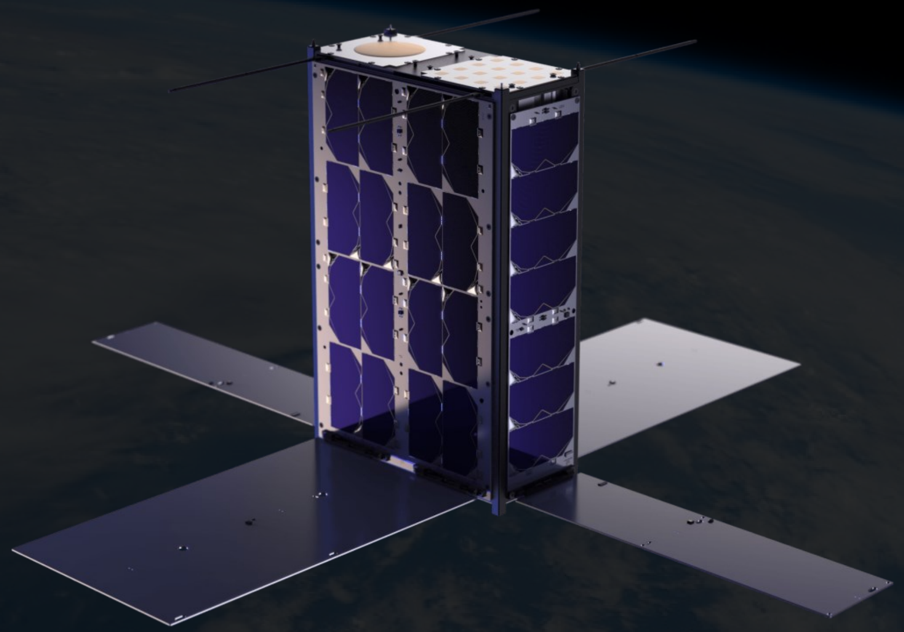
Test your R&D on board of our vehicle with quick and customized launch campaigns.

DRIVE-IT-YOURSELF

The vehicle can potentially be operated autonomously by the client.

