Space Transportation at CM25

Belgian Industry Briefing

Brussels, Belgium
26 September 2025

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Europe has restored its Access to Space

The Global Context is Shifting

European space transportation needs are evolving fast

- Geopolitical situation is rapidly evolving towards reinforcement of European Security and Defence responses
- Europe needs a reinforced space infrastructure for Security & Defence
- European access to space is in the short to medium term ensured by Ariane 6 and Vega C

Safeguarding and strengthening independent European space transportation capabilities now and in the future is more crucial than ever

ESA Strategy 2040

Five goals and their objectives by 2040, guided by the vision to uplifting European aspirations for a better tomorrow:

01
Protect our planet and climate

02
Explore and discover

03
Strengthen European autonomy and resilience

04
Boost European growth and competitiveness

05
Inspire Europe

ESA Strategy 2040 & Space Transportation

Secure autonomous and competitive access to and mobility in space through new transportation systems, solutions and services.

"ESA will boost Europe's space access and mobility by 2040, making it a key player in space transportation.

Recognising that launch costs dictate competitiveness in space, the agency will reduce reliance on non-European entities and strengthen its own capabilities."

Space Transportation at CM25
Drivers, Priorities and Programmatic Pillars

Drivers: European Autonomy

- Space transportation is the gateway
- Secure Europe's independent access to space
- Enable and strengthen European space transportation industry and services to compete globally in all space transportation domains
- Provide Europe's space transportation industry with world-class strategic ground infrastructure

Drivers: Demand at the 2040 Horizon

Priorities

1 Ramp-up cadence of ESA-developed launchers (Ariane 6 & Vega C/E)

to deliver on institutional and commercial demand, securing European space transportation autonomy and non-dependence in the short- and medium-terms

Priorities

2 Start the transition from ESA-developed launch systems

to a more diverse European space transportation sector including launch systems and related services developed under the responsibility of European industry

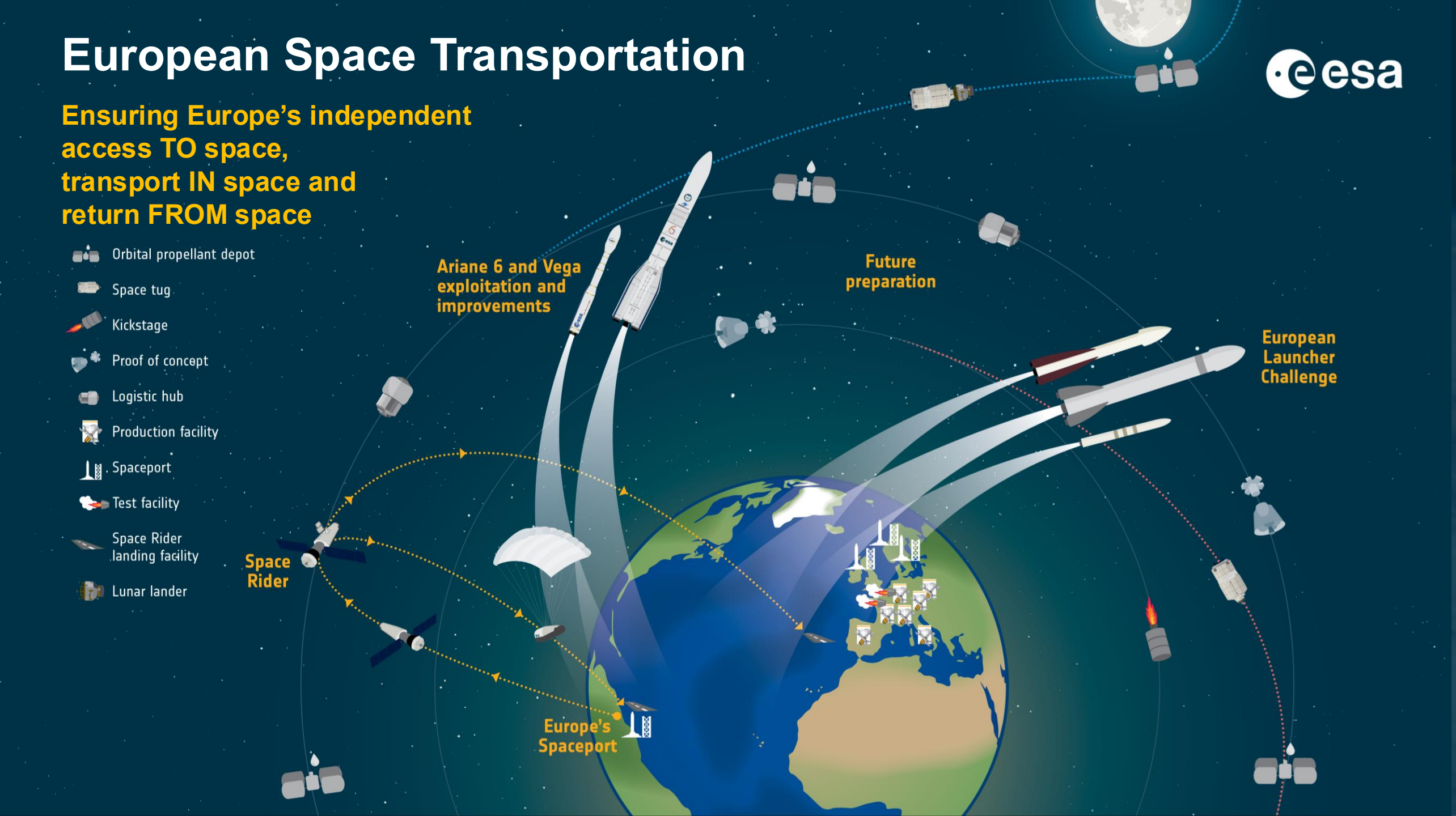
Priorities

3 Embark on Europe's space transportation towards horizon 2040

- Development, test and demonstration of elements necessary for realizing the future space transportation ecosystem in 2030s
- In-space transportation and space logistics solutions geared towards end-to-end services to all orbital destinations

