

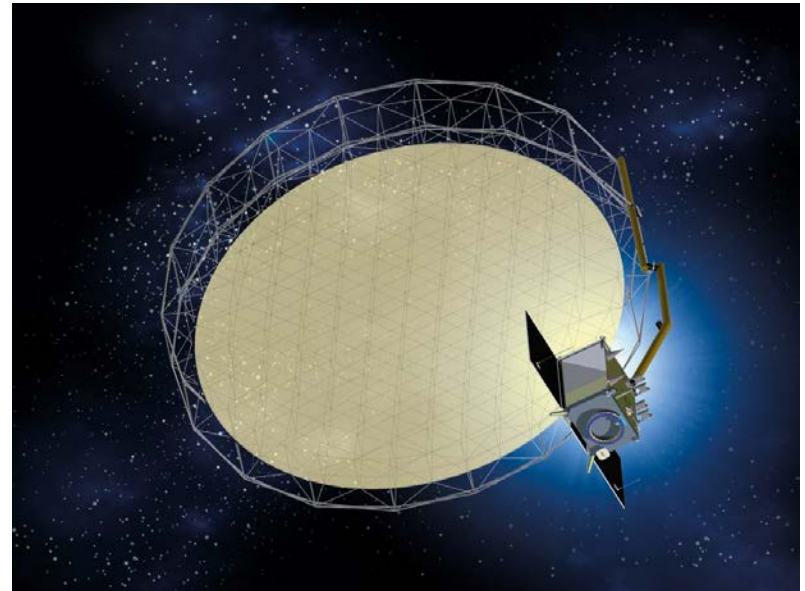
H2020

Success Story

Industrial Space Technology

H2020 Large European Antenna (LEA)

Roland Zenger
Sales Manager Mechanisms
RUAG Space
Zurich, 20 June 2018

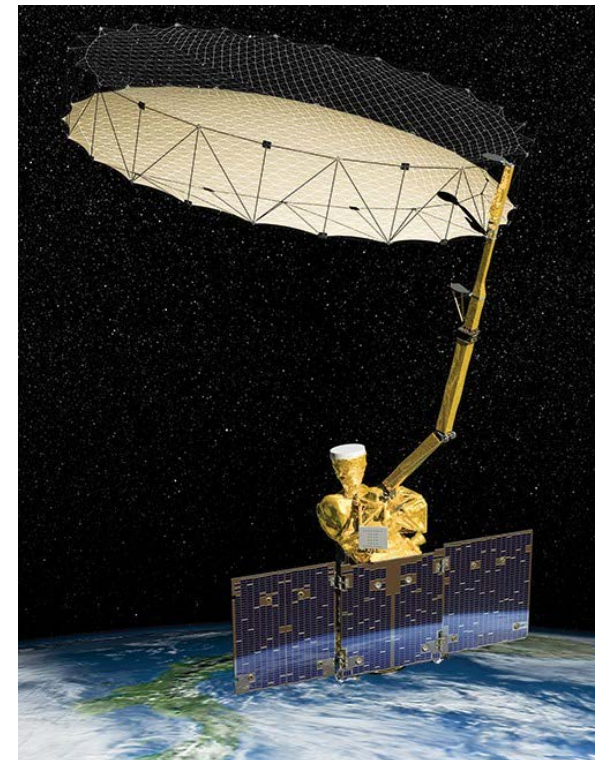


Together
ahead. **RUAG**

Large Deployable Antennas

Interesting niche Market – dominated by US Companies

- Large Deployable Antennas (LDA)
 - folded during launch to fit into the payload fairing
 - deployed size from 3 to 50m (Northrop Grumman AstroMesh AM-2)
- Main applications
 - Telecom, e.g. mobile/fixed broadcasting, satellite communication systems
 - Earth Observation, e.g. BioMass P-band SAR
- Major players with flight heritage
 - Northrop Grumman (AstroMesh)
 - Harris Corporation



Large Deployable Antennas

ESA ARTES-5 Contract 15230/01/NL/JSH

- 1st ESA contract for complete Large Deployable Antenna system
- Kicked-off September 2001
- Project closed November 2007

Development in frame of ESA
Program on Advanced Systems
and Telecommunications Equip-
ments (ASTE),

Element of the Agency's
"ARTES" Program

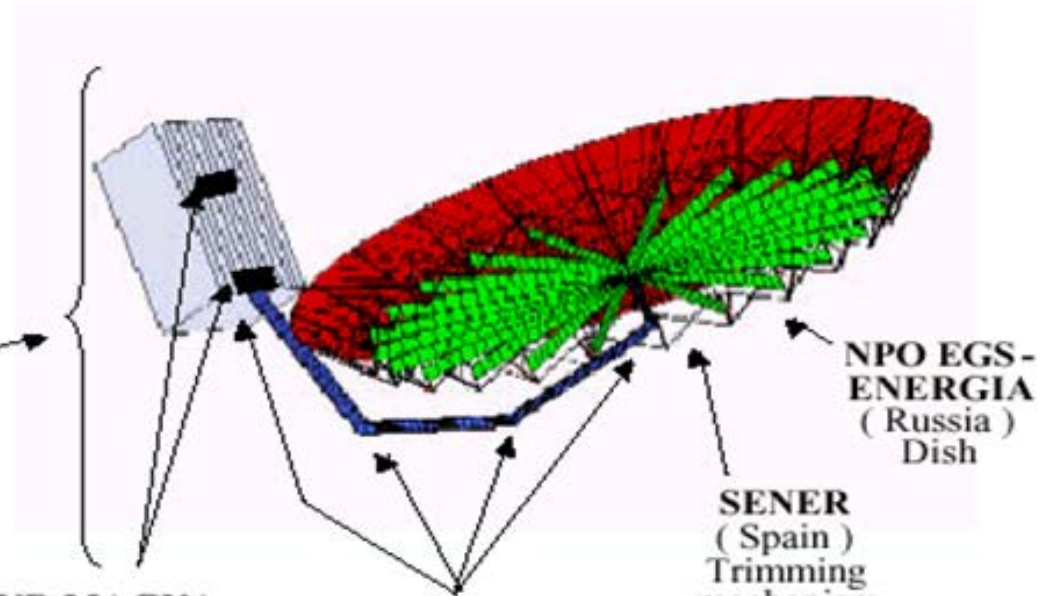
ALENIA SPAZIO
(Italy)
RF design,
System engineering
with
NPO EGS
support