Fast Response Platforms

FEATURES

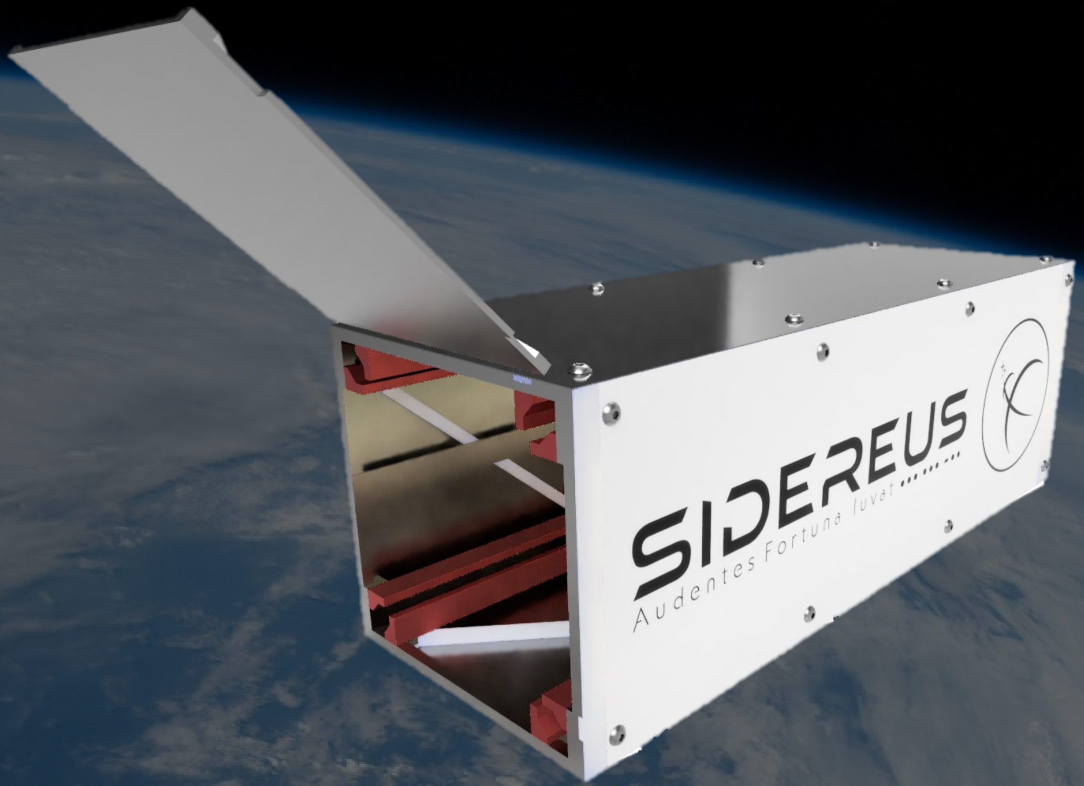


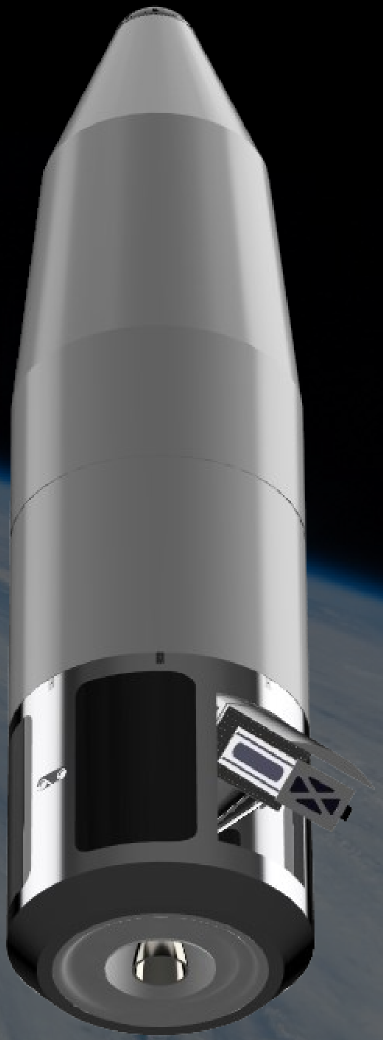
- SHORTER DEVELOPMENT TIME, REDUCED COST
- CUTTING EDGE TECHNOLOGY
- INFRASTRUCTURES UPFRONT INVESTMENTS
- TECHNOLOGICAL DEMONSTRATION AND QUALIFICATION
- CONSTELLATION RESILIENCE, RESPONSIVITY, DETECTABILITY, UPDATE RATE
- TRAINING AND FORMATION
- SCALEUP

Technologies Comparison

	SIDEREUS	Microlauncher Custom Mission	Microlauncher Rideshare Mission	Orbital Transfer Vehicle
Time from contract to launch	Shortest	Mid	Longest	Long
Orbit and integration customizability	High	High	Low	High
Complexity of payload integration	Lowest	Mid	High	High
Launch location flexibility	High	Depends	Depends	Low
Onboard services	Numerous	Depends	None	Depends
Launch costs	Low	Highest	Average	High

Custom Deployer





- Timed deployment for payloads (from 0.25U to 6U)
- Very lightweight structure (1 kg)
- Closable for reentry
- Providing power, telemetry, and thermal dissipation upon request
- Allow for glovebox payload integration
- Provide a clean environment during prelaunch activities

Payload User's Guide

Payload capacity and onboard conditions

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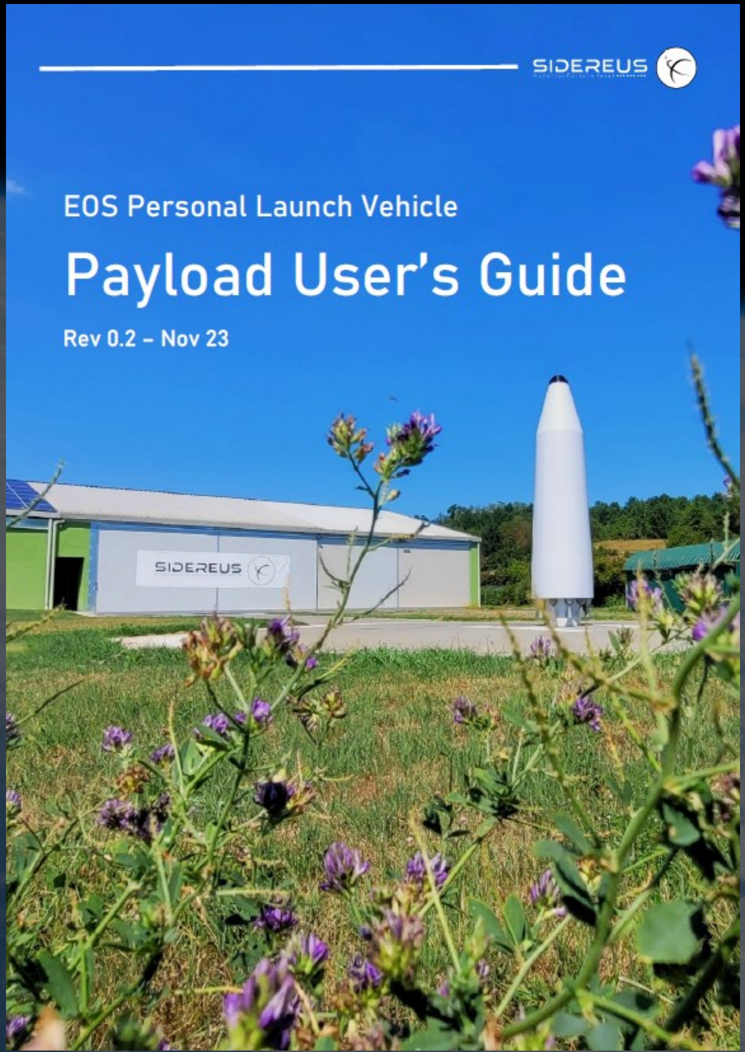

