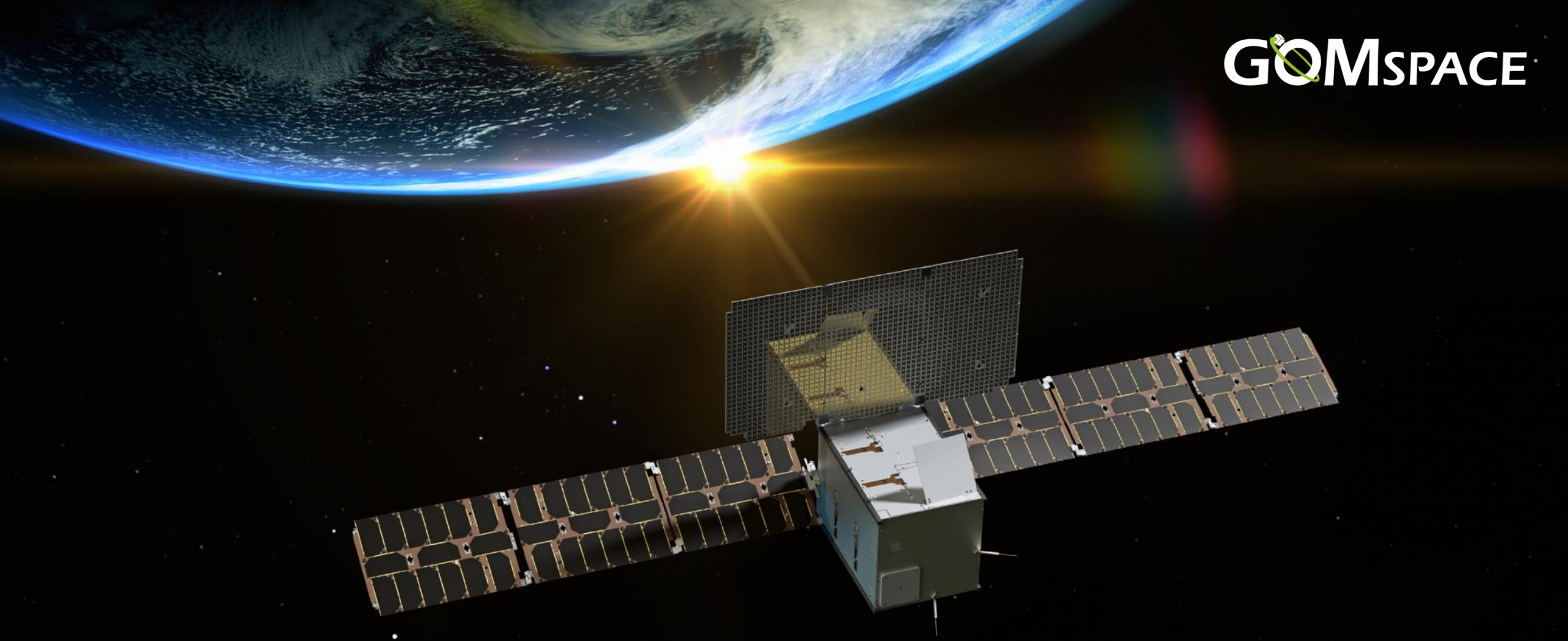


JUVENTAS CUBESAT IN SUPPORT OF HERA MISSION TO DIDYMOS ASTEROID SYSTEM

Mehdi Scoubeau – GomSpace Luxembourg

Mehdi Scoubeau

Belgium – 4 years

B. Sc. Engineering
M. Sc. Mechanical Engineering

France – 2 years

Engineering Degree = Grande Ecole

Switzerland – 1/2 year

Propulsion R&D Intern

Germany – 2 years

Belgian National Trainee Programme

Germany – 2 years

Astrodynamics Software Engineer

Luxembourg – 2+ years

Space Systems Engineer

GOMSPACE AT A GLANCE

- **Globally leading manufacturer & supplier of nanosatellite solutions**
- **Founded in 2007 and listed at Nasdaq stock exchange in Stockholm (GOMX) in 2016. 230 employees strong.**
- **Our global footprint:**
  - HQ, design and production in Denmark
  - Satellite operations in Luxembourg
  - Propulsion technology in Sweden
  - Sales office in Washington
- **Our positions of strengths:**
  - Miniaturised satellites ready for constellations
  - Radio technology / software defined radio
  - Production capacity in place
- **Our traction:**
  - Very successful in orbit validation program (GOMX)
  - Customers in more than 55 countries

GOMSPACE WORLDWIDE

GomSpace HQ, Denmark
- Production Facilities
- Professional Class 100.000 Cleanroom
- Satellite integration and Customer Project Management
- Main R&D Site
- Administration & Group Management
- Sales Office

GomSpace, Sweden
- Propulsion & MEMS Technology Center

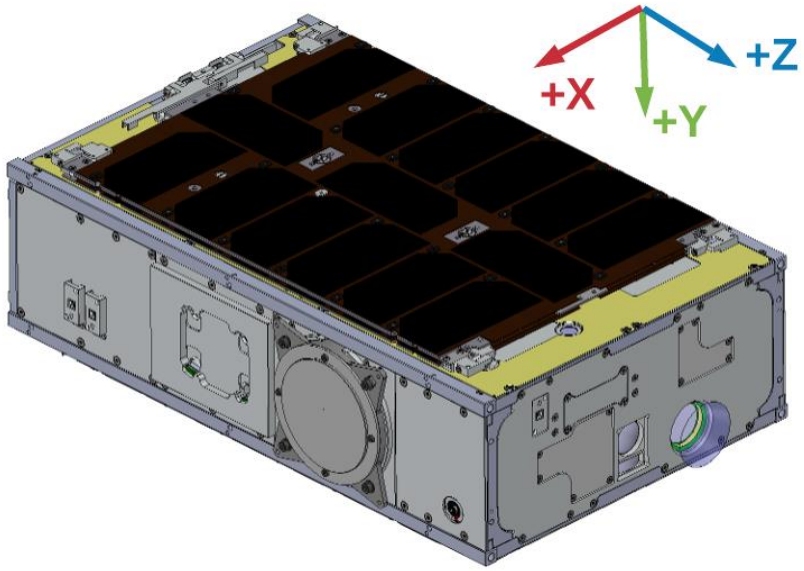
GomSpace, Luxembourg
- Satellite & Constellations Operations Center

