Media Workshop - Forum International Météo et Climat

Understanding Earth from Space: Data, AI, and Communication for Climate Adaptation

European Space Transportation Systems: VEGA family & Space Rider

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Introduction: Why Space Transportation Matters

Earth observation starts on the ground

No climate data without access to space

Europe's autonomous access to space as strategic capability

Link between launch systems and environmental intelligence
(eg: Earth digital twin)

Reliable climate intelligence depends on reliable access to space.
Space transportation is the enabler of knowledge, action and a sustainable future.

ESA Space Transportation Ecosystem

ESA Directorate of Space Transportation

The ESA Directorate of Space Transportation ensures Europe's autonomous and reliable access to space.

- Defines and implements Europe's launchers strategy in line with European needs
- Develops and operates European launchers and related infrastructures
- Works with European industry and Member States to strengthen competitiveness and innovation
- Promotes sustainability and responsible access to space

European launchers overview

Vega-C

Small/medium satellite launcher

- Earth observation & scientific missions
- Small to medium payloads
- Dedicated, agile and cost-effective

Ariane 6

Heavy-lift launcher

- Constellations & large satellites
- Heavy payloads
- High capacity, versatile & competitive

Next to come: ELC

European Launcher Challenge

- Expanding European launch service supply
- Ensuring greater robustness of access
- Strengthening European autonomy

Complementary roles

Vega-C

Earth observation / small-medium payloads

Ariane 6

Heavy payloads and constellations

ELC

Expanding European launch service supply and ensuring greater robustness in Europe's access to space

A comprehensive and evolving ecosystem to guarantee Europe's autonomous access to space, **today and for the future.**