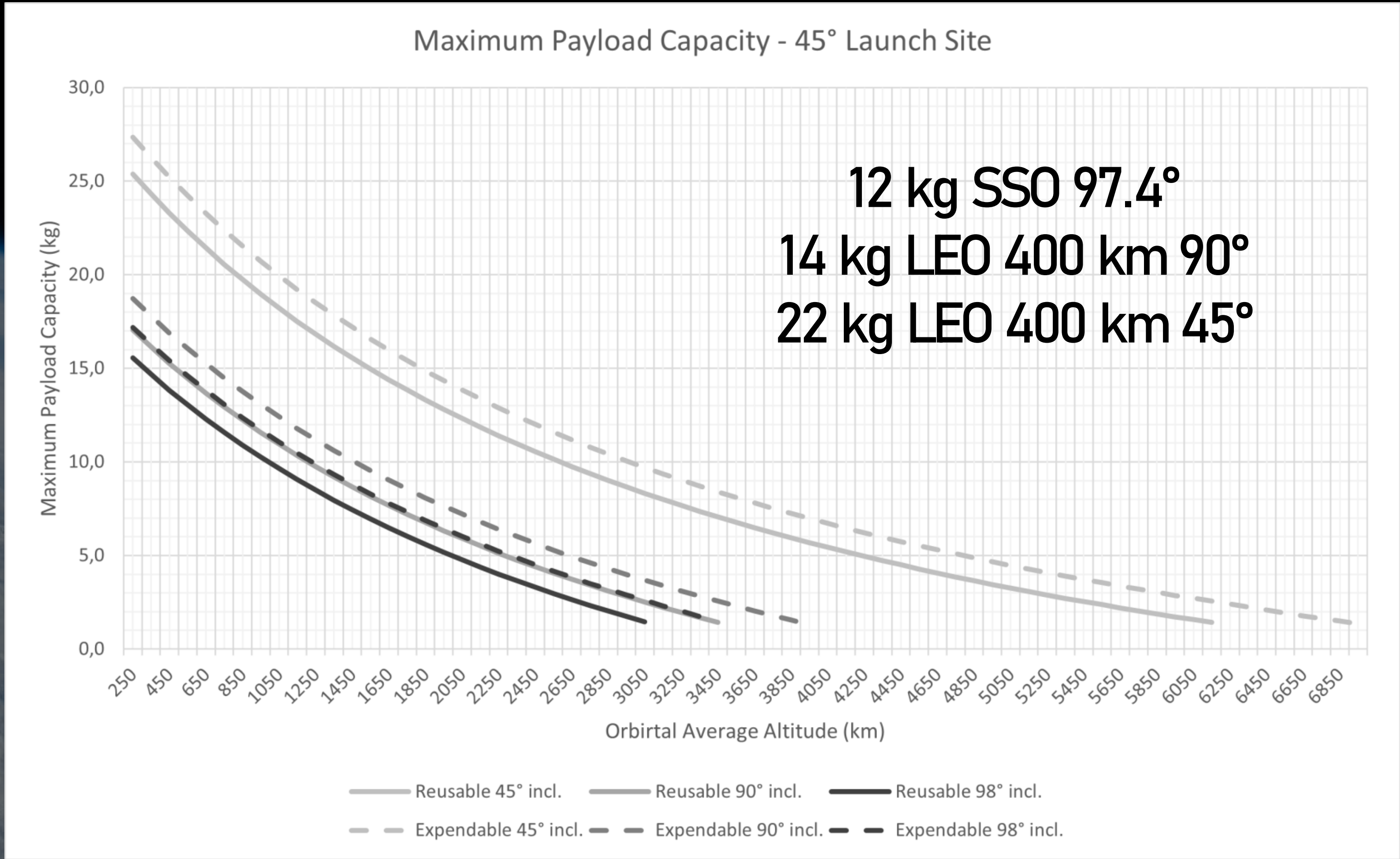

EOS Integrated System Test

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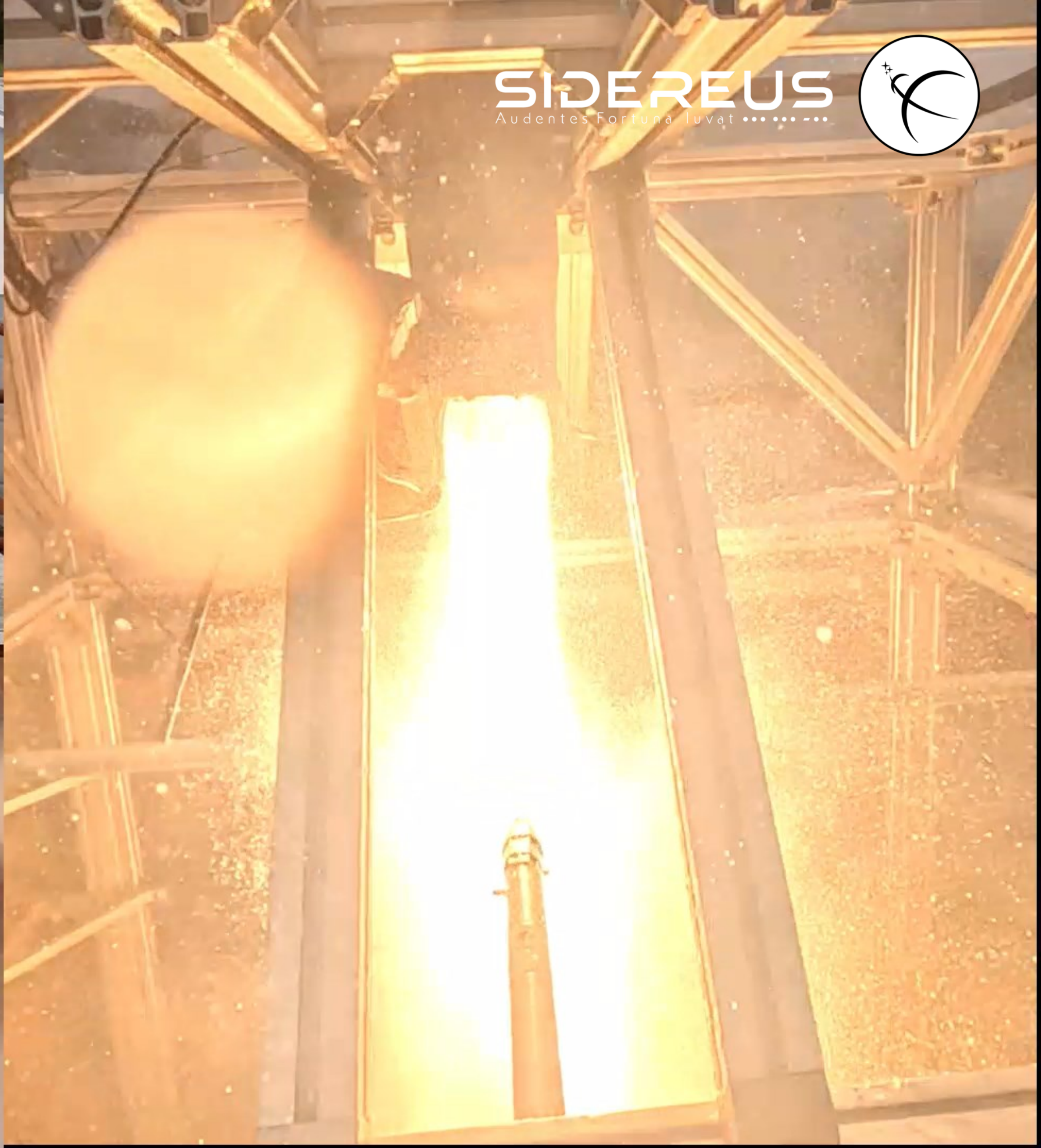
EOS Wet Dress Rehearsals