European Space Transportation

Ensuring Europe's independent access TO space, transport IN space and return FROM space



Pillars

Pillar 01

Securing access to space

- Ariane 6 development
- P160C rate increase
- Vega C development
- Vega E development
- Ariane 6 classical accompaniment
- Vega C classical accompaniment
- Ariane & Vega stabilised exploitation

Pillar 02

Securing future space transportation

- Future Launchers Preparatory Programme (FLPP)
- Vega High Thrust Engine
- ASTRIS & ENDURE
- Space Rider evolution and commericialisation
- European Launcher Challenge and Boost!
- Green hydrogen infra at CSG

Pillar 03

Maintaining and enhancing space transportation ground segment infra

- Guiana Space Centre (CSG)
- Strategic Infratsructure, including Test Facilities

Financial envelope: 3,530 M€

Space Transportation at CM25

Pillar 01 - Securing Access to Space

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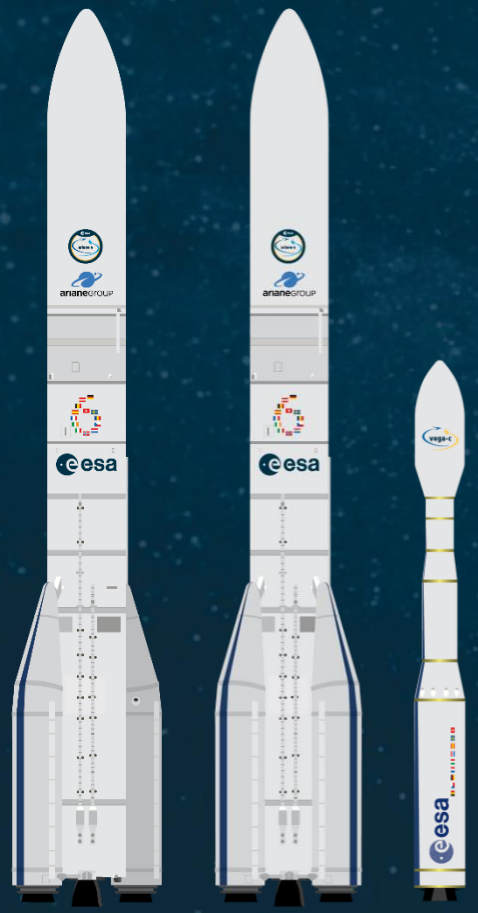
Pillar 01: Securing Access to Space with Ariane and Vega

01



With Ariane and Vega

- Ensure Europe's access to space with Ariane 6 and Vega
- Support ramp-up of launch cadence
- Implement further cost-savings and efficiency

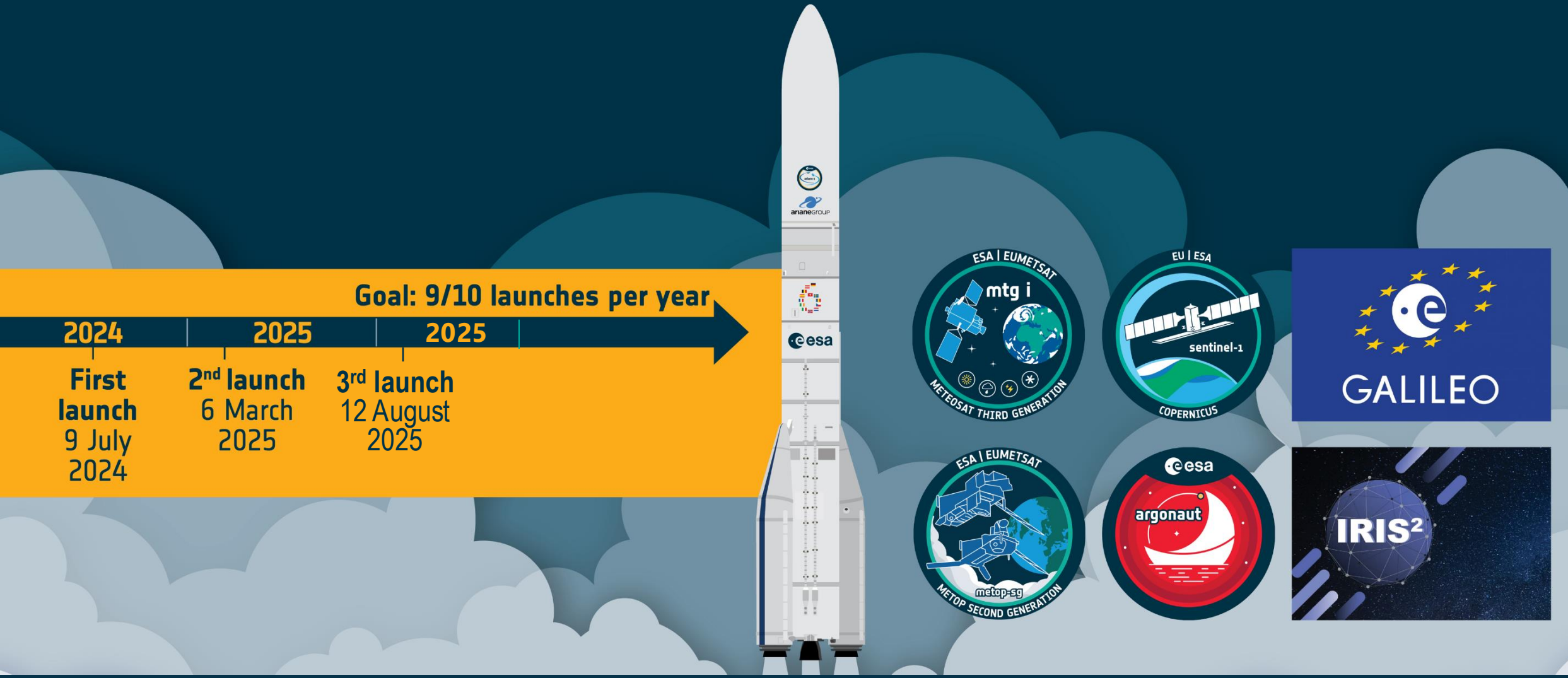
Securing Access to Space – Ariane Evolution