VEGA family

VEGA
Family foundation

2012-20 24

VEGA C
Current backbone

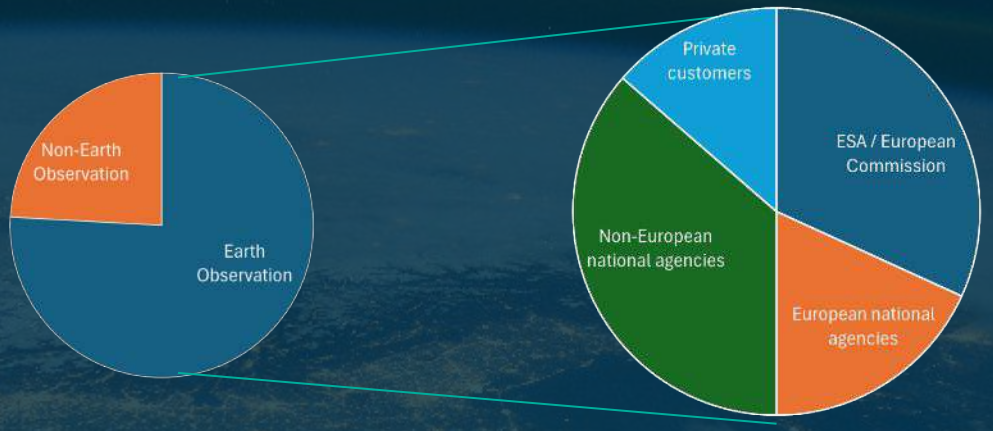
2022 -

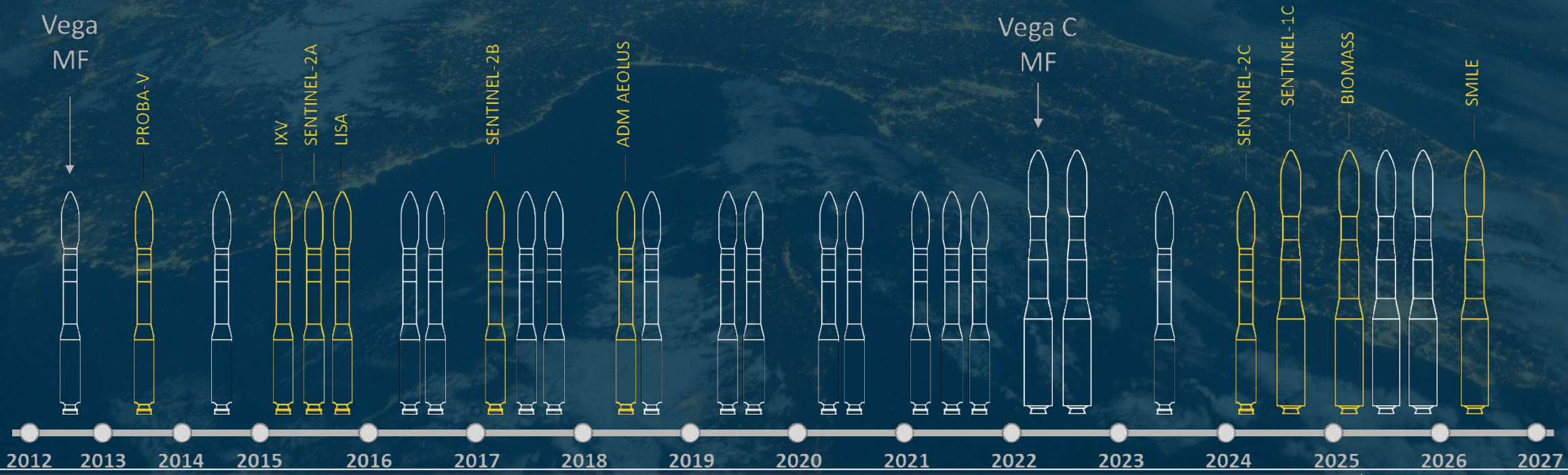
VEGA E
Next step

Starting 2029

Launch record

14 years of exploitation
29 Missions
+140 satellites to orbit
35 tons of orbited mass





Elevating Europe's Launch Capabilities

Enhanced Payload Capacity:
Up to 2.3 tons in LEO, offering a 35% performance increase for heavier climate satellites (radar).

Volume and comfort:
Larger payload fairing and decreased shock environment

Very precise orbit injection:
Increased number of AVUM firing to attain three orbit mission and Upgraded adapters to flawlessly deploy multi-satellitea.

Synergy with Ariane 6:
Shared P120C first-stage solid rocket motor, streamlining European industrial supply chains and production costs.

