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OH B VISION TO PRESERVE SPACE VALUES THROUGH IN-ORBIT SERVICING IN THE TIMEFRAME OF 2030-2050

CSID 2022

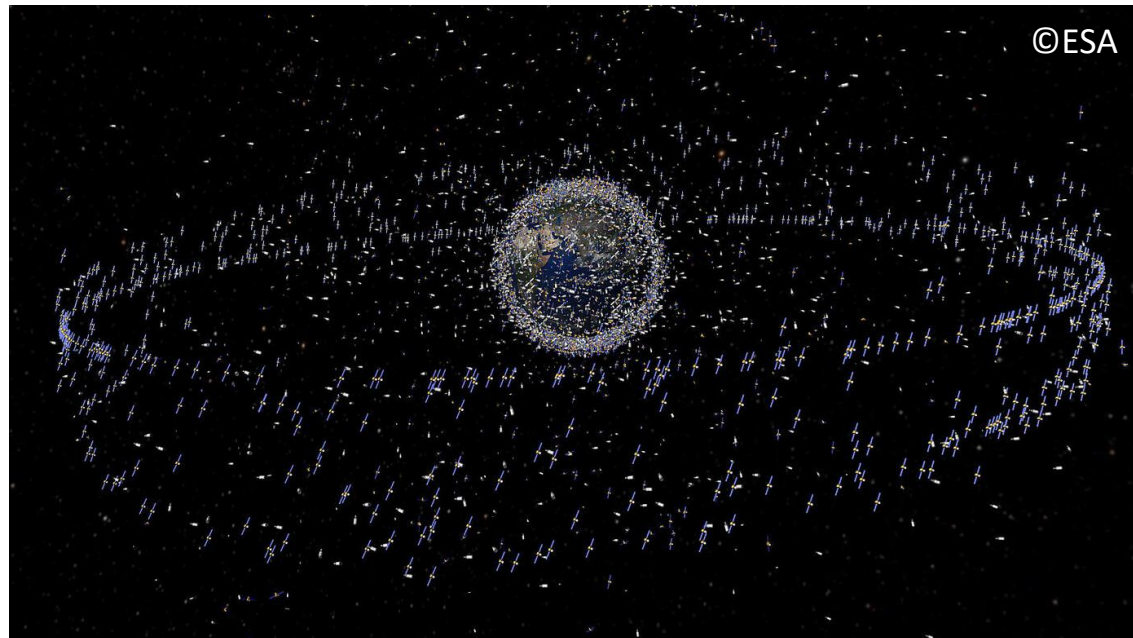
C.BERGEMANN, OCTOBER 13TH 2022

SPACE NOWADAYS AND A FUTURE WITHOUT „SPACE“

UNREGULATED GROWTH OF SPACE TRAFFIC

Analogy of "chaos theory" in space

What if all the means of transportation produced in the automotive history were still on the roads today? If no tow truck, gas station or assistance existed? If no traffic lights were installed or rules of the road implemented?



OHB PRINCIPLES OF MANAGEMENT TO PRESERVE SPACE

OHB MISSION, VISION AND VALUES



Mission

We bring together people with passion who realize sophisticated space systems to preserve space.

We develop intelligent and innovative solutions that optimize the benefits for our customers and space environment. We embrace a sustainable growth based on space future.



Vision

We simplify your life through smart space solutions.



Values

Embracing our values on Earth and in Space.