Launch capacity is increasing
Additional investments to shorten launch complex turn-around time

Evolution on cost reduction

ASTRIS
Opening a new domain of missions on Ariane 6

Ariane 6 Timeline

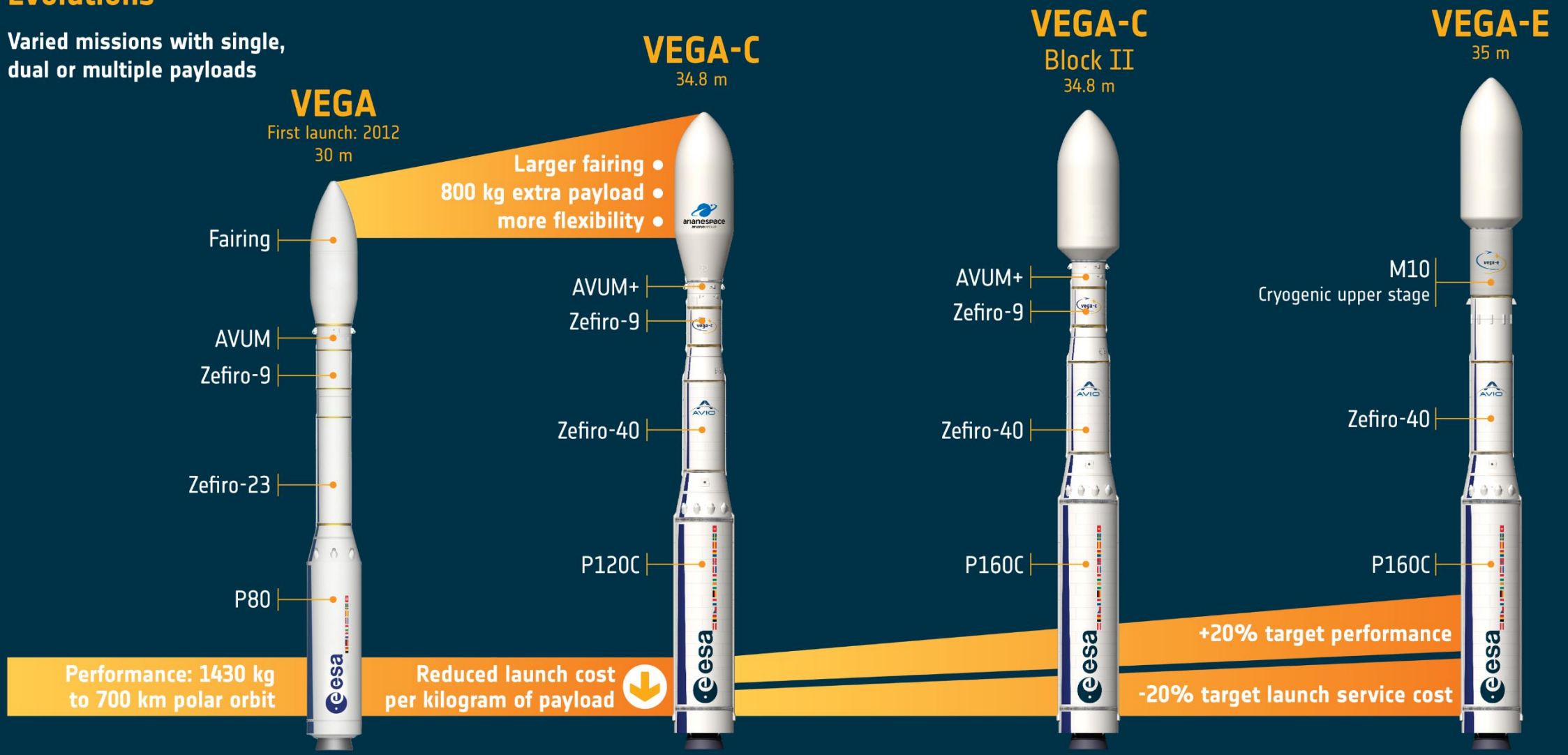


Securing Access to Space - Vega Evolution

VEGA FAMILY

Evolutions

Varied missions with single, dual or multiple payloads



Space Transportation at CM25

Pillar 02 - Securing Future Space Transportation

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Pillar 02: Securing Future Space Transportation