Versatile Mission configuration

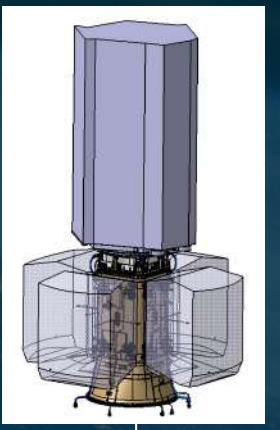
1 | VAMPIRE
Dedicated launch

2 | HEXA 1 – HEXA 2
Main PL + Piggyback

3 | SSMS PLAT & FLEXI
Constellations / Rideshare

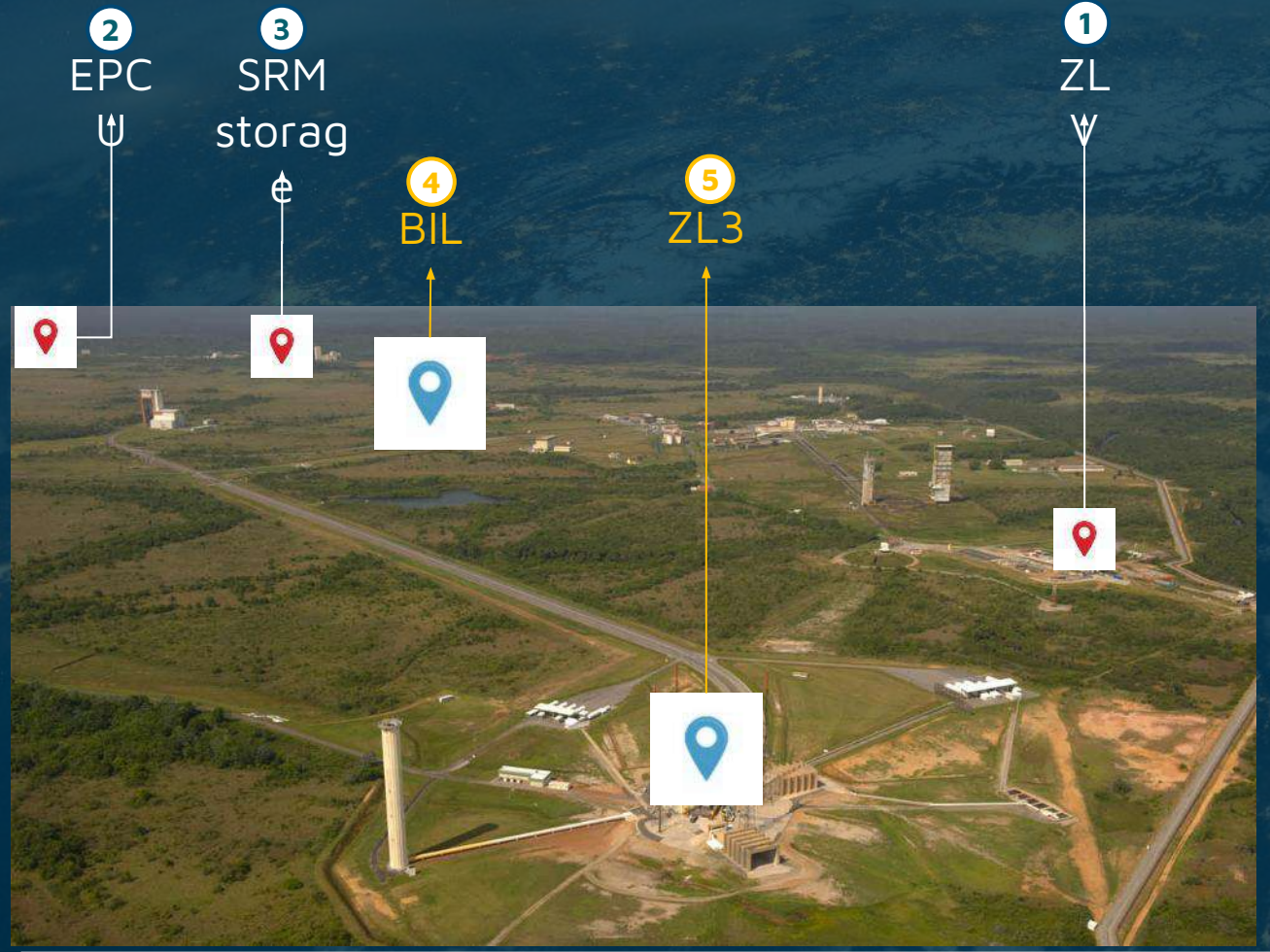
Next to Space

4 | VESPA +R & VESPA C
Dual Launch



5 | CLESSIDRA
Lateral separation

Increased Launch rate



WHAT CHANGES AT CSG

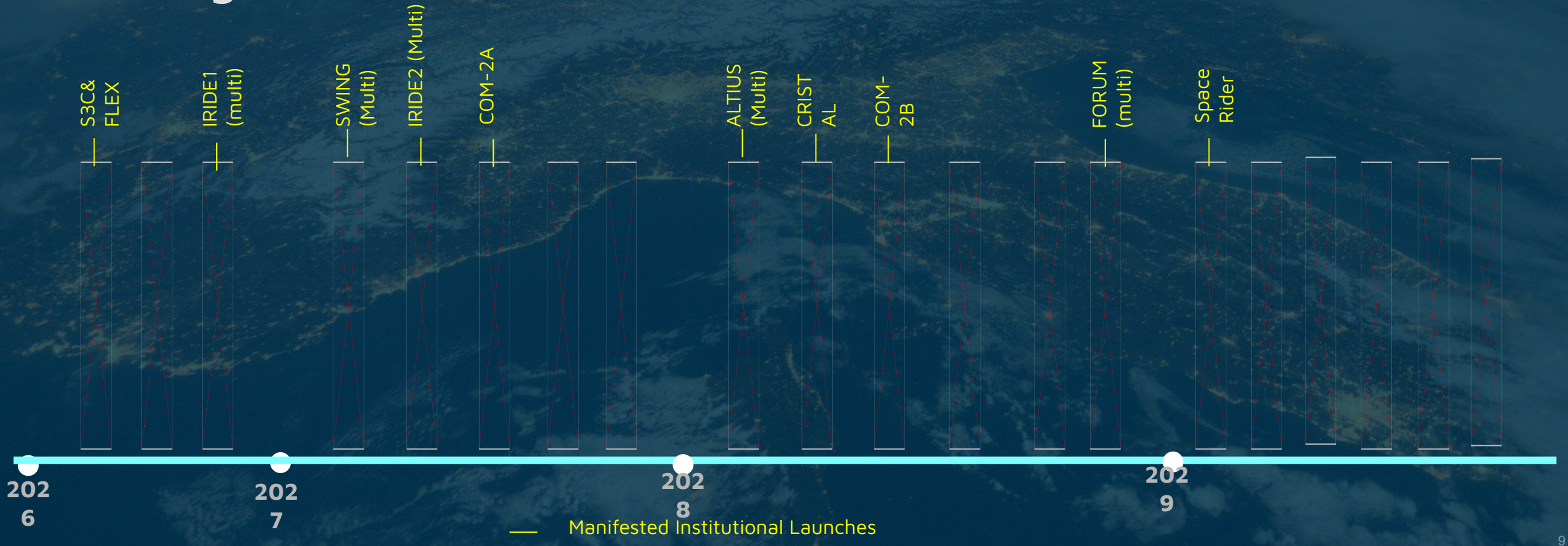
1. ZLV - Mobile Gantry: current Vega C Launch Pad
2. EPCU: Satellite Preparation Building
3. SRM Storage

NEW

4. BIL: to be converted in the new Vega C Integration Building
5. ZL3 - former Ariane 5 Launch Pad. To be converted in a future Vega C/E Launch Pad

VEGA C Institutional mission pipeline

Increasing European Strategic Autonomy
Supporting both dedicated and rideshare solutions
Ensuring continuous Earth Observation data streams



From Launch to IOD & IOV: Space Rider

Beyond launch: enabling future space technologies

Space Rider is ESA's reusable spaceplane designed to demonstrate key technologies in orbit and return valuable payloads to Earth, accelerating Europe's innovation capabilities.

Need for reusable and sustainable orbital systems

Reusability reduces cost, increases mission flexibility and enables more frequent access to space, while minimising environmental impact and supporting long-term sustainability.

Transition toward reusable transportation concepts

Space Rider paves the way for a new generation of European reusable transportation systems, bridging today's launch capabilities with tomorrow's fully reusable space future.