GomSpace, France
- Regional Sales
- Project Development

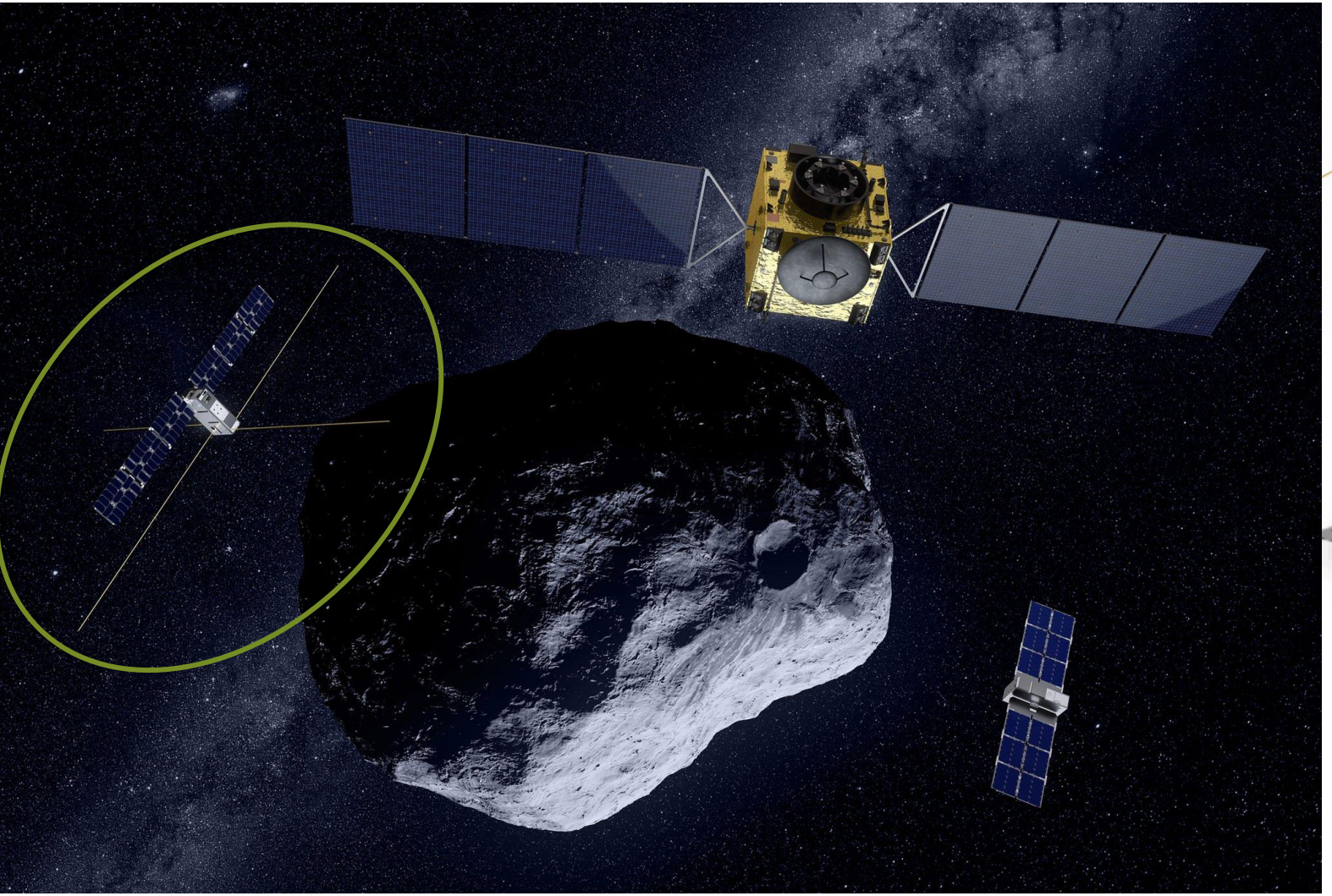
GomSpace, North America
- Regional Sales
- Project Development