02

- European Launcher Challenge
- FLPP
- Space Rider
- **Vega High-Thrust Engine**
- **ENDURE**
- **Green hydrogen infra at CSG**

European Launcher Challenge Objectives

Shaping a competitive European launch sector for the future

- More choice
- Increased competitiveness
- Demand-pull
- Service diversity
- European
- Fair competition
- Privately led
- Private capital

The European Launcher Challenge (ELC)

Selected challengers shall demonstrate orbital launch capability, unlocking capacity upgrade activities and eligibility to compete for launching institutional (ESA) missions.

ELC Step 2: Towards a European heavy reusable launcher not later than 2035

Demonstrate successful launch by 2027

Demonstrate capacity upgrade by 2028

Regular launch services

ELC Update

Stage 1 of the ELC Competition completed – PB-STS de-briefed on 7 July

ESA TEB recommended the pre-selection of five Launch Services / Challengers:

- **Maia Launch Service** by Maiaspace
- **Miura Launch Service** by Payload Aerospace S.L. (PLD Space)
- **Prime Launch Service** by Orbital Express Launch Ltd. (ORBEX)
- **RFA One Launch Service** by Rocket Factory Augsburg AG
- **Spectrum Launch Service** by Isar Aerospace SE

ELC structured dialogue held with all Challengers over the summer

Preparing the Future

Future Launchers Preparatory Programme (FLPP) is shaping the future space transportation for orbital economy by helping **create an ecosystem of key players** who will offer **scalable, resilient and competitive** end-to-end transportation services to all orbits.

Preparing the Future

High-thrust Re-Usable engines for European Space Transportation

Pushing forward European liquid propulsion.

- Identify industry consortia
- Reignitable full-flow staged combustion
- Quick to test

Preparing the Future

Boosters for European Space Transportation

Foster competition for future reusable first stages or boosters.

- Identify industry consortia
- Avionics & GNC
- Re-entry control & aerodynamics
- Structures & thermal protection

In-Space Proof-of-Concept for European Space Transportation

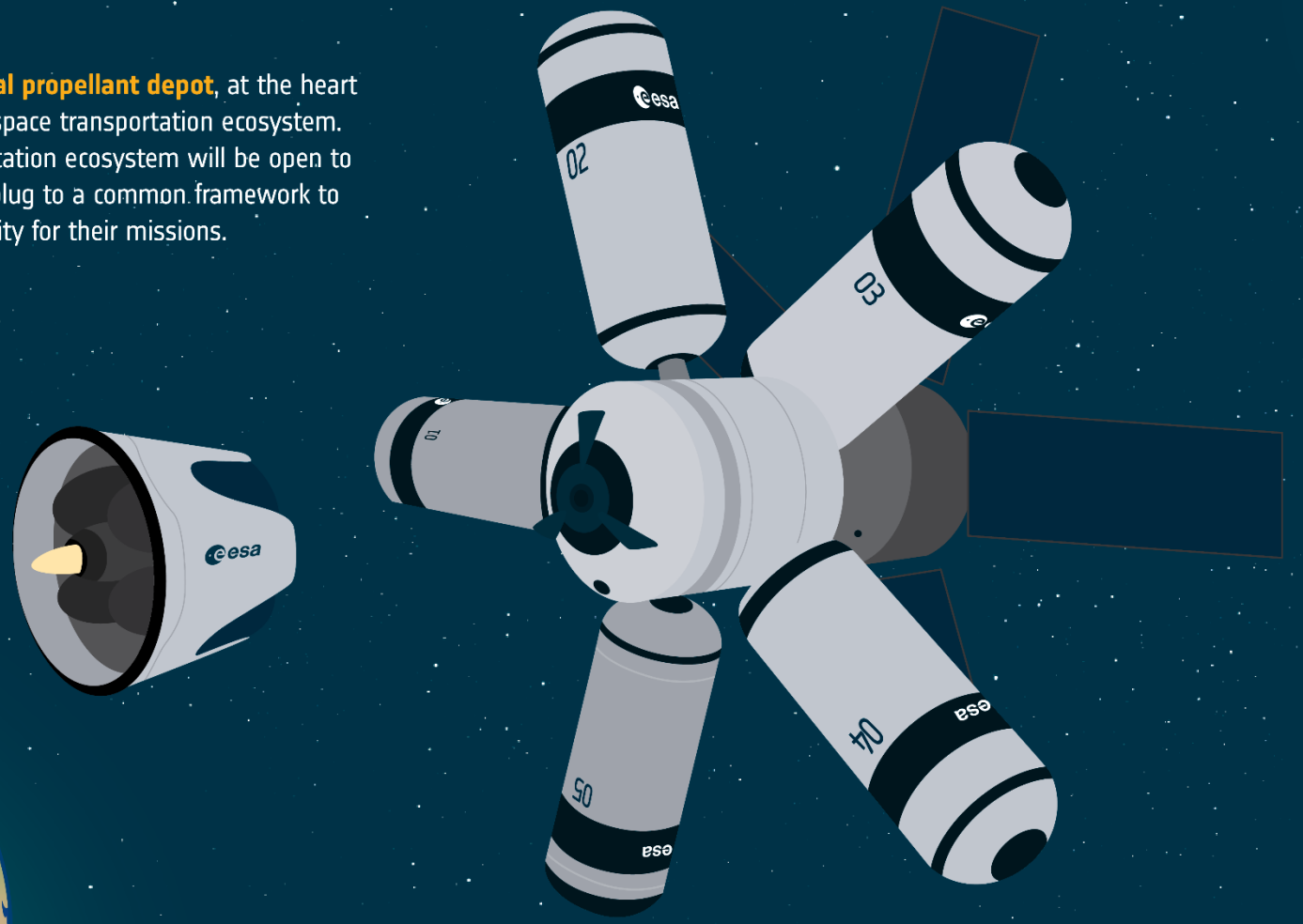
Developing and demonstrating in-space capabilities required for a competitive space transportation ecosystem.