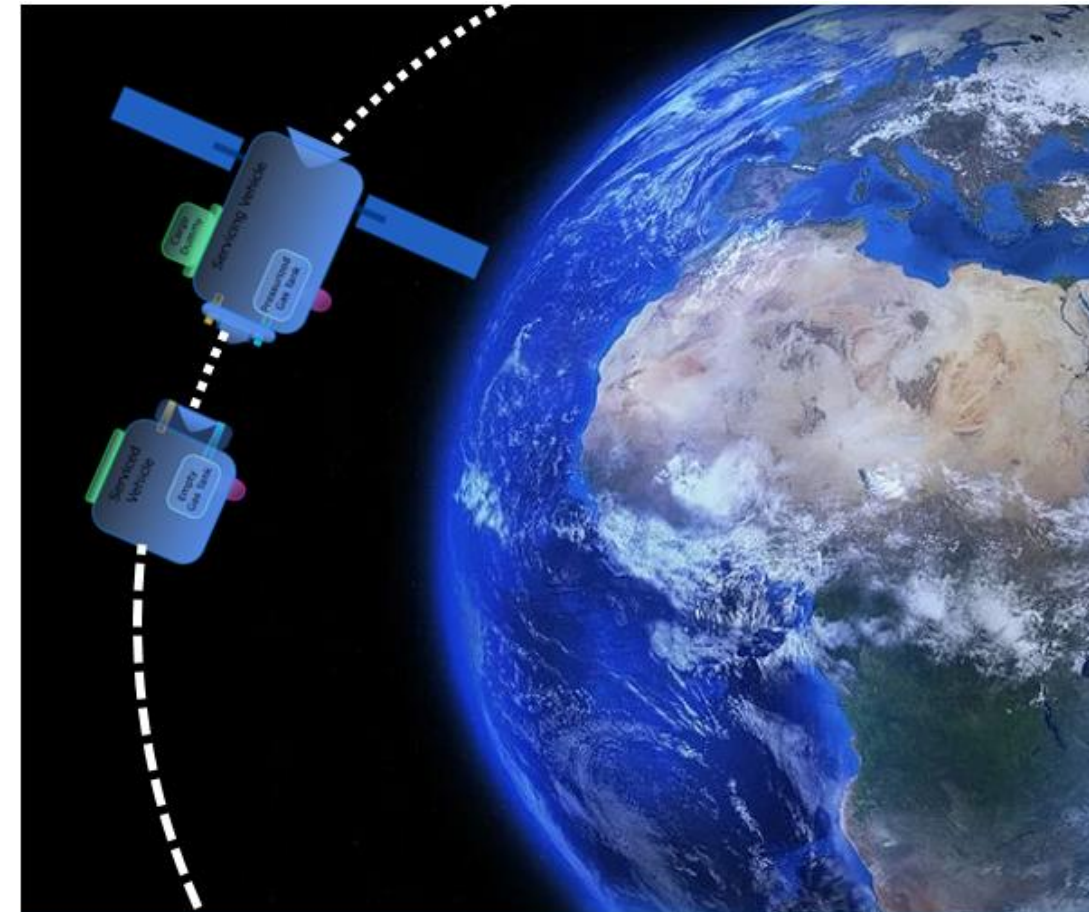


SUSTAINABLE DEVELOPMENT CREATING A CLEAN SPACE

ACTIONS THAT SURVIVE FOR DECADES

Develop a flexible, technology-neutral regulatory regime for:

- Minimization of further debris;
- Maximization of orbital resources through proper space traffic management guidelines including launch activities;
- Creation of mitigation actions and responsible solutions to reduce the existing debris and to avoid even more deposition of orbital debris:
 - Force atmospheric reentry;
 - Recycling etc.



3D PRINTING PRODUCTION CHAIN FROM SPACE AND IN SPACE

IMPERIAL



- **IMPERIAL: ISS ALM PrintER** suitable for Large part production using high performance polymers (2019-2021).
 - Goal: *Design, develop, and test a fully functioning open 3D-printer model for Additive Manufacturing using high-performance thermoplastics that alleviates build volume constraints while meeting the fabrication requirements for of the ISS.*
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- *Focusing on Engineering thermoplastics*
 - *Self-sustainability of the entire process*
 - *Large part production demonstration*
 - *Evaluation of functional properties*



