

# HEARTED PROJECT: endowing Europe with a high energy sample return facility



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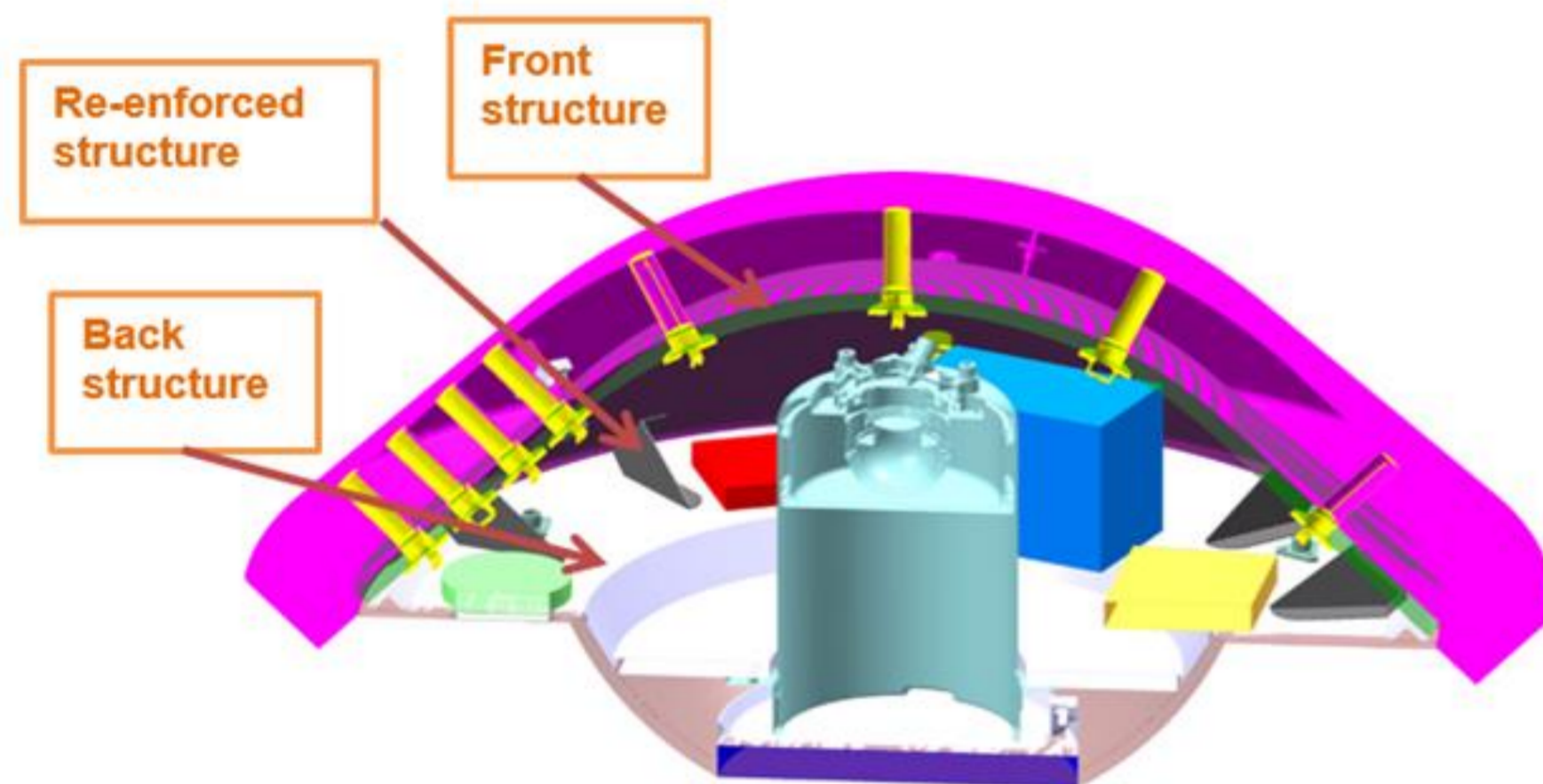
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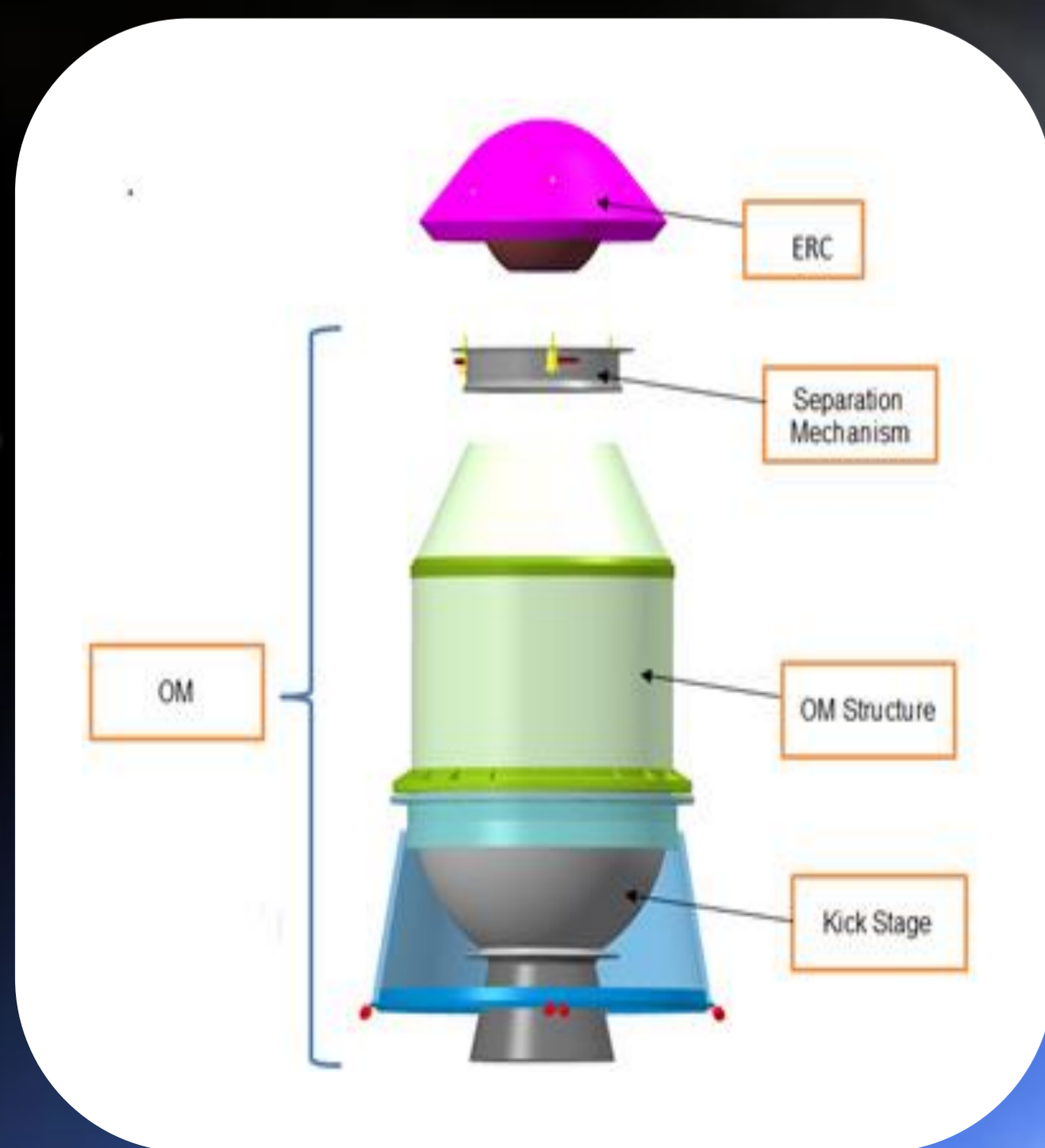
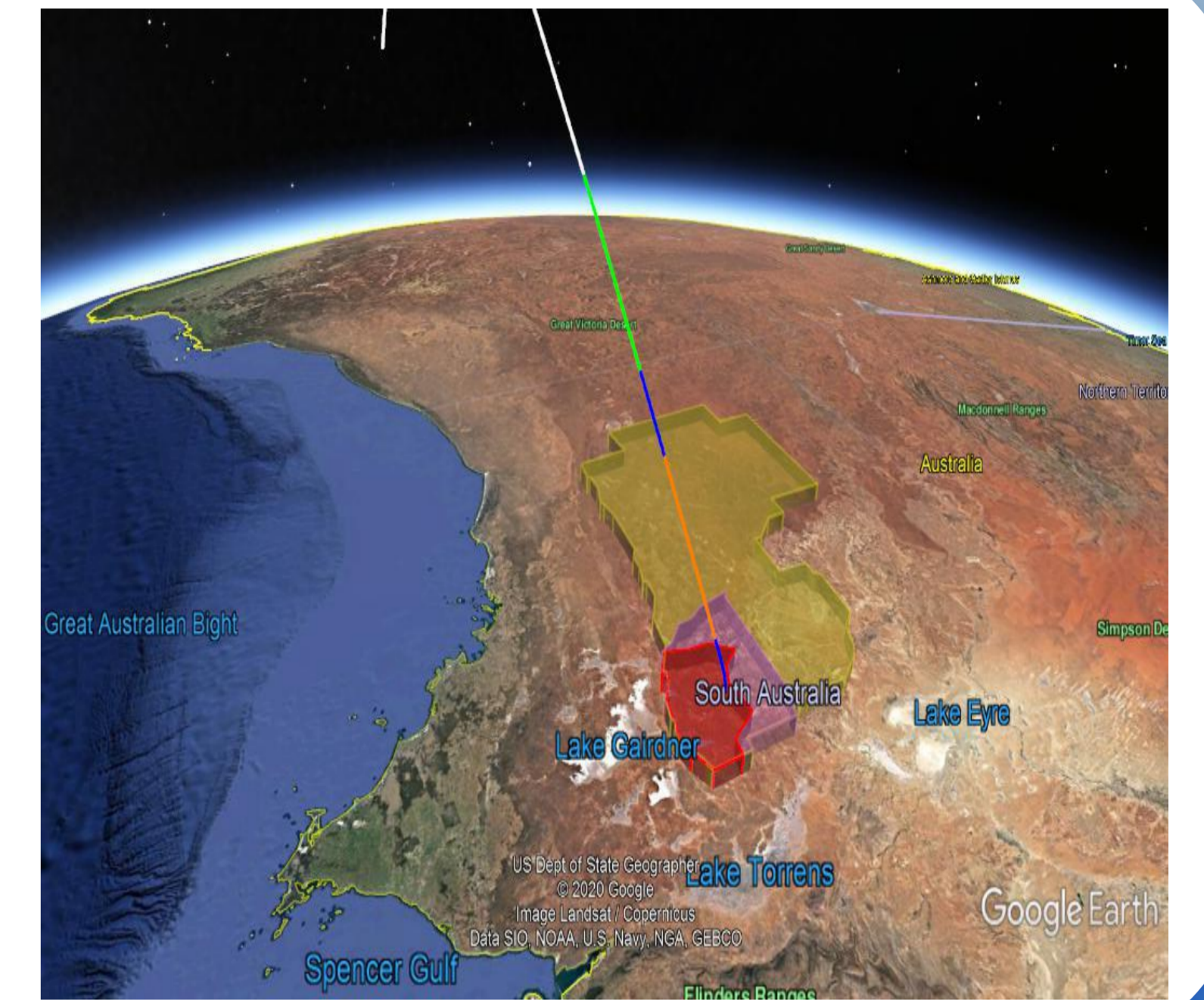
The **HEARTED** (**H**yper-velocity **E**Arth Re-entry **T**Echnology **D**emonstrator) project aims at the major upgrade of the European competence in the sample return technologies by testing and qualifying an ERC (Earth Re-entry Capsule) and its subsystems in a representative environment.