- In-orbit rendezvous and docking
- Cryogenic propellant storage and refilling
- On-board and shared intelligence
- Logistics, containerisation and cargo transfer

Preparing the Future

ODYSSEY

ESA's planned **orbital propellant depot**, at the heart of a sustainable in-space transportation ecosystem. This space transportation ecosystem will be open to all: companies can plug to a common framework to ensure interoperability for their missions.

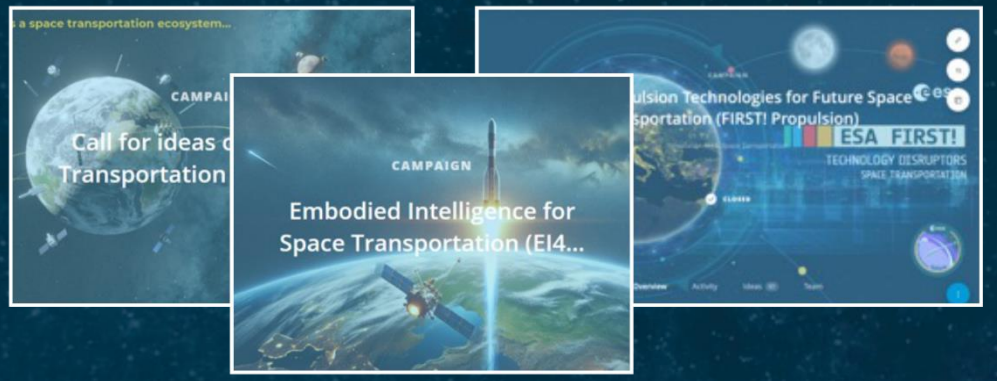


Odyssey relies on **four new technologies** in development, that will be flight-proven in space:

- Rendezvous, docking and refilling (**InSPoC-1**)
- Cryogenic propellants management and refuelling (**InSPoC-2**)
- Onboard and shared intelligence (**InSPoC-3**)
- Containerisation and advanced space logistics (**InSPoC-4**)

How to Reach Us

OSIP calls



Pitch days

Workshops

User clubs

REGISTER NOW

AUTUMN SESSION

29 October 2025
14:00

ESA FUTURE SPACE TRANSPORTATION

Location: Salons de l'Aveyron
17 Rue de l'Aubrac 75012, Paris
(Metro 14: Cour Saint-Emilion)

