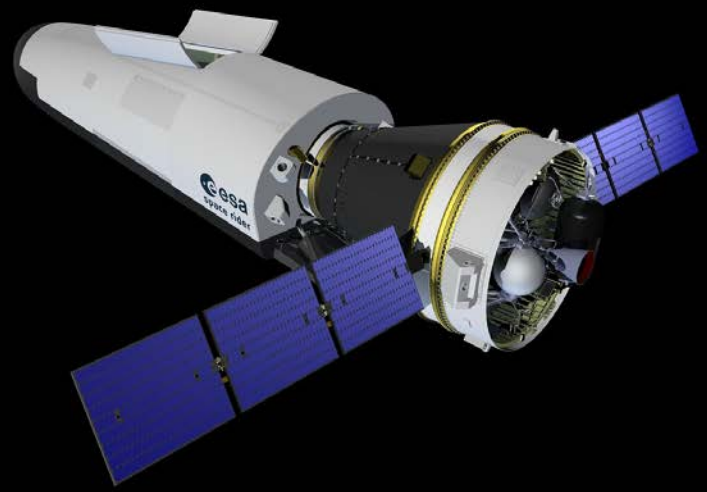
SPACERIDER



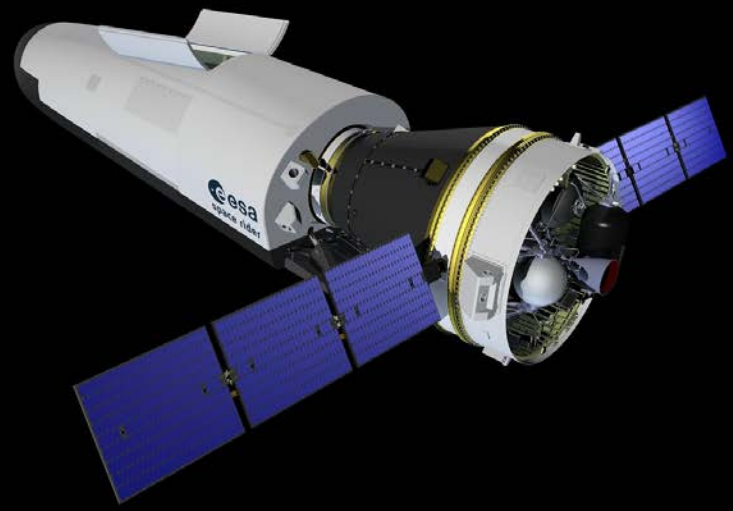
PORTUGAL SPACE

Pedro Costa

Defence Liaison Officer | Portuguese Air Force Officer (OF-4)

Portuguese Space Agency

Space Rider - Agenda



1. What is it?

2. Applications - Aerospace Medicine

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Space Rider – 1. What is it?

ESA Space Rider spacecraft

Status: Undergoing critical design review.

Basics

Participating states:

Operator: ESA for the maiden flight. An operator for subsequent flights will be selected in 2022.
Total length: 8.044 m
Launch mass: ~ 4900 kg (Full stack + fluids and propellants)
Launch vehicle: Vega-C
Planned debut: 2024
Launch site: Europe's Spaceport, French Guiana
Flight time: At least 60 days

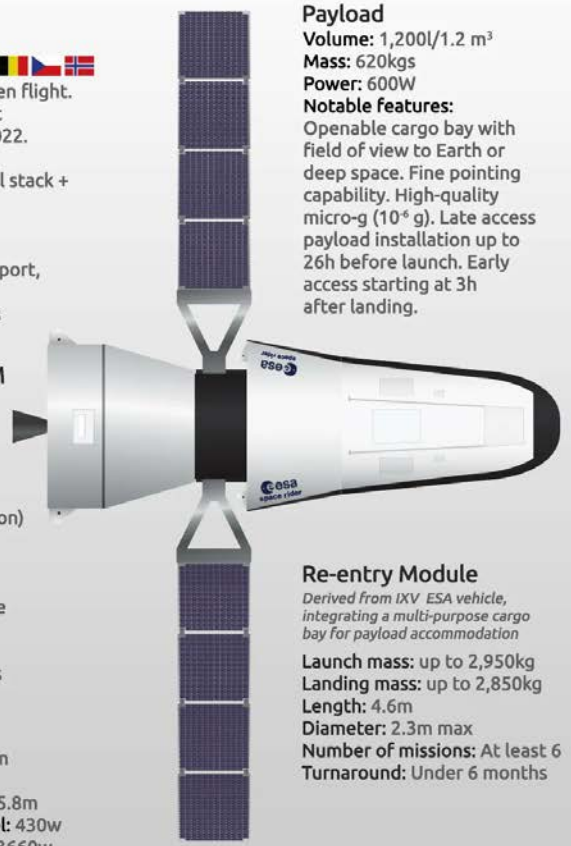
Service module (AVUM Orbital Module)