3D PRINTING PRODUCTION CHAIN FROM SPACE AND IN SPACE

IMPERIAL

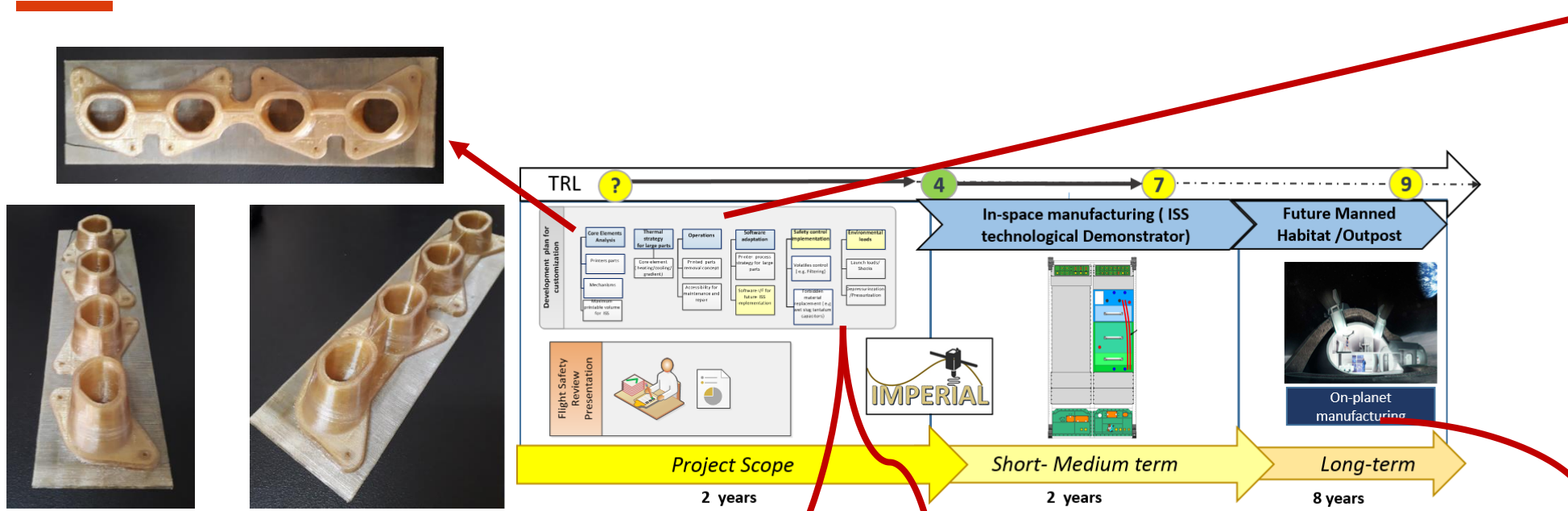


Figure: 3D-printed manifold with IMPERIAL printer (PEKK)

Figure: IMPERIAL breadboard overview

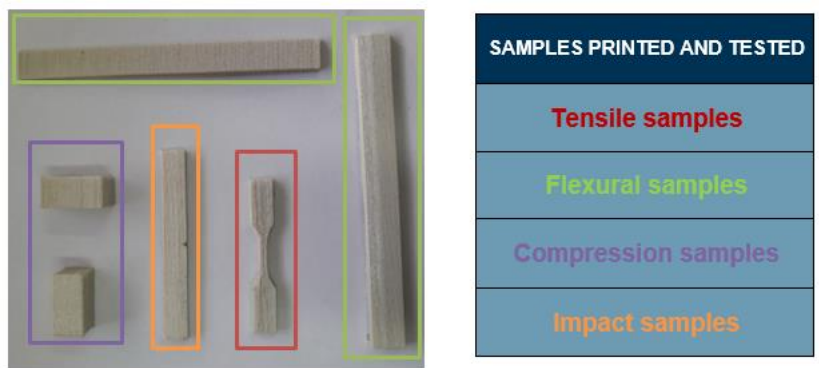


Figure: 3D-printed ASTM sample (PEI/PC)

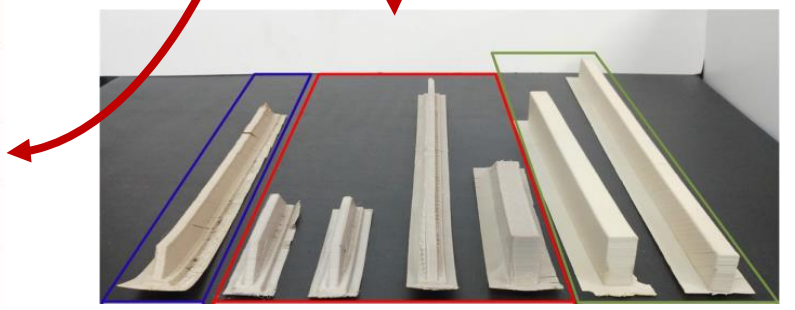


Figure: From left to right, samples printed with PEEK 450 (blue), PEEK 4000 (red), PEI ULTEM® 9085 (green)

On a long-term time scale, a permanent use of this technology is envisioned for the development of an Off-Earth Manufacturing outpost in the frame of a lunar base. Such a base will provide among others:

- ✓ in-situ surface exploration to determine material composition and lunar chronology;
- ✓ remote seismic exploration of lunar interior to determine physical structure;
- ✓ assessment of lunar surface/near surface resources for human exploitation;
- ✓ testing of technologies for human exploration of the Solar System.