ESA THRUST! STAGED COMBUSTION ENGINES

ESA BEST! REUSABLE BOOSTERS

InSPoC & ODYSSEY IN-SPACE PROOF-OF-CONCEPTS

ESA FIRST! TECHNOLOGY DISRUPTORS

Vega High-Thrust Engine

Roadmap

Bridging the transition to future European launch systems

Inaugural flight Vega E

Development Vega E

Exploitation: New 2nd stage with High Thrust Engine

2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036

Studies Vega Future

Development Vega Future

High Thrust Engine firing test

Stage 1 firing test

In Flight demonstrator with High Thrust Engine

Inaugural flight VEGA Two Stage To Orbit

High thrust, high Specific Impulse Liquid Oxygen-Methane engines

Two Stage To Orbit architectures with same engine for main and upper stage

Second/Upper stages for multiple applications

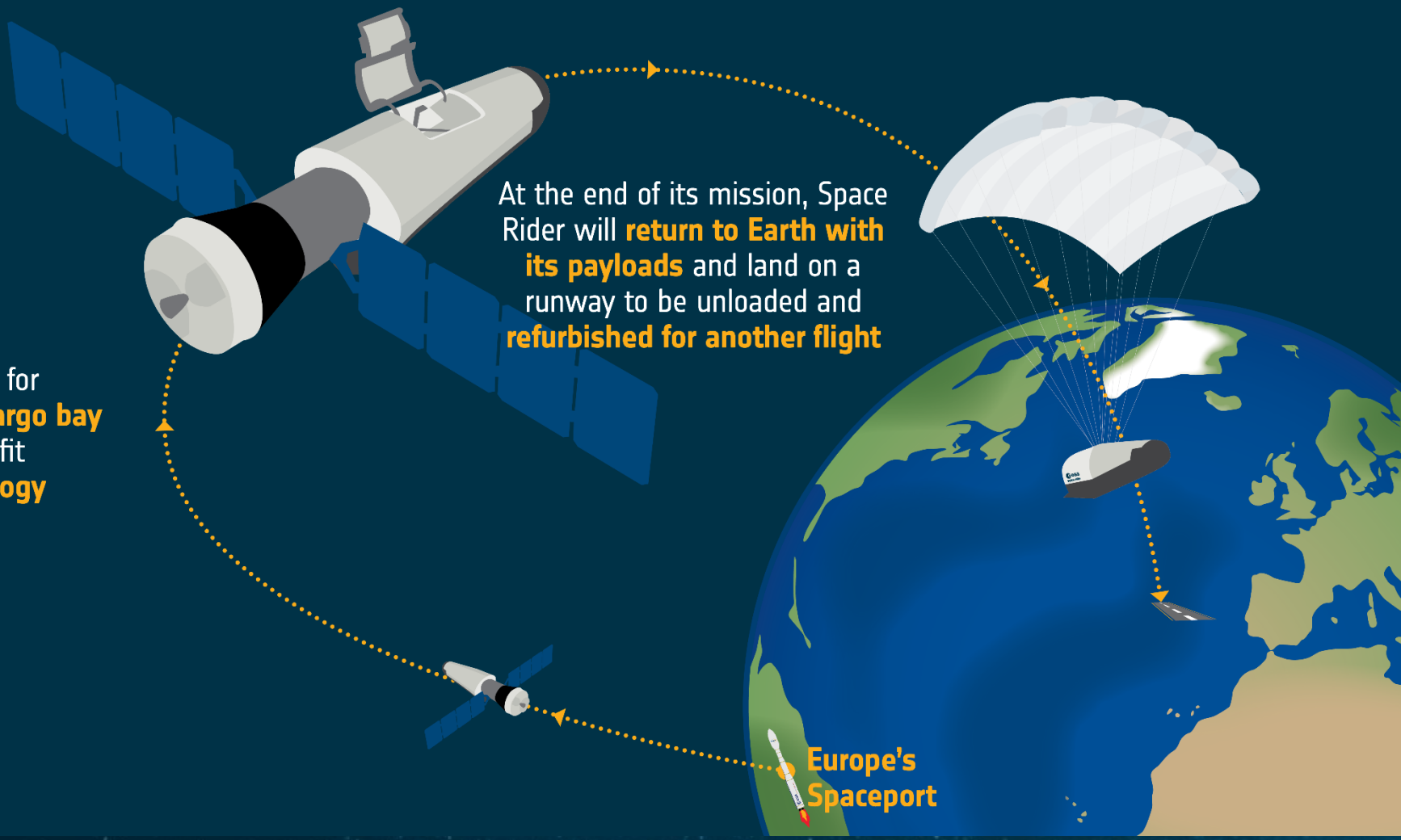
Reusable First Stage

Space Rider – Europe's first reusable transport system

Europe's first reusable space transportation system

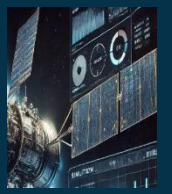
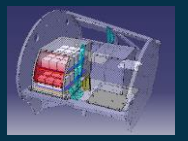
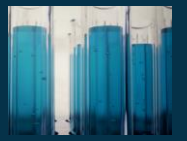
Space Rider is an **uncrewed robotic laboratory** about the size of two minivans.

After launch on Vega-C it will stay in low orbit for about two months. **Experiments inside its cargo bay** will allow technology demonstration and benefit research in **pharmaceutics, biomedicine, biology and physical science**.



Space Rider – Europe's first reusable transport system

Space for exploitation: technologies enabling the future

CAPABILITY		ENABLES
Reusable Thermal Protection & Structures	 	Multiple re-entries, reduced costs
Health Monitoring & Data Analytics	 	Predictive maintenance, lifecycle extension
Digital Twin & Simulation		Smart mission planning, degradation prediction
Autonomous GNC & Proximity Ops		Servicing, dual-use manoeuvring
Payload Return & Refurbishment	 	Industrial use-cases, post-flight analysis

Vega High-Thrust Engine

Opportunities for European industry

- Master LOX-CH4 staged combustion engine technology
- High industrialised approach with further improvement of Industry 4.0 principles (rapid prototyping, highly automated AIT)

- Product oriented approach with lean design cycles in favour of both ground (engine, stage) and in-flight experimentation (IFDs)
- Step by step approach to reusability with all relevant implications (propulsion, structures, aerothermal, GNC)