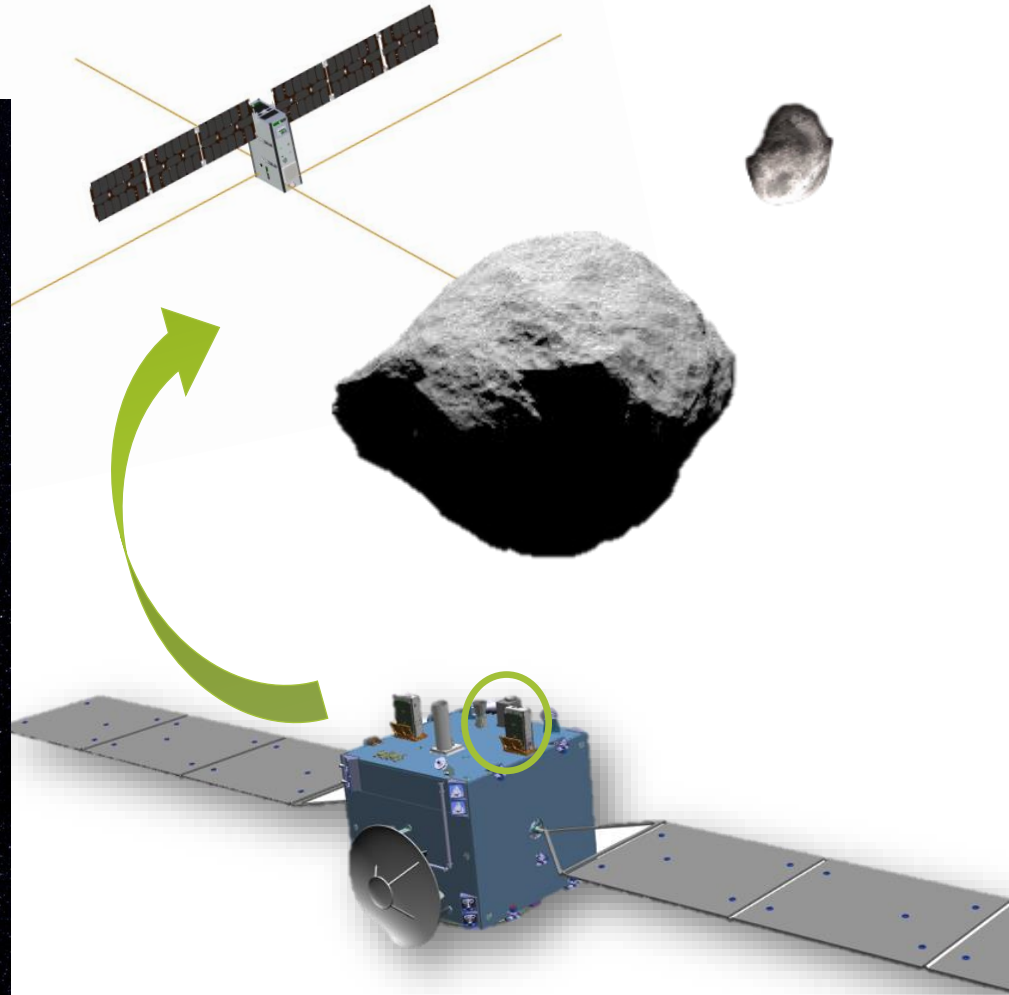
WHAT'S INSIDE A SATELLITE

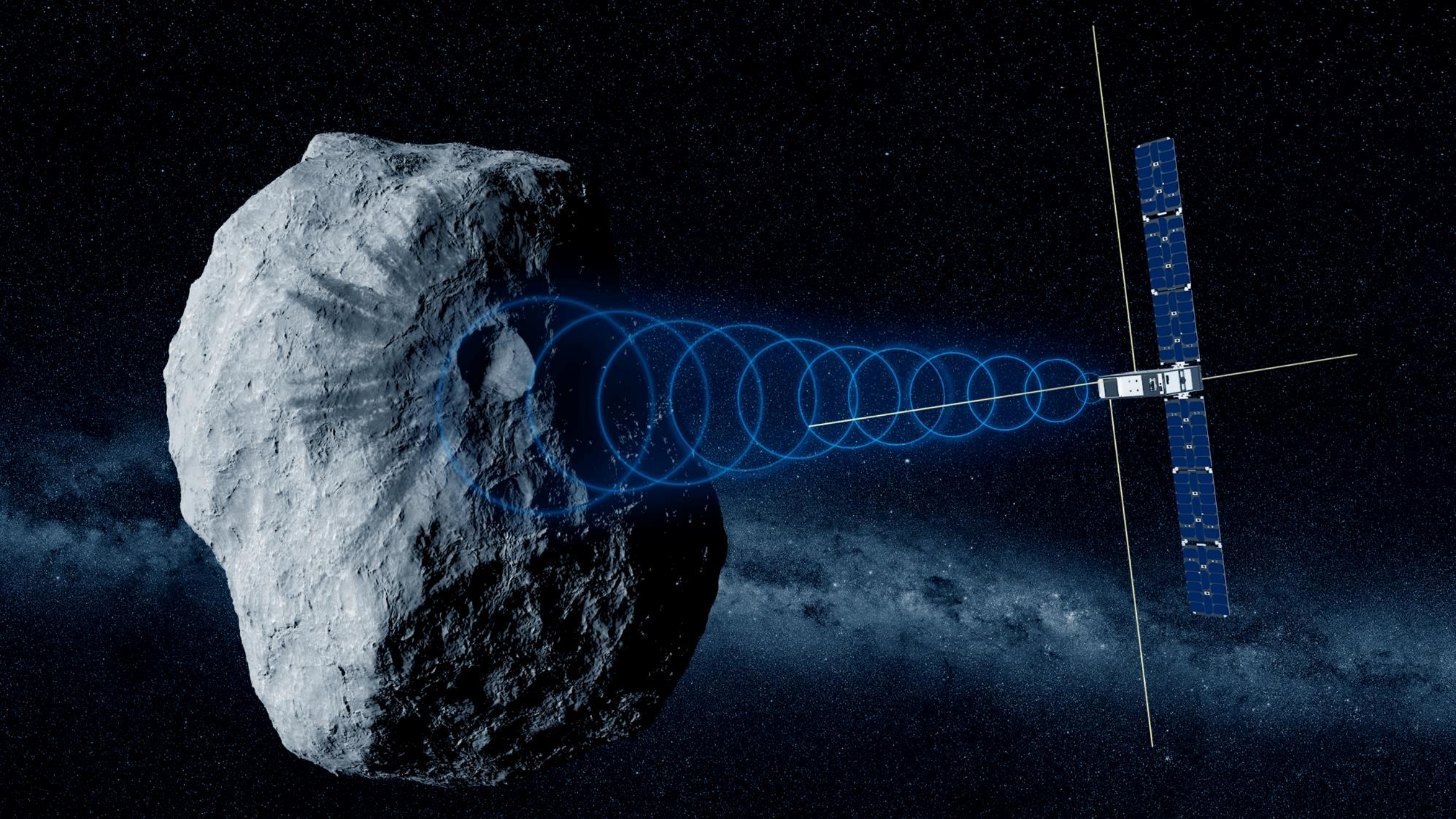
JUVENTAS = CUBESAT



JUVENTAS, PART OF HERA







GOMSPACE AND JUVENTAS CONSORTIUM

Juventas Project
GOMSPACE LUXEMBOURG

Juventas Platform Team
- Mission/Sys Eng. — GOMSPACE LUXEMBOURG
- Platform Products — GOMSPACE
- Propulsion — GOMSPACE SWEDEN
- GNC& Mission Analysis — gmv