Derived from Vega-C AVUM+ upper stage with the addition of ALEK (Avum Life Extension Kit)

Diamter: 2.3m max (Solar arrays in folded configuration)
Length: 3.5m (including engine protuberance)
Launch mass: 2,000 kg
Engine: AVUM+ Main Engine
Average thrust: 2.4kN
Specific impulse: 316s
Cumulated firing time: 940s

Solar Wings

Length of each panel: 1.25m
Height of each panel: 1.7m
Length of each solar wing: 5.8m
Power generation per panel: 430w
Power generation in total: 3660w



Payload

Volume: 1,200l/1.2 m³
Mass: 620kgs
Power: 600W
Notable features: Openable cargo bay with field of view to Earth or deep space. Fine pointing capability. High-quality micro-g (10^{-6} g). Late access payload installation up to 26h before launch. Early access starting at 3h after landing.

Re-entry Module

Derived from IXV ESA vehicle, integrating a multi-purpose cargo bay for payload accommodation

Launch mass: up to 2,950kg
Landing mass: up to 2,850kg
Length: 4.6m
Diameter: 2.3m max
Number of missions: At least 6
Turnaround: Under 6 months

Landing

Landing site: Europe's Spaceport, French Guiana as baseline, Portugal and Italy as alternatives for mid-inclination missions.
Landing: <4g reentry then subsonic parachute then soft landing under parafoil
Lander accuracy: 150m
Landing speeds: horizontal: 15 m/s and vertical: 2 m/s

Contractors

Re-entry Module
Thales Alenia Space Italy - Prime (System activities and On-board Computer)
Beyond Gravity (Cold Structure)
CIRA (Thermal Protection System)
SENER/Deimos (GNC)
GMV (On-Board SW)
Frentech (Mechanisms & Landing Gear)
SABCA (Aerodynamic Surface Control System)
ArianeGroup (Reaction Control System)
CIMSA (Descent System)

Service Module
Avio - Prime (AVUM + System activities)
Leonardo/RUAG/KONGSBERG (Electrical Power Subsystem)
RUAG (ALEK Structure)
GMV/SPACEBELL (On-Board SW)
Thales Alenia Space Italy (On-Board Computer)

@AndrewParsonson

All info on this data sheet has been verified.