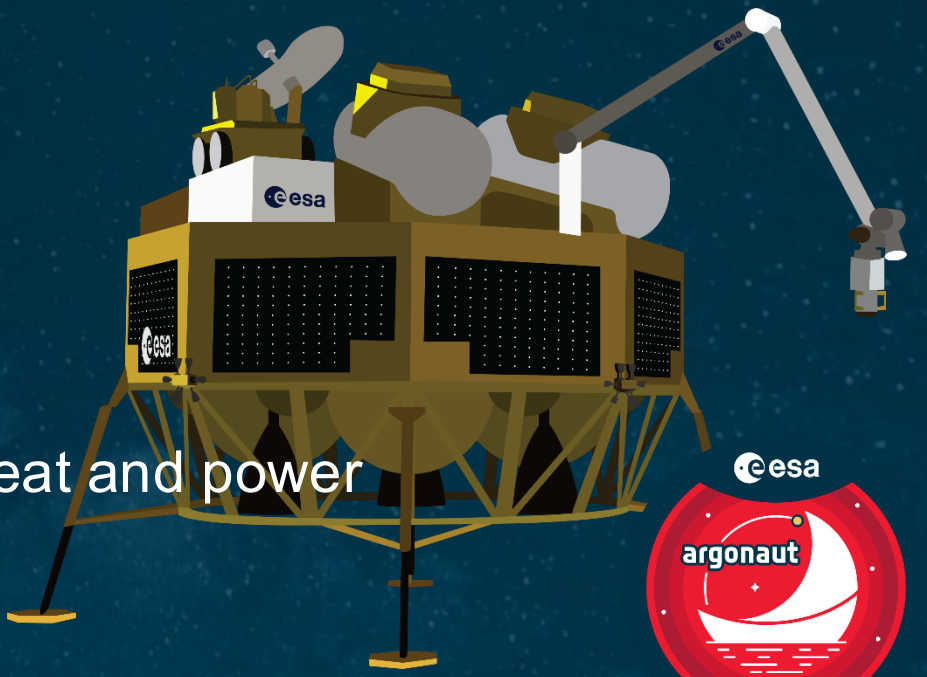
- Opportunity to early plug-in in operating launch systems (VEGA-E and/or other European initiatives)

Vega Day involving ESA/Industries and delegations planned at ESRIN on 6 October

ENDURE

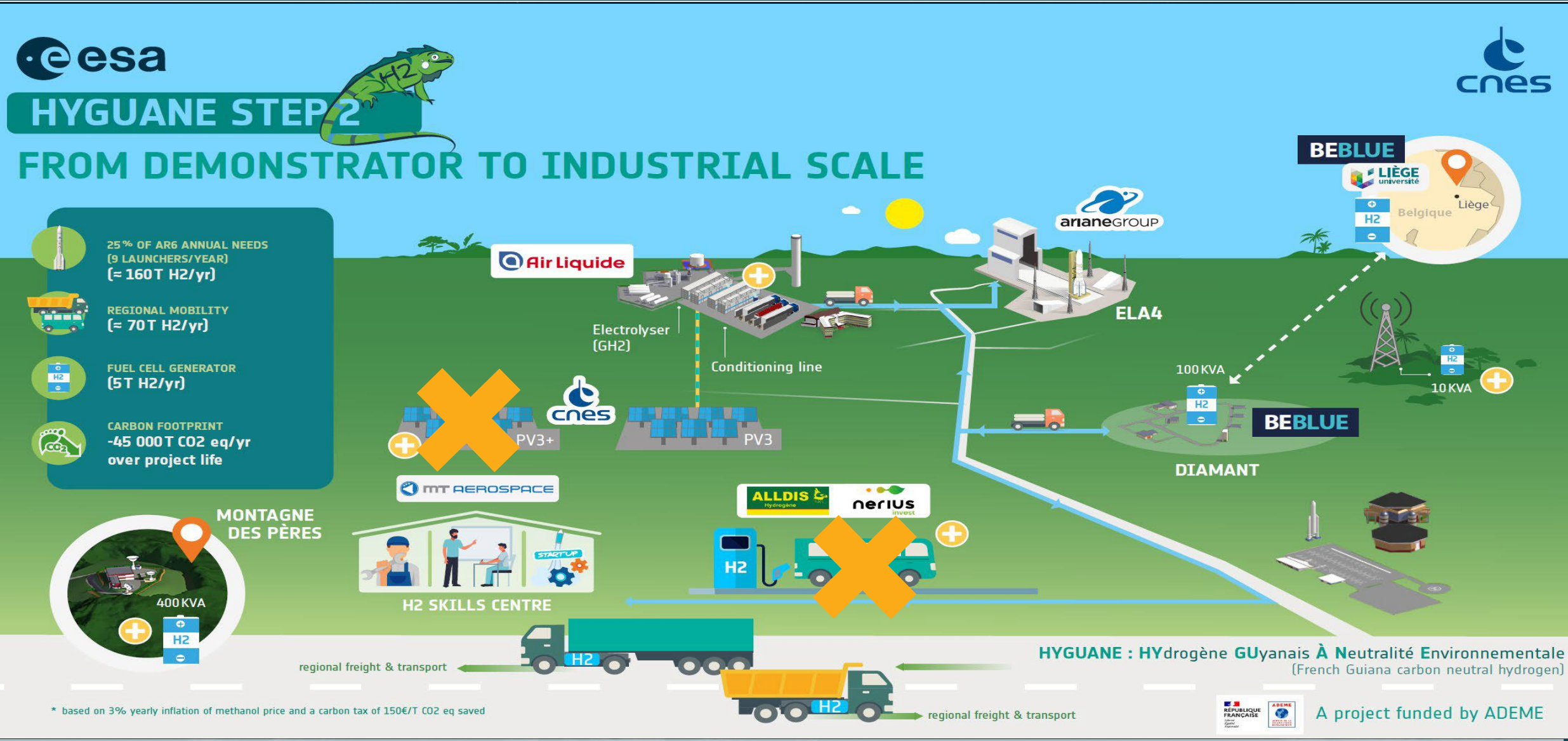
The **ENDURE** project, (**E**uropea**N** **D**evices **U**sing **R**adioisotope **E**nergy) will deliver European capability for radioisotope heat and power systems. The system will be based on radioisotope fuel derived from reprocessing of nuclear waste and covering fuel production and encapsulation as well as system development.