Hera ISL/ Radio Sci.
- Inter-Satellite Link — GOMSPACE LUXEMBOURG
- Radio Science — Radio Science vs Planetary Exploration

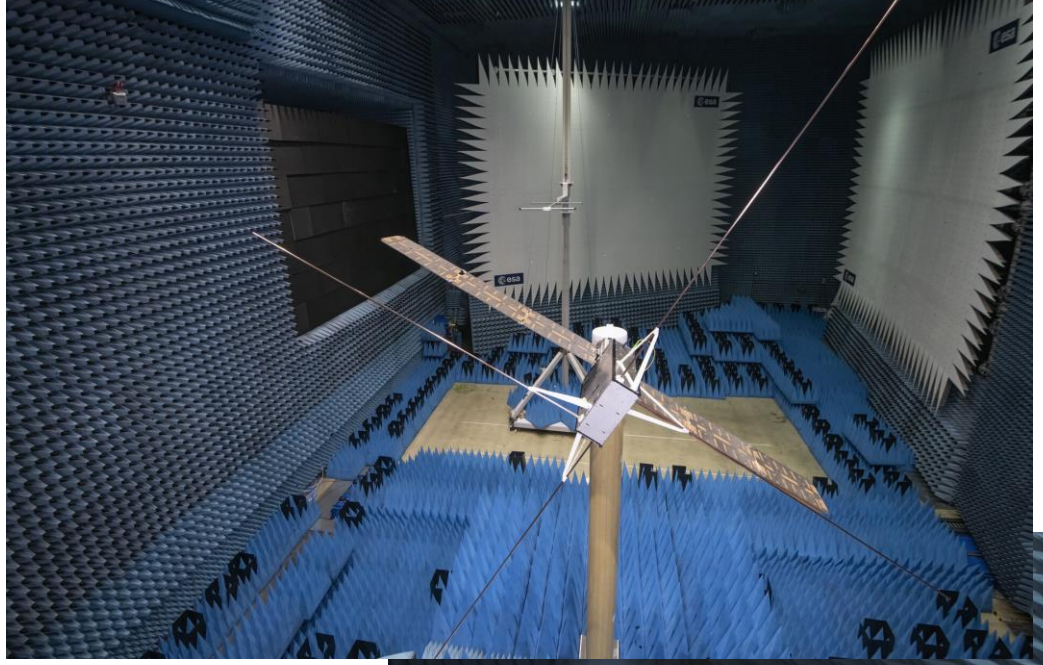
JuRa Payload Team
- JuRa Lead — EmTroniX
- JuRa Design/RX — IPAG
- JuRa Dig. Design — Filip Zaplata
- Antenna Sim/TX — Technische Universität Dresden
- LFR Antennas — Astronika

GRASS Payload Team
- Gravimeter Lead — emxys
- Gravimeter Design — Royal Observatory of Belgium

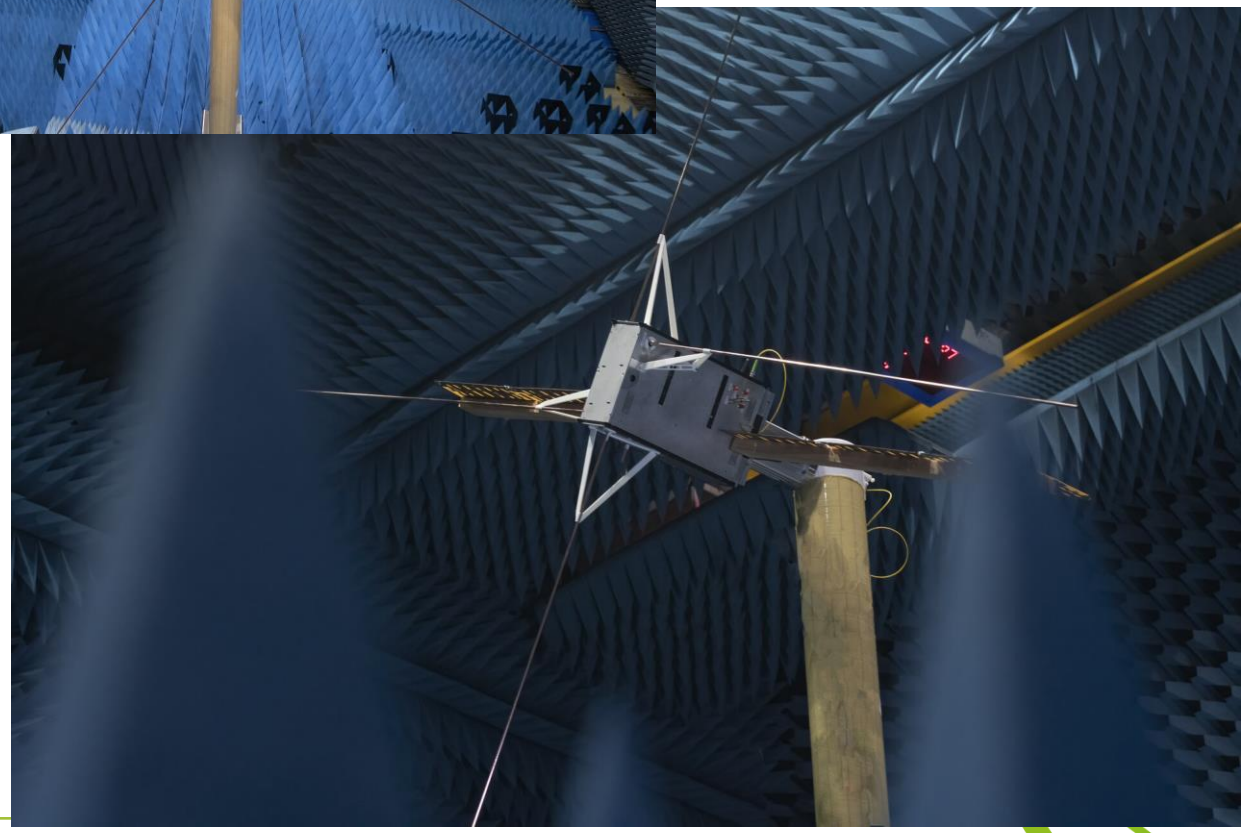
CubeSat MOC
- Juventas Ops — GOMSPACE LUXEMBOURG
- CMOC Lead — SPACEBEL
- Milani Ops — tyvak International SRL
- Flight Dyn. & Mission Planning — cnes