MR5 Static Test Fire

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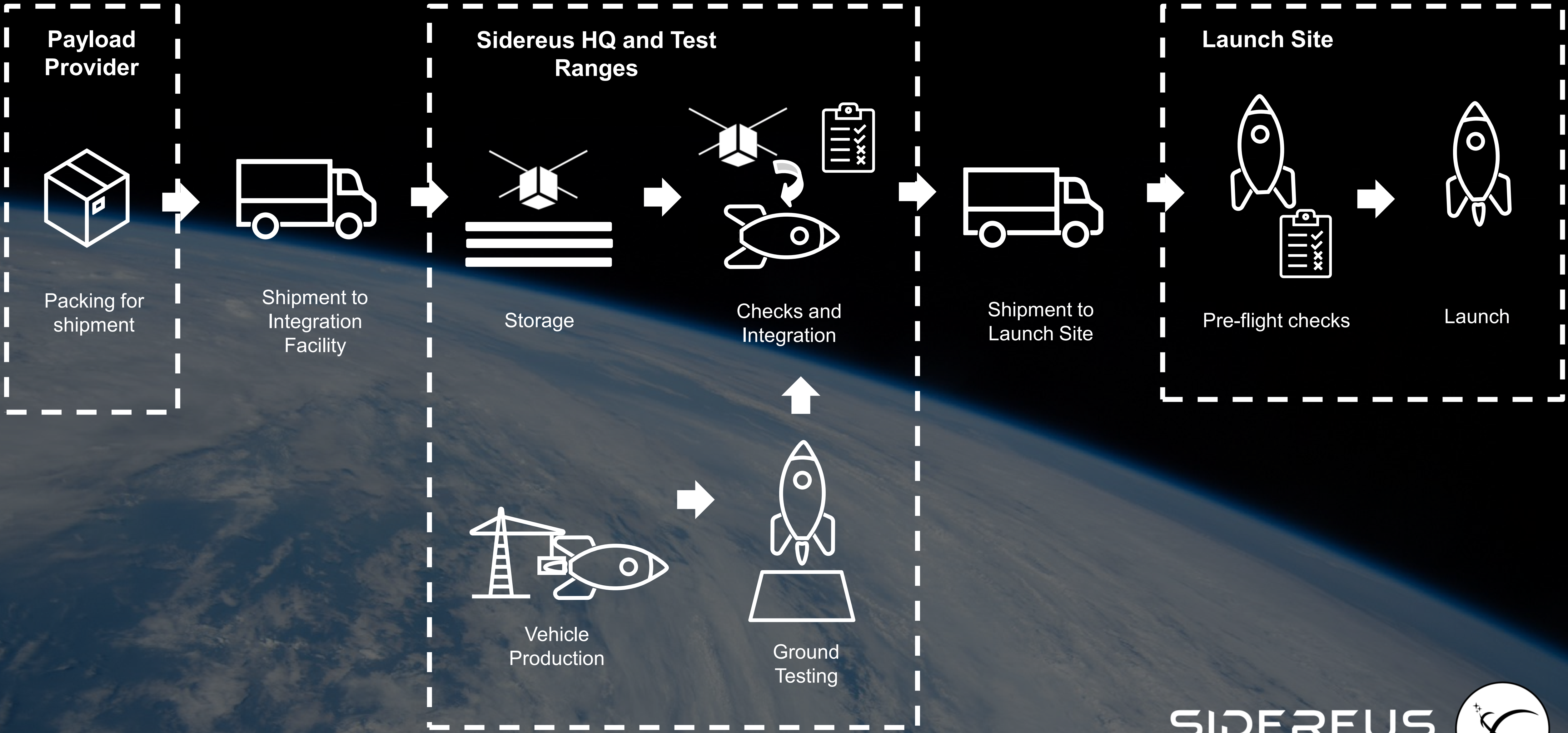
MR5 Static Test Fire



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EOS Orbital Launch Site Configuration