Space Rider demonstrates, in orbit and on return, Europe's capability to innovate, experiment and prepare **the next generation of reusable space transportation systems.**

Space Rider: Europe`s Reusable Orbital Laboratory

esa

1. What Space Rider is

- **Reusable robotic laboratory** designed to host experiments and technologies in orbit.
- **~2 months in orbit** providing time for experiments and technology validation.
- **Autonomous return to Earth** with precision re-entry and runway landing.

Reusable by design | ~2 months in orbit | Autonomous operations | Precise landing

2. Why it matters

In-orbit experimentation
Enables controlled experiments in the unique environment of space.

Materials / science in microgravity
Advances scientific knowledge and the development of new materials and processes.

Technology demonstration and validation
Validates critical technologies and de-risks future missions, including Earth observation systems.

Direct contribution to Earth observation technology maturation.

3. Link with EO

Technology maturation
for future Earth observation systems.

Autonomous orbital experimentation
reducing risk and increasing flexibility.

Reusable access to orbit
lowering cost and increasing mission opportunities.

Sustainable space operations
supporting Europe's long-term environmental and climate objectives.

Faster validation of environmental-monitoring technologies
to deliver timely data and better inform decisions on Earth.

Space Rider is a key enabler for Europe's future space capabilities and **a powerful accelerator for Earth observation innovation.**

Closing Message