JOINING FORCES TO CREATE A BETTER SPACE ENVIRONMENT

ENCORE

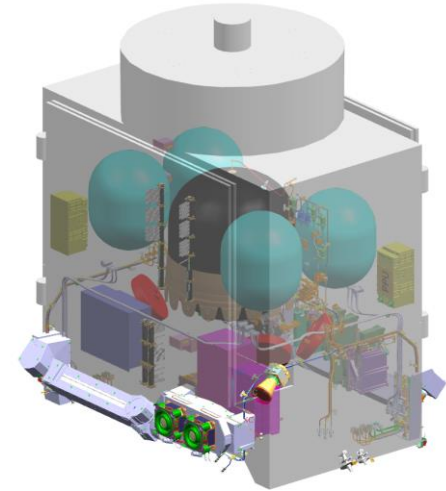
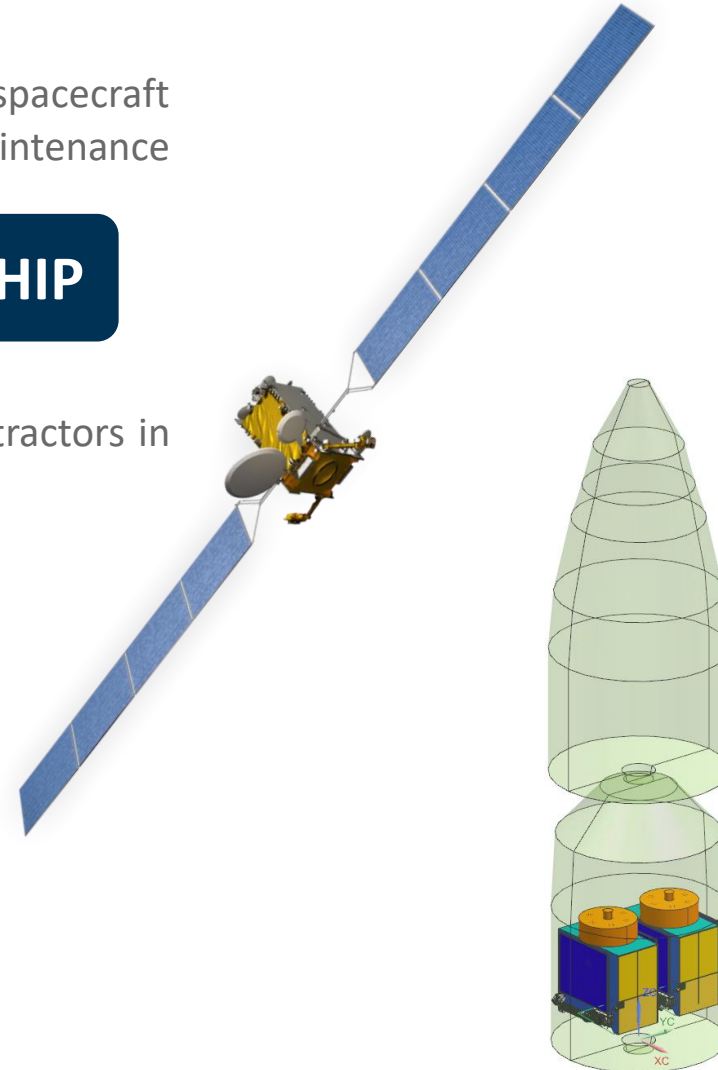


- **Goal:** To bring together a service provider and a customer for spacecraft maintenance by using one or a combination of in-orbit maintenance capabilities.