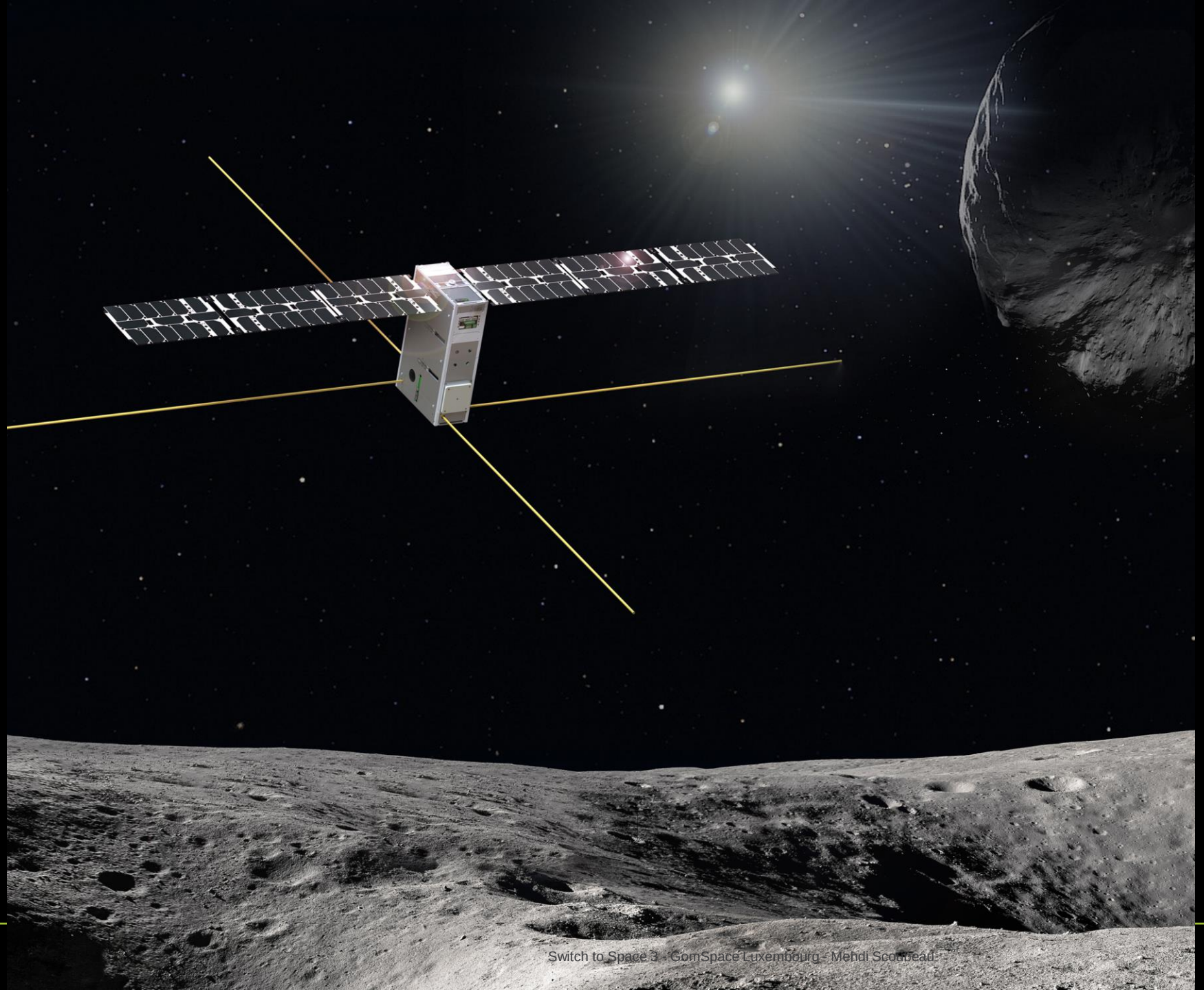
JUVENTAS – TESTS

Credits: TUD



Credits: ESA



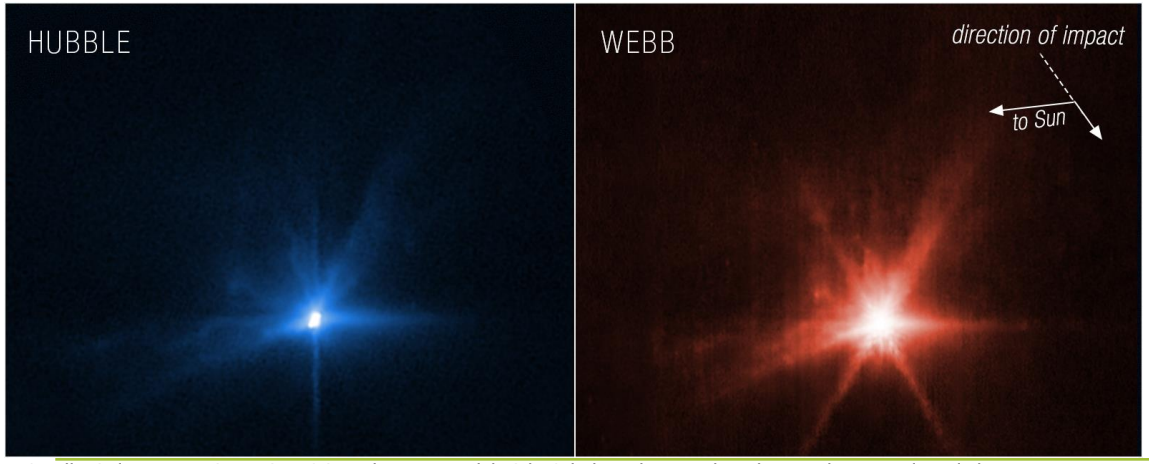


Mehdi Scoubeau
@Mehdastra

gomspace.com

DART IMPACT

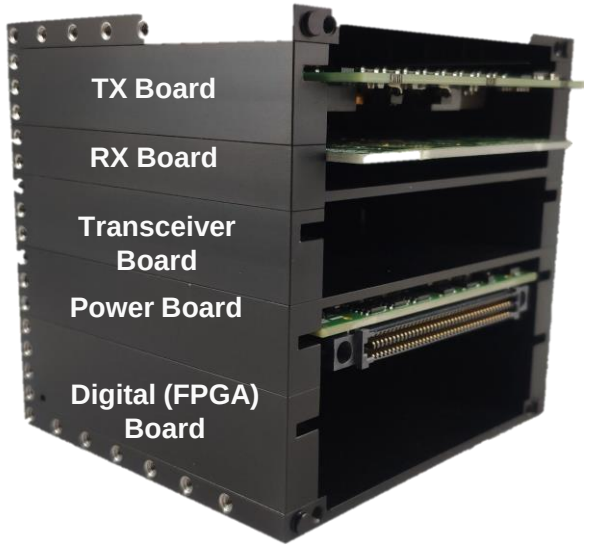
Credits: NASA/Johns Hopkins APL

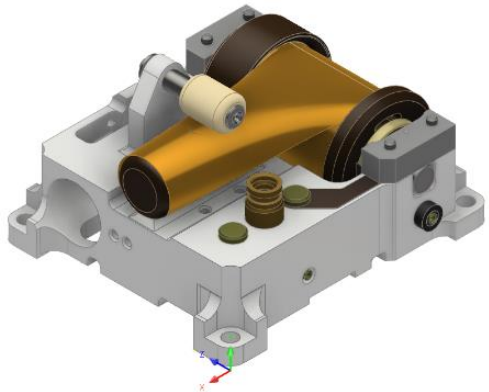


Credit: Science: NASA, ESA, CSA, Jian-Yang Li (PSI), Cristina Thomas (Northern Arizona University), Ian Wong (NASA-GSFC); image processing: Joseph DePasquale (STScI), Alyssa Pagan (STScI)

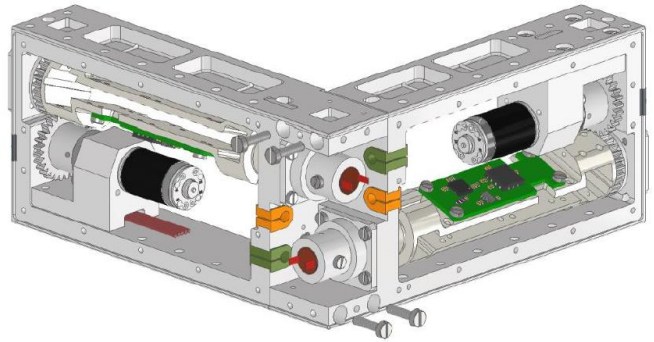
JUVENTAS – SCIENCE

Science Objective	Instruments	Mission Phase
SO#1: Gravity field of Dimorphos	ISL radio link	Proximity operations
	Gravimeter	Surface operations
	IMU	Landing / Bouncing
SO#2: Internal structure of Dimorphos	Low frequency radar	Proximity operations
SO#3: Surface properties of Dimorphos	Visible camera	Proximity operations, Surface operations
	IMU	Landing / Bouncing
SO#4 (secondary) Dynamical properties of Dimorphos	ISL radio link	Surface operations
	Gravimeter ISL	Surface operations
	Star tracker, sun sensors	Surface operations
SO#5 (secondary) Sub-Surface properties of Dimorphos	IMU	Landing / Bouncing