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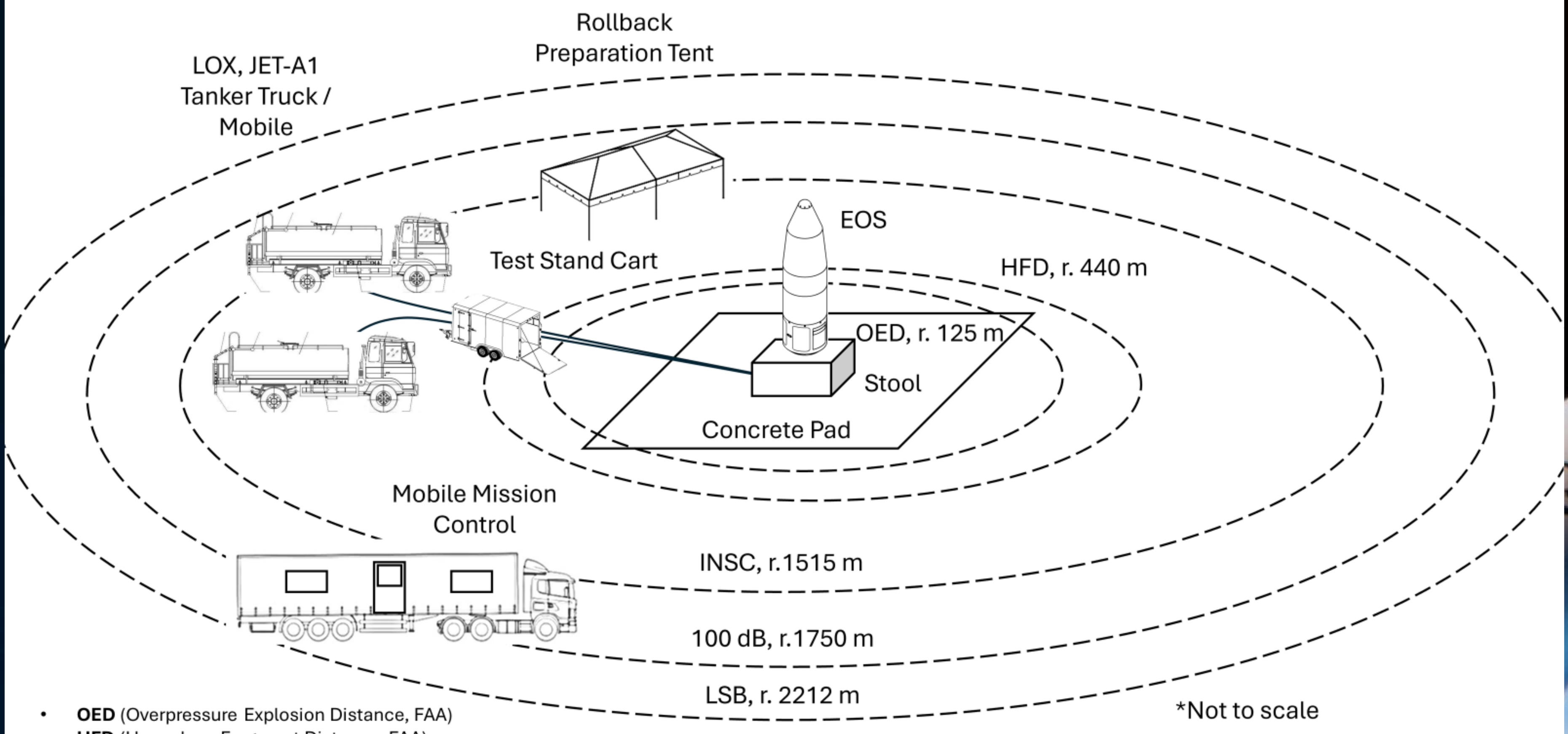
Mobile launch site arranged in a few hours



- **OED** (Overpressure Explosion Distance, FAA)
- **HFD** (Hazardous Fragment Distance, FAA)
- **INSC** (Impulsive Noise Safety Cutoff, UN)
- **100 dB** (1/1000 household damage distance, OSHA)
- **LSB** (Launch Site Boundary, FAA)
- **r.** (Radius from the launch site)

- FAA, License to Operate a Launch Site, Part 420.
- Calculation of Safety Clear Zones for Experimental Permits under 14 CFR § 437.53(a)
- IATG 01.80 - Formulae for Ammunition Management - Clause 9.4

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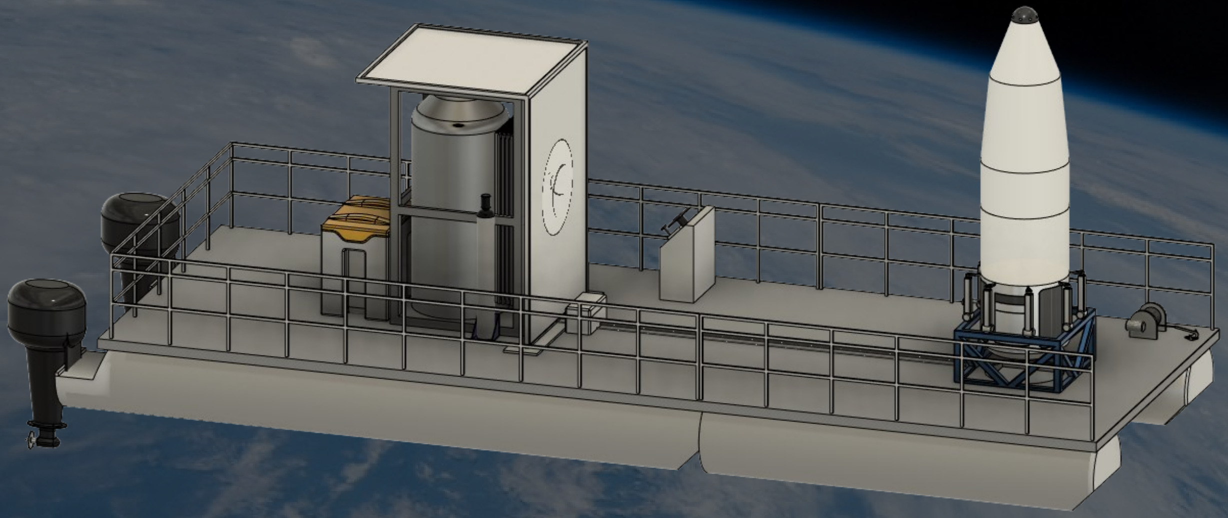
Sea Launch Operations

Taking advantage of the only “Italian desert”



With Italy’s lack of a desert, sea operations offer the next lowest risk configuration for energetic test (long-duration static fires) and various flight profiles, from LAF to potential orbital.