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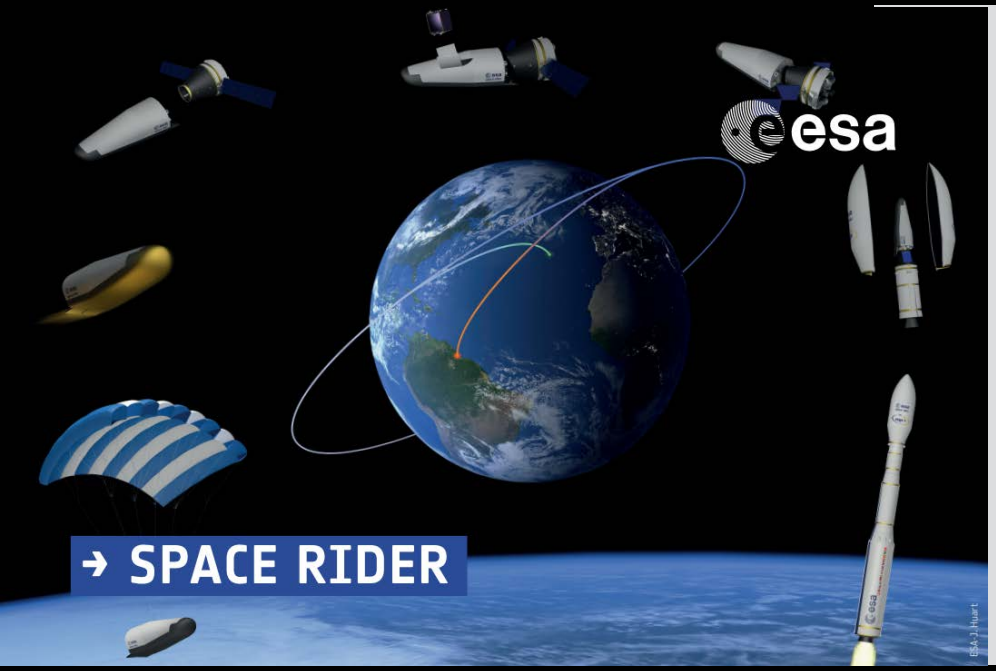
Pedro Costa | Portuguese Space Agency - Portugal Space

Space Rider – 1. What is it?



Objectives	Design and develop a space transportation system, integrated with Vega-C, to provide regular access and return to/from space for users in the fields of microgravity experimentation, in-orbit technology demonstration, radiation exposure experimentation, Earth monitoring and others.
Technical features	• 'Lifting body'-type reentry module strongly based on IXV spaceplane heritage • Vega-C AVUM + ALEK (Avum Life Extension Kit) used as orbital service module • 3-axis stabilised spacecraft with high pointing accuracy • Solar array jettisoned just before reentry (no debris left in orbit) • 600 W power available for payload • Radio frequency systems: S-band for tracking and telecommand
Launch vehicle	Vega-C
Orbits	Reference mission is circular orbit (5° inclination, 400 km altitude). Higher inclination or altitude possible
Launch mass	Approx. 3000 kg including payload and fuel for the reentry module
Payload bay	Conditioned, hosting several types of payloads and a robotic arm
Payload volume	At least 1.2 m^3
Payload mass	Up to 800 kg for the reference mission
Landing site	Santa Maria in the Azores archipelago (PT) for orbits with inclination > 37°. For lower inclination missions French Guiana and Dutch Curaçao are being considered
Mission duration	Minimum 2 months

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Space Rider – 1. What is it?

Sustainable Space for a Sustainable Earth

Atlantic Constellation

Credit: GEOSAT


Credit: ESA
ClearSpace-1

Credit: ESA

Digital Planet

Space Innovation Hub
Santa Maria Island
Azores

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Space Rider – 1. What is it?

Objective:

Design and develop a space transportation system, to provide regular access and return to/from space for users in the fields of microgravity experimentation, in-orbit technology demonstration, radiation exposure experimentation, Earth monitoring and others

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Space Rider – 2. Applications - Aerospace Medicine

Space Rider will have the potential to allow:

→ In-orbit technology demonstration and validation for applications for:

- Exploration, such as robotics,
- Earth observation, such as instrumentation,
- others, such as Earth science, telecommunication.

→ Surveillance applications such as Earth disaster monitoring, satellites inspection.

Space Rider – 2. Applications - Aerospace Medicine

Space Rider will have the potential to allow:

→ Free-flying applications such as experiments in microgravity for:

- Pharmaceuticals
- Biomedicine
- Biology
- Physical Science

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Space Rider – 2. Applications - Aerospace Medicine

Space Rider will have the potential to allow:

→ Free-flying applications such as experiments in microgravity for:

ANSA.it › English › Science & Tecnology ›

Expo Dubai: Space Rider 'will revolutionize medical science'

Expo Dubai: Space Rider 'will revolutionize medical science'

Vega C launcher will facilitate space services says Ranzo

Redazione ANSA

ROME

19 October 2021
13:16
NEWS

(ANSA) - ROME, OCT 19 - The European Space Agency's pioneering Space Rider programme will help revolutionize medical sciences, Italian aerospace firm Avio CEO Giulio Ranzo said on Expo Dubai's Space Week.