The HEARTED mission is proposed as a near-Earth mission with a dedicated launch utilizing a low cost launch solution and an acceleration stage needed to achieve the required velocity at the re-entry in the atmosphere. A sophisticated set of instrumentation will study the flow field and vehicle's performance during the whole re-entry phase, and a parachute system will ensure a soft landing and possibility to carry out a post flight inspection after the capsule has been recovered



Instrument	Experimental Objective
10 HEARTED Integrated Sensor Plug (HISP)	Temperature Total heat flux TPS recession
2 Radiometer	Radiative heat flux
1 Spectrometer	Shock layer chemical composition Radiation/ablation coupling
2 Pressure probe	Pressure

The way we get the desired energies to experiment a capsule is based on the launch of a system on a target orbit of 7100 Km altitude. Our system is composed by two connected elements: a kick motor which impart the correct velocity and attitude, and the Earth Re-entry Capsule which is the object of our experiment. Once the correct conditions are met, the capsule is separated by the kick stage and follow a trajectory arc through the atmosphere targeting the Woomera desert, or the ocean. In both cases, a dedicated ground segment will be there.



Parameter	Value
Shape	45 deg blunt nose cone
Launch mass	Up to 1400 kg
Capsule's mass	Up to 50 kg
Capsule's diameter	0,9 m
Launched by	VEGA-C or ISAR Spectrum
Launch site	CSG, Kourou
Landing site	Woomera test range, Australia
Entry velocity	Up to 12,3 km/s
Max heat fluxes	15 MW/m <sup>2</sup>
Max g-loads	70 g
Overall mission duration	Up to 6 hours
Atmospheric phase duration:	750 seconds
Delta-v capability	Up to 4100 m/s
Propulsion type	solid
Telemetry system	Yes, S-band and Iridium
Recovery system	Single stage parachute