EOS miniaturized size allows for very small vessel requirements to perform launch operations nm away from the shoreline everywhere needed.

Suborbital Flight and Orbital Flight from Italy

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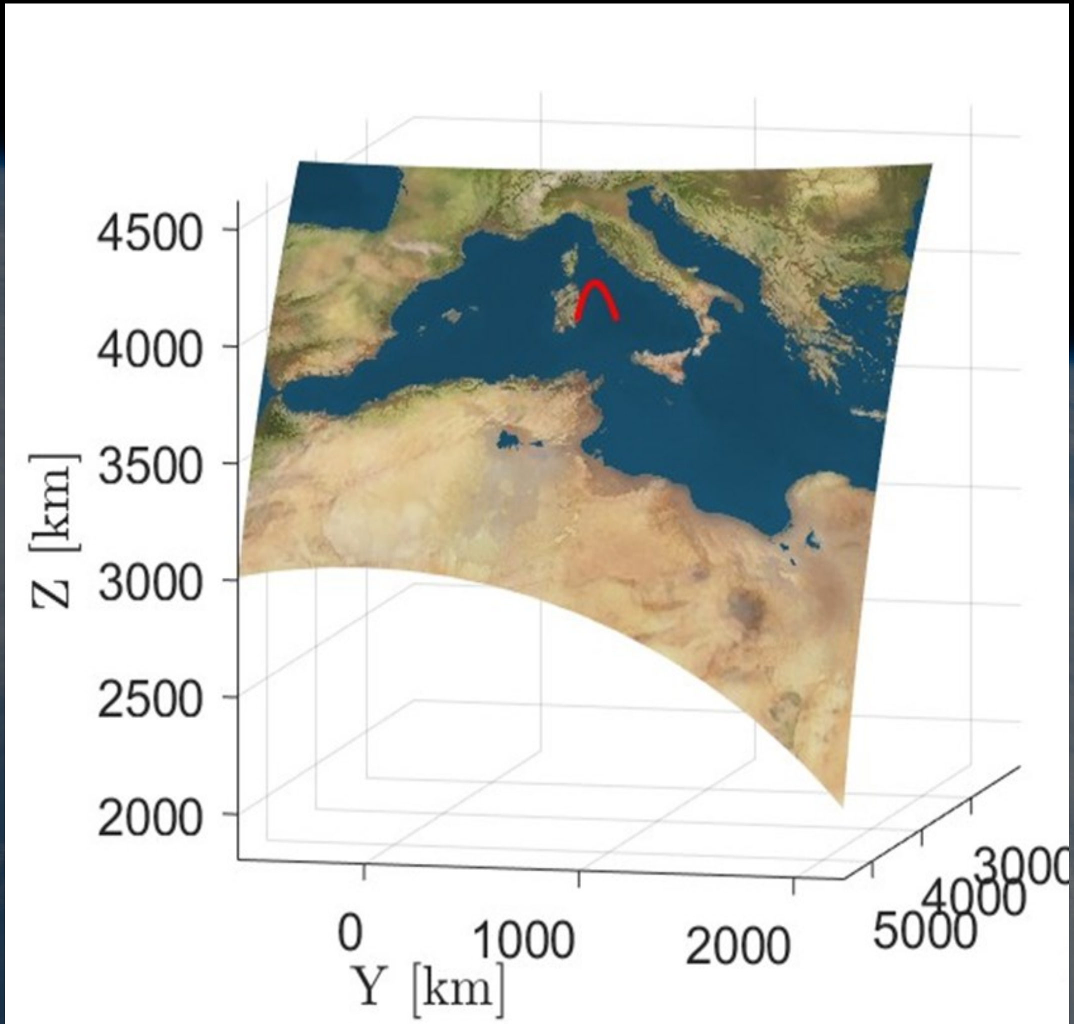
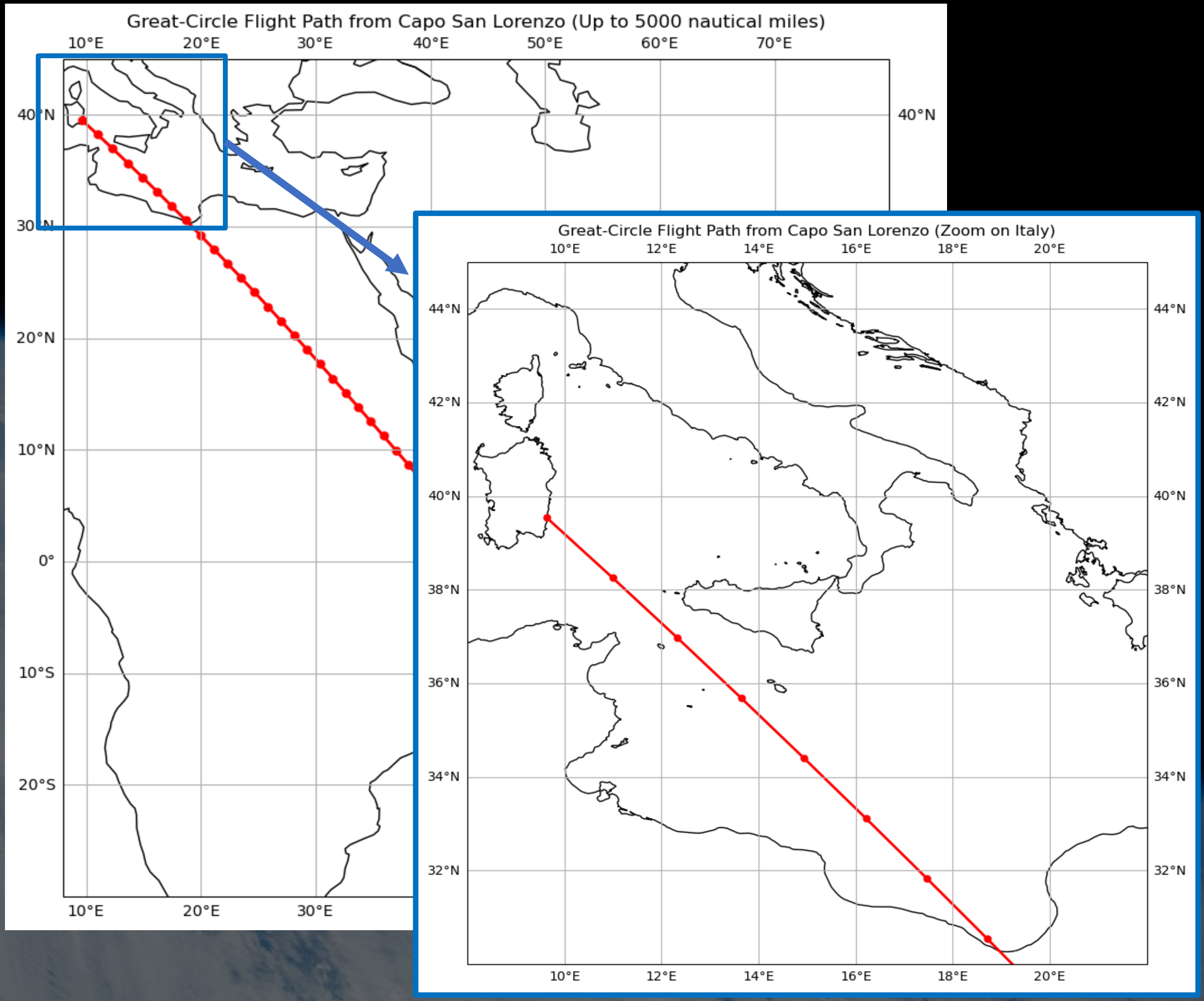
Suborbital 250 km Apogee