STRONG PARTNERSHIP

- In the Maturation Phase, **OH B** has the role of one of the subcontractors in the ENCORE (**ClearSpace** consortium)
- **Uses Cases** (at least):
 - Orbit Station Keeping;
 - Attitude Control;
 - Longitude relocation;
 - Disposal service;
- **OH B Contribution:**
 - Platform provider -> **Electra Light Encore**



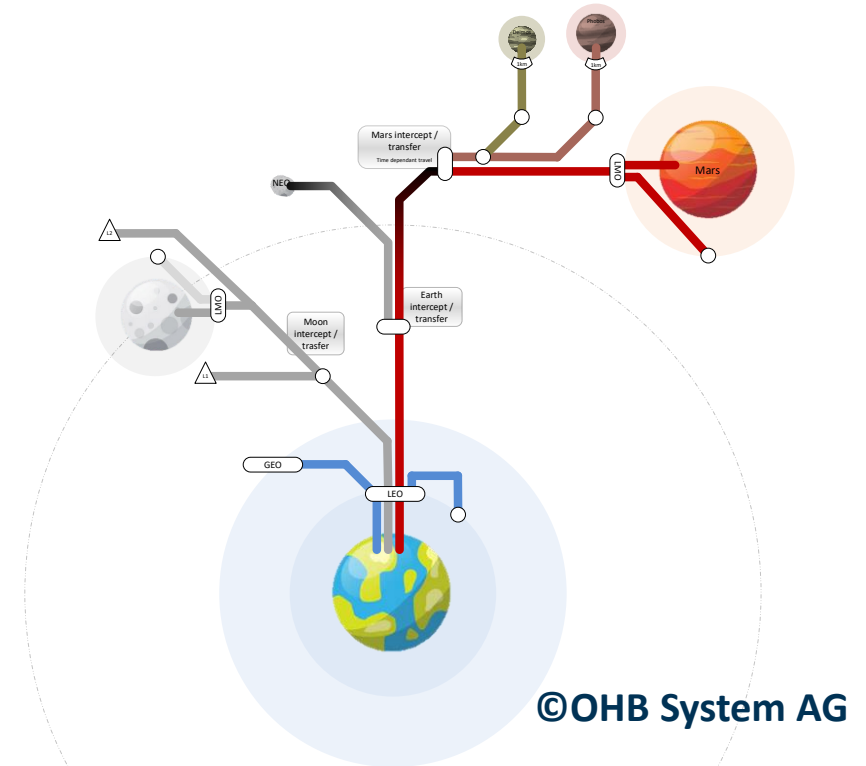
CREATING SYNERGY ON BEHALF OF SPACE

SPACE TRANSPORT LOGISTIC VEHICLE WITH IOS CAPABILITIES

- **Flexible** and **Efficient** Vehicle
- **Open Architecture** with Standard interfaces to include different servicer providers
- **Sustainable** and **reusable** vehicle solution to preserve space resources for future missions and applications
- **Embedded** in a future orbital space infrastructure