Avio is closely involved in the programe with a new version of its Vega C launcher.

"Space Rider will make possible the creation of services in space over a long space of time and therefore to carry out activities that were previously not possible, such as pharmaceutical research in conditions of microgravity," he said.

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Space Rider – 2. Applications - Aerospace Medicine

Space Rider will have the potential to allow:

→ Free-flying applications such as experiments in microgravity for:

The Space Rider would be fully integrated with Vega C to provide a space laboratory for payloads to operate in orbit for a variety of applications in missions lasting about two months.

Space Rider – 2. Applications - Aerospace Medicine

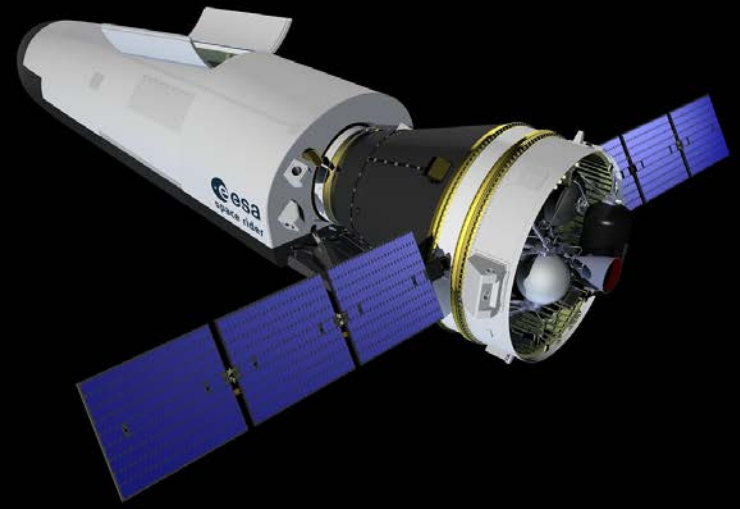
→ ESA's Space Medicine Team:

- Astronauts face many health challenges when living and working in space, including the impacts of microgravity, radiation and isolation.
- To better support astronauts during current missions to the International Space Station and prepare for human missions beyond low Earth orbit.
- To identify, evaluate and develop new space technologies and procedures.
- To identify existing space-relevant technologies and scientific knowledge, and looking outside of ESA at terrestrial technology developments and the wealth of current science knowledge concerning human health.

CONCLUSION - Space Rider

DUAL USE OF SPACE TECHNOLOGY - NOT ONLY FROM A CIVIL-MILITARY PERSPECTIVE

SPACE TECHNOLOGY CAN SUPPORT DEVELOPMENTS ON THE EARTH – PARTICULARLY IN MEDICINE



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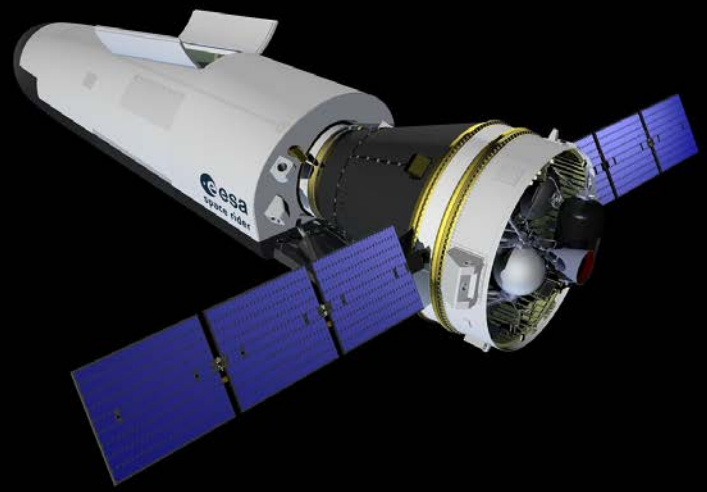
SPACERIDER



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