Orbital 400 km, 48°



Milestones Timeline

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State of the art

Validated propulsion system, achieved dry tanks tests, first flight prototype in construction

2023

Integrated System Test

Vehicle preflight preparation and static fire for assembly test and validation

July 2024

Low Altitude Flight

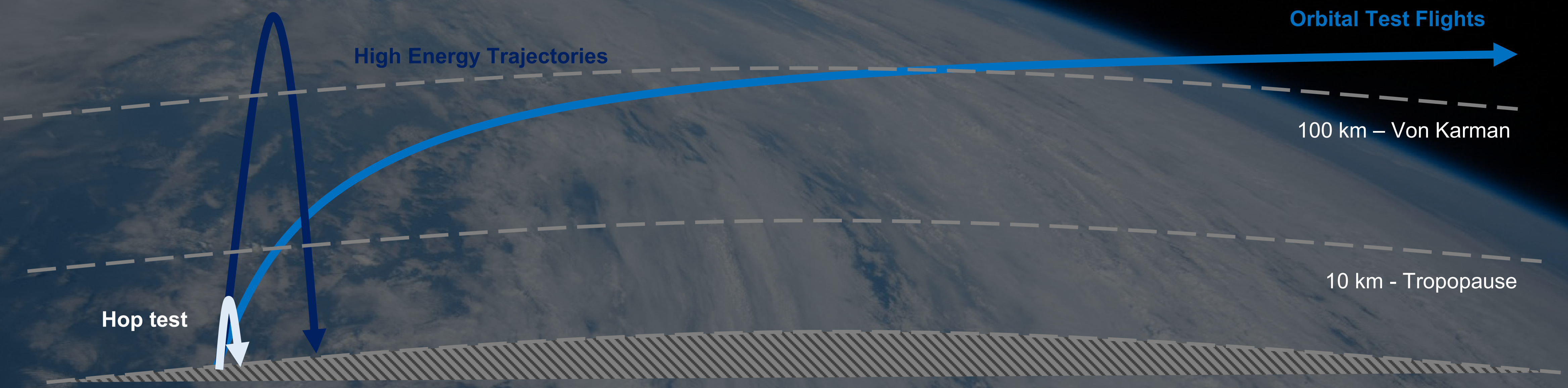
Flight below controlled air space for simplified high stress conditions vehicle's verification