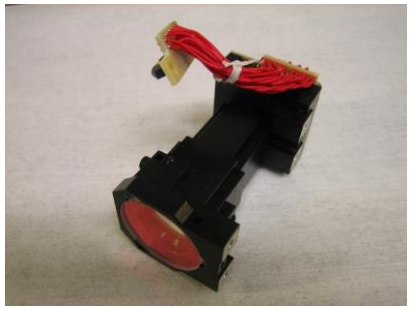




JuRa, Low Frequency Radar



GRASS, Gravimeter

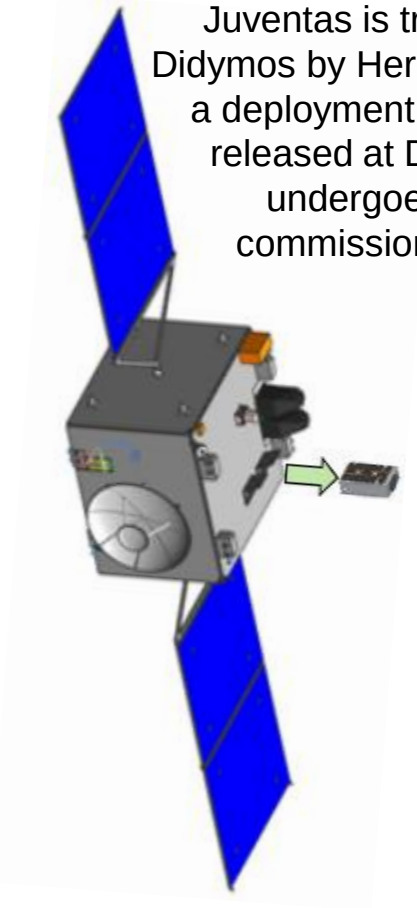


ISL, NavCam, IMU

JUVENTAS – CONOPS

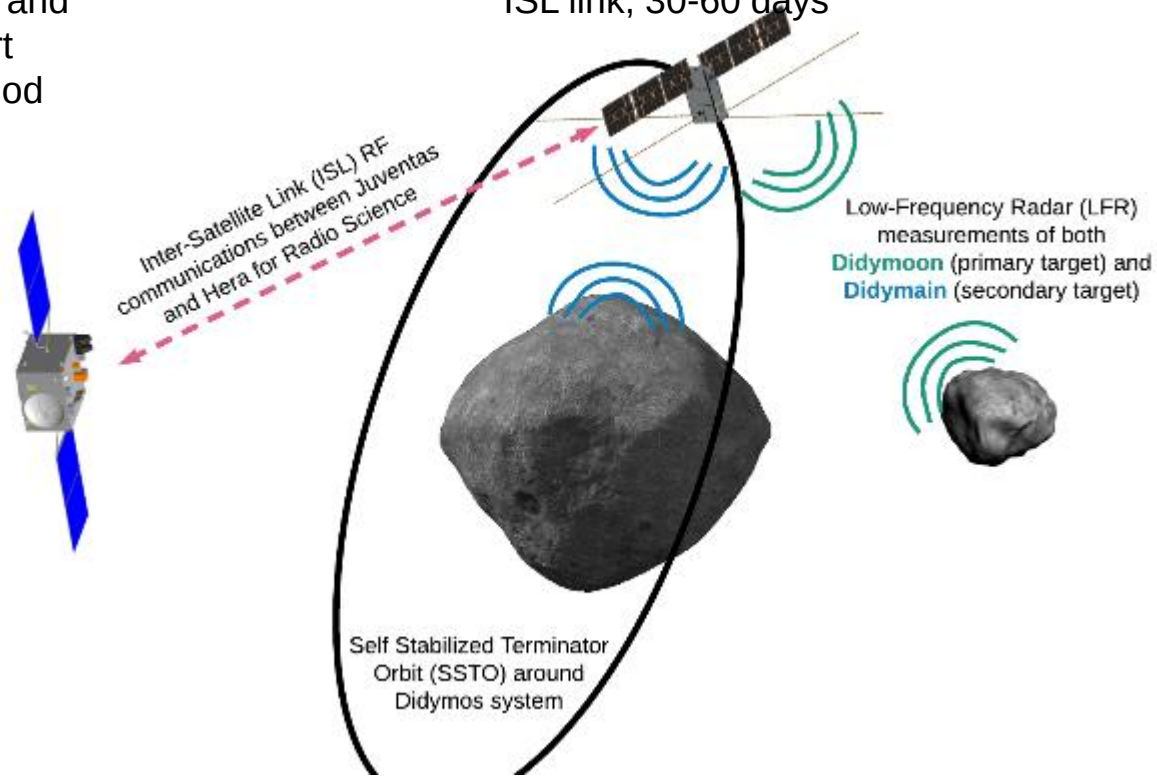
1. Launch and Cruise

Juventas is transported to Didymos by Hera, stowed within a deployment canister. It is released at Didymos and undergoes a short commissioning period