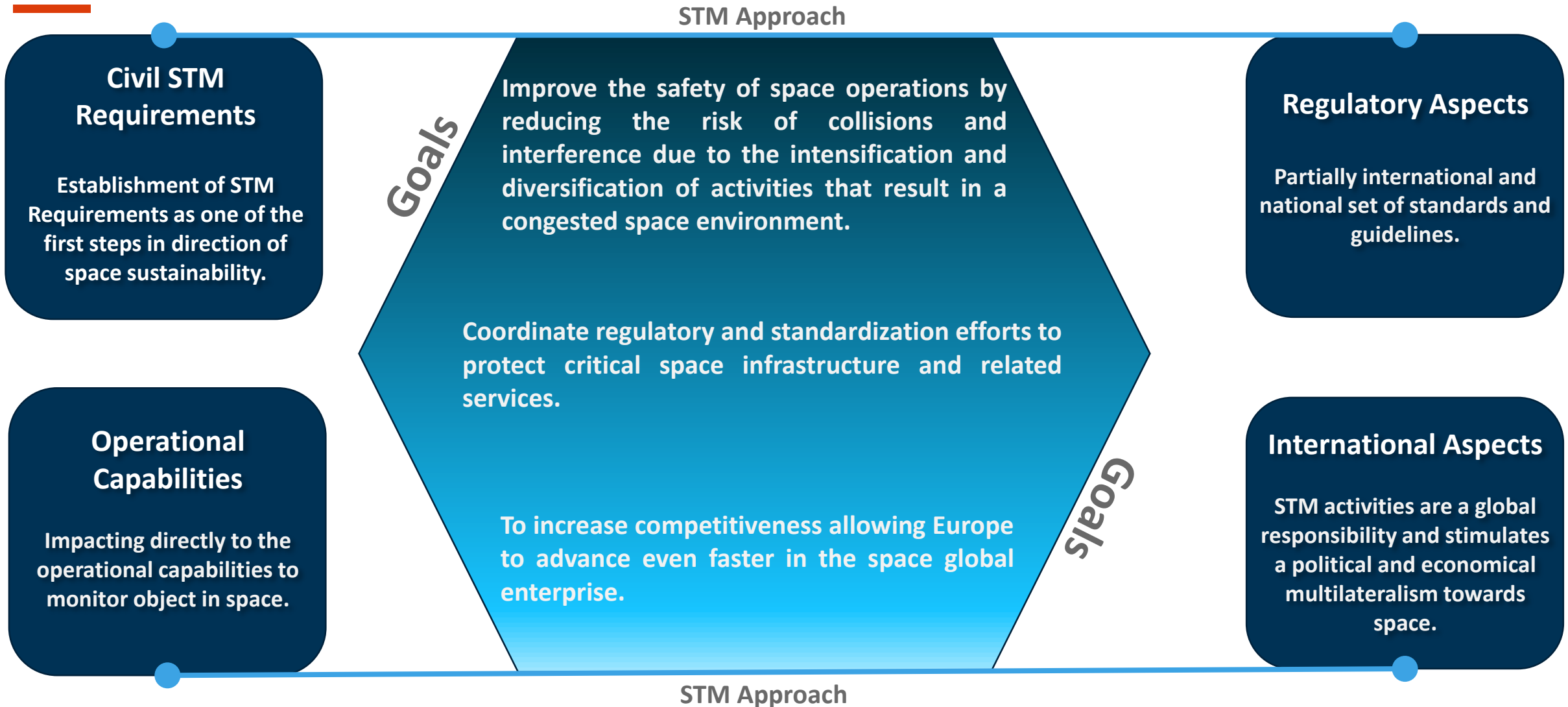
Synergy that merges two different fields to create a single multifunctional product

Opening doors to a next generation of space innovations direct connected to a global space environment



ENSURING FLAWLESS MANAGEMENT THROUGH IOS MISSIONS

SPACE TRAFFIC MANAGEMENT (STM)

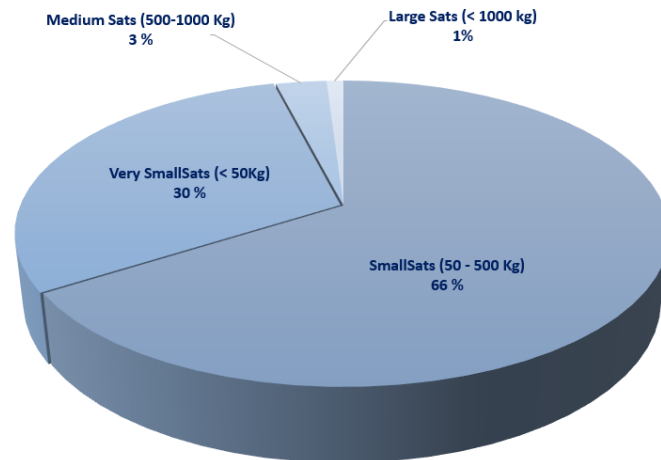


COMMERCIAL POTENTIAL TO PRESERVE SPACE

BUSINESS OF TODAY BRINGING SOLUTIONS FOR THE FUTURE

LEO Market

**Telecommunications, Earth
observation and Military satellites**



- Assumptions:
 - Annually, an average of 1500 satellites, which are placed in the LEO;
 - After 2030, LEO constellations are fully operational with more than 12000 satellites in LEO;
 - The global market grows in the first half of the 2030 decade, but will be mainly a replenishment market thereafter;
 - European companies have access to 25% of the world market.



THANK YOU!

OHV SE

Manfred-Fuchs-Platz 2-4
28359 Bremen
Germany

Phone: +49 421 2020 8
Fax: +49 421 2020 700
Email: info@ohv.de
Web: www.ohv.de