Q1 2025

High Energy Trajectories & Orbital Test Flights

Flight up to orbital velocities in expendable mode, the first SSTO ever flown

Q4 2025



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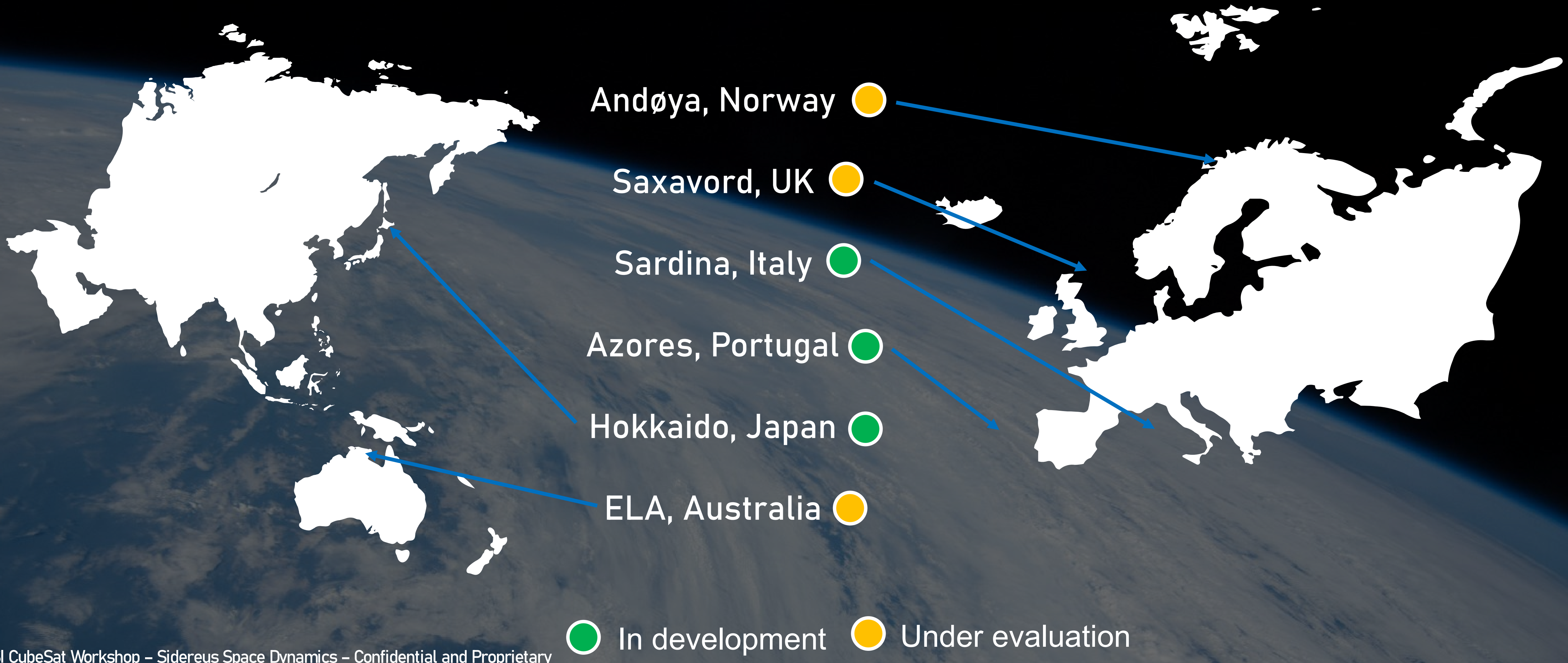
Spaceport for suborbital/orbital flights

Current launch site options in development and under evaluation



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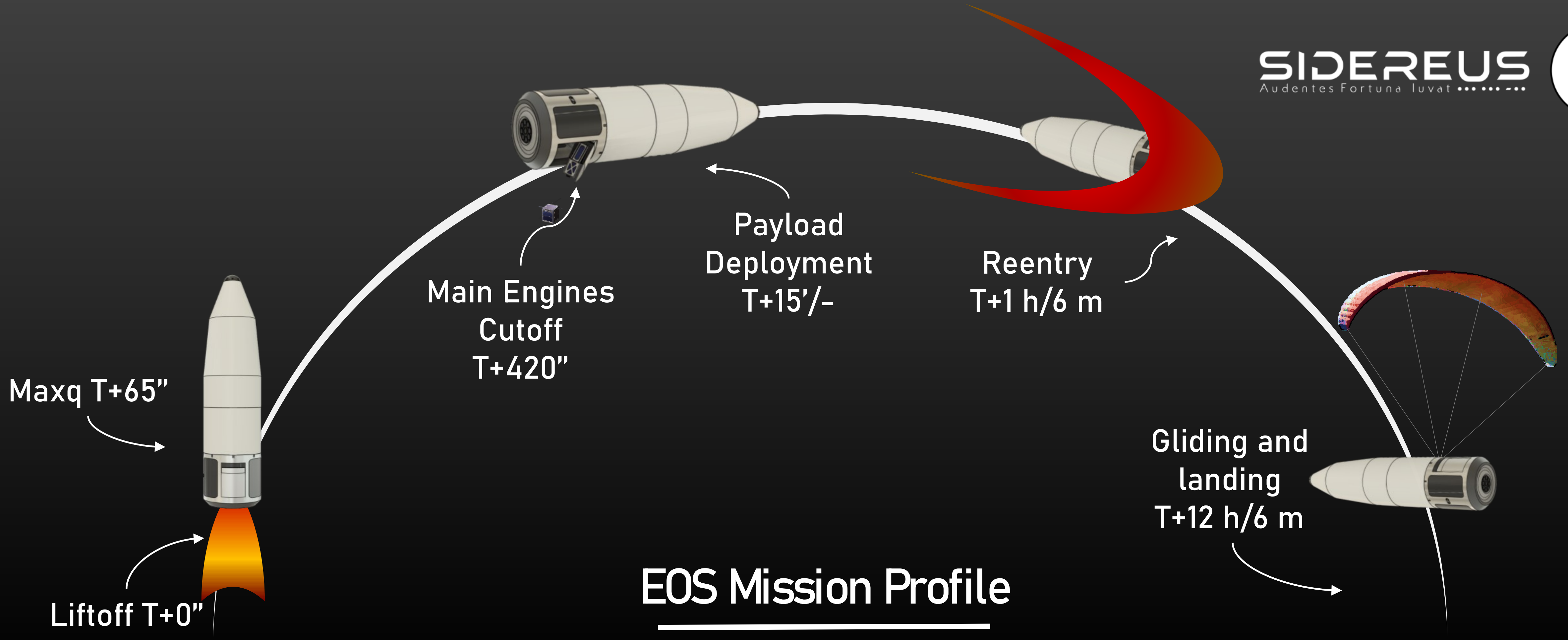
CREATING THE EASY WAY FROM EARTH TO THE STARS



EOS Mission Profile

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Possible mission profiles

Orbits are not limited to SSO or LEO, very low earth orbit (VLEO) is also feasible, allowing much higher resolution/power communication/observations. Very high orbits are also possible, a 1U CubeSat can achieve a 185 km X 12.000 km.

Mission Profile
EOS vehicle