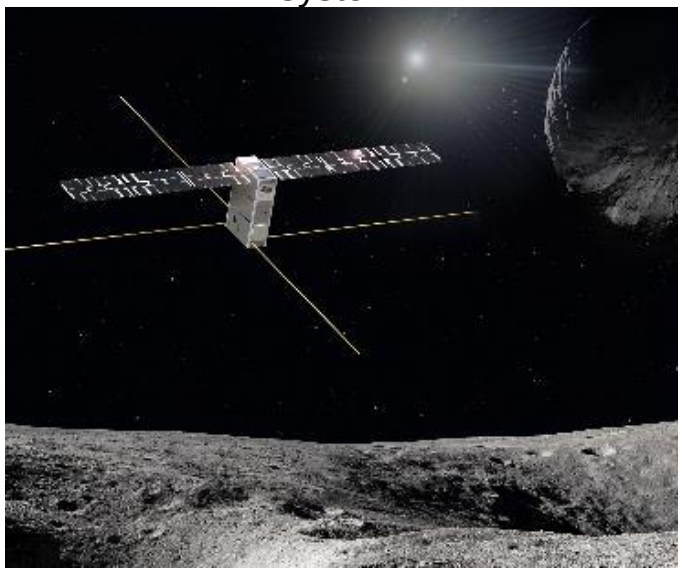
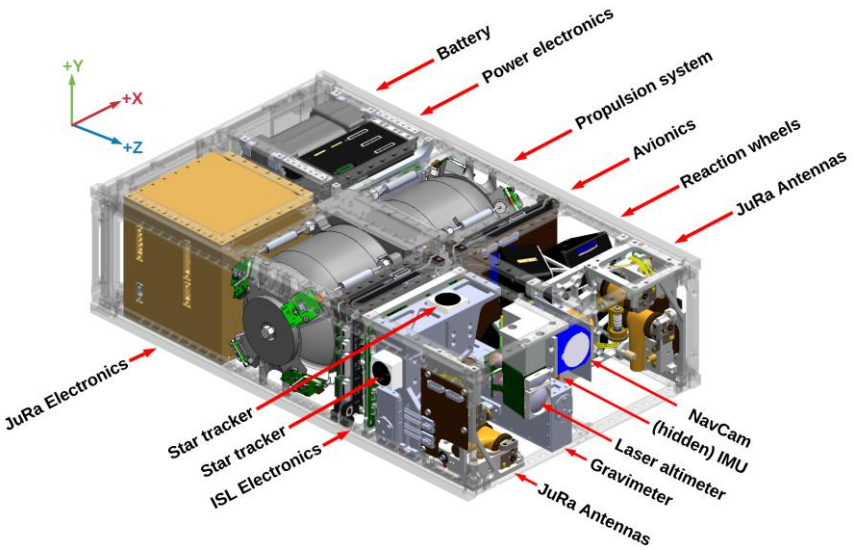
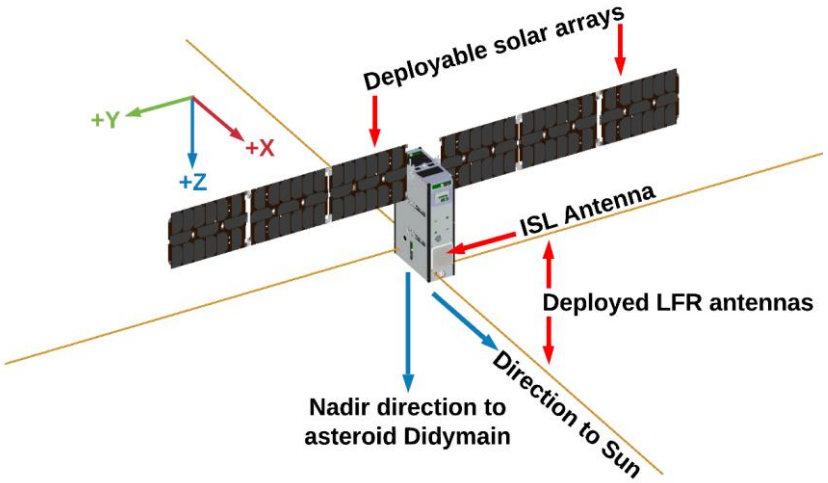
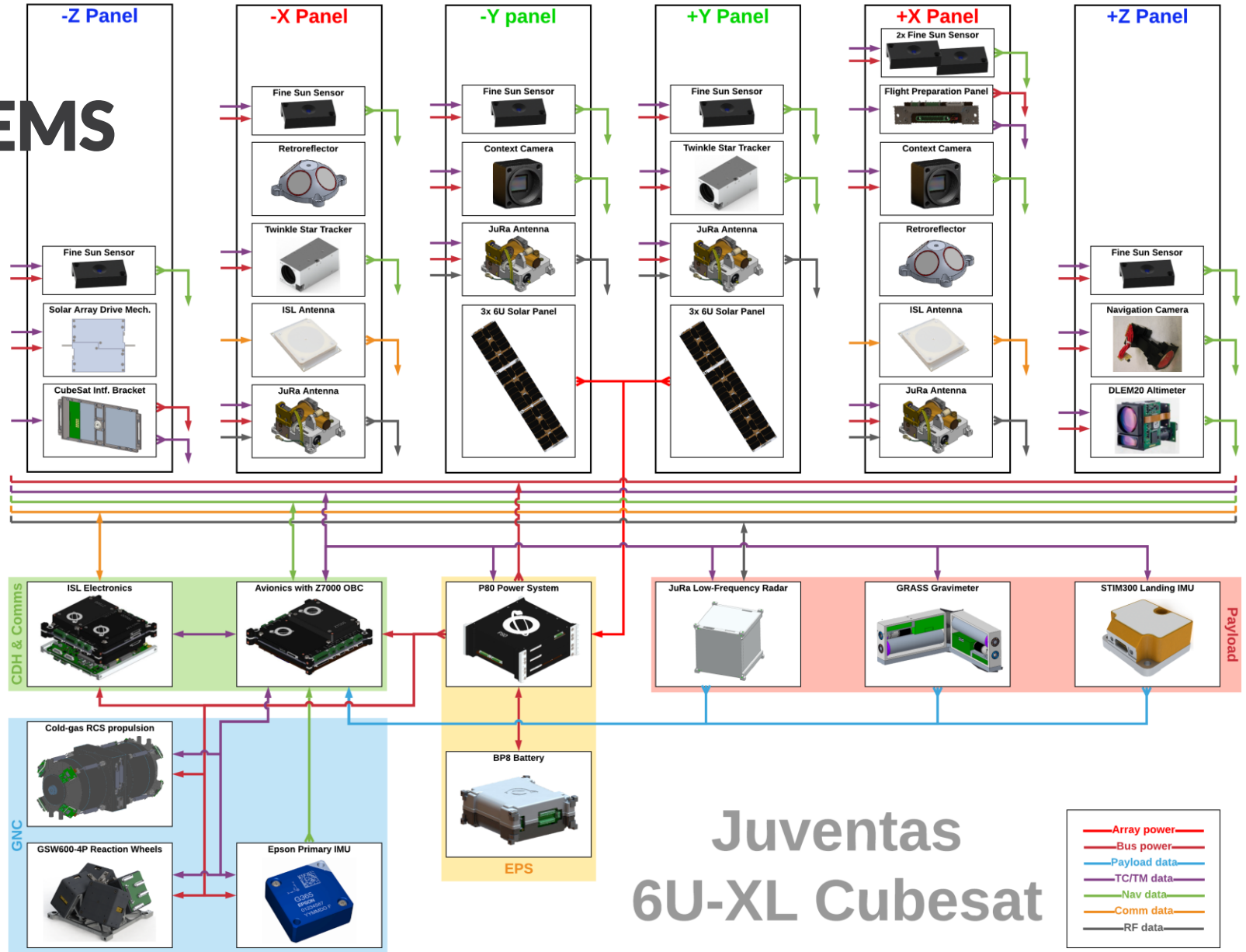
2. Proximity Operations – Radar and Radio Science Observations

Juventas performs the main scientific observations with its low frequency radar payload to look inside the asteroid interior, and operate radio science experiments through the ISL link, 30-60 days



3. Attempted Landing on Dimorphos and Surface Operations

Juventas attempts to land on the surface of Dimorphos, making measurements of the impact and bouncing events and then operating its gravimeter payload from the surface to understand dynamical properties of the asteroid system



JUVENTAS – SYSTEMS