ENDURE will end Europe's dependence for radioisotope heat and power systems needed for exploration of the outer Solar System as well as challenging planetary environments such as the long nights on the lunar surface or the cold and stormy conditions prevailing on Mars.



- European autonomous and independent radioisotope heat and power
- Farther exploration of our Solar System
- Moon missions with Argonaut
- Future Mars missions

Green Hydrogen Infra. at CSG



Space Transportation at CM25

Pillar 03 - Maintaining and Enhancing Ground Infrastructure

Pillar 03: Maintaining and Enhancing Ground Infrastructure

Through strategic infrastructure investments

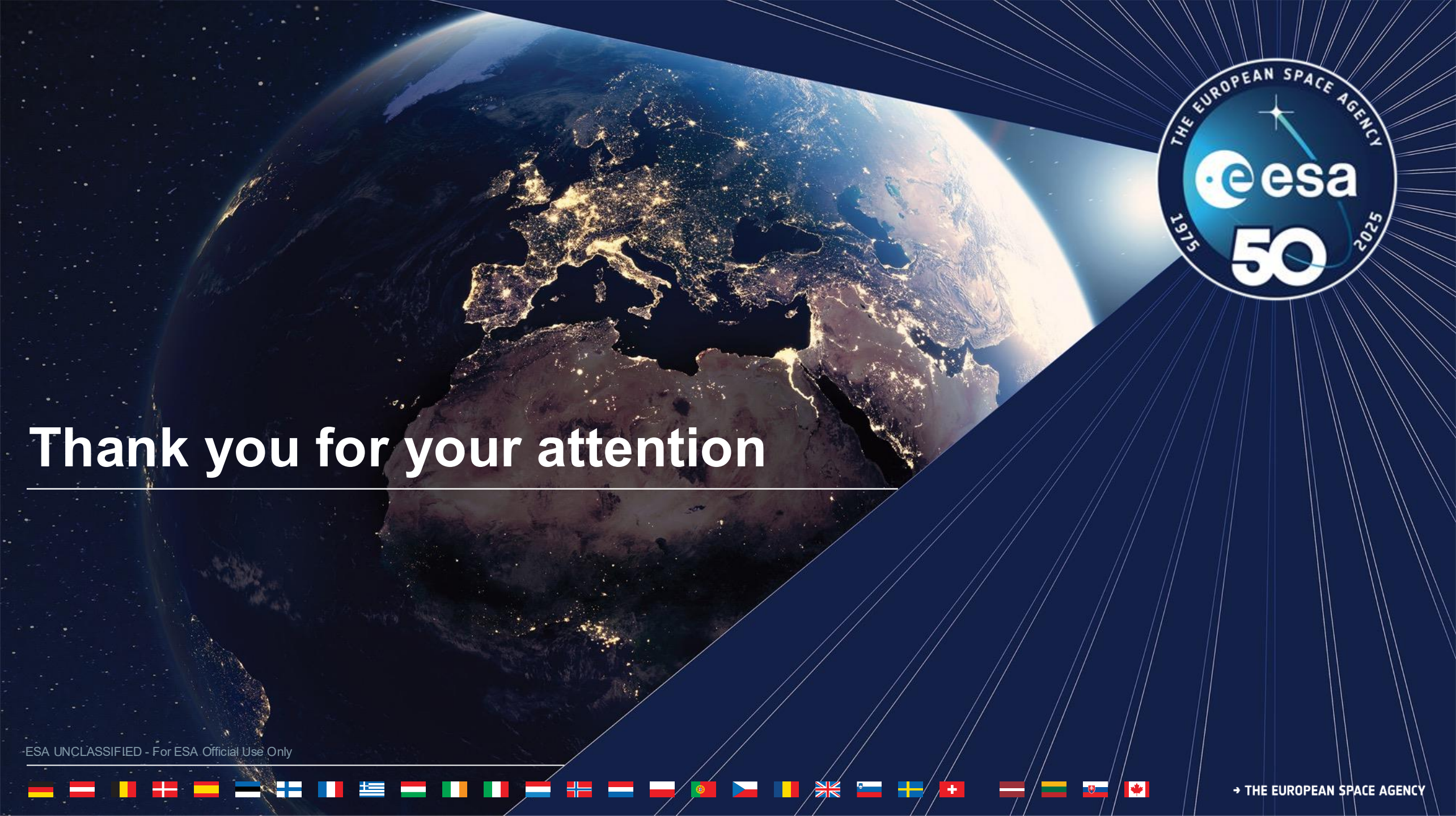
03

- Guarantee that the European Spaceport in French Guiana is operational and offers facilities, assets and resources
- Strengthen resilience and capacity through digital transformation and carbon foot-print reduction
- Ensure strategic infrastructure and test facilities for European access to space
- Increase robustness and accompany the industrialisation of launch complexes and strategic infrastructure

European Spaceport in French Guiana

- Covers an area of 660 km^2
- **Range** co-funded by ESA and France and operated by the French space agency CNES

- **Launch infrastructure** for Ariane and Vega launchers owned by ESA, maintained and operated by ArianeGroup and AVIO, with the support of European industry
- **43 industrialists** present on site



Thank you for your attention

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