STEYR MAGNA
(Austria)
Arm Hold down

HTS
(Switzerland)
Hinges and tubes

SENER
(Spain)
Trimming
mechanism

**NPO EGS-
ENERGIA**
(Russia)
Dish



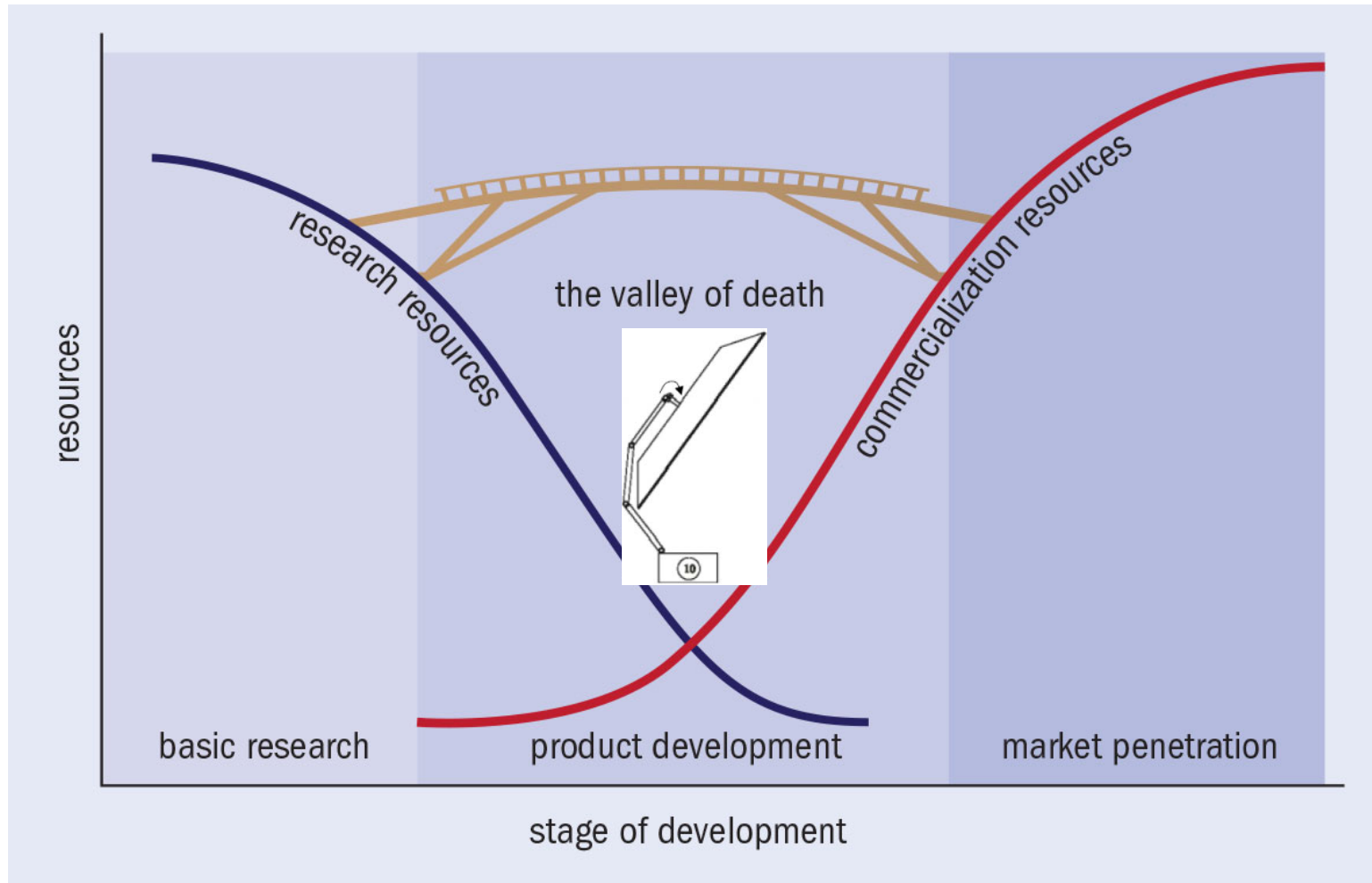
Large Deployable Antennas

Achieved Developments ARTES-5 Contract

- LDA System, reached TRL 5
 - complete system developed and analyzed, incl. RF performance
 - MAIT process for flight hardware established
Testing quite challenging!
 - component validation in relevant environment
- Reflector with Hold Down and Release Mechanism (HDRM), TRL 6
 - 0-g deployment test, environmental tests, PIM test
- Arm Hinge Deployment and Blocking Mechanism (ADB), TRL 5
 - critical hinge and part of limb qualified in accordance with ECSS
- Reflector Trim Mechanism (RTM), TRL 5
 - qualified in accordance with ECSS
- Limb Hold Down Mechanism (AHD), TRL 5
 - one limbs AHD qualified in accordance with ECSS

Large Deployable Antennas

Valley of Death - 2007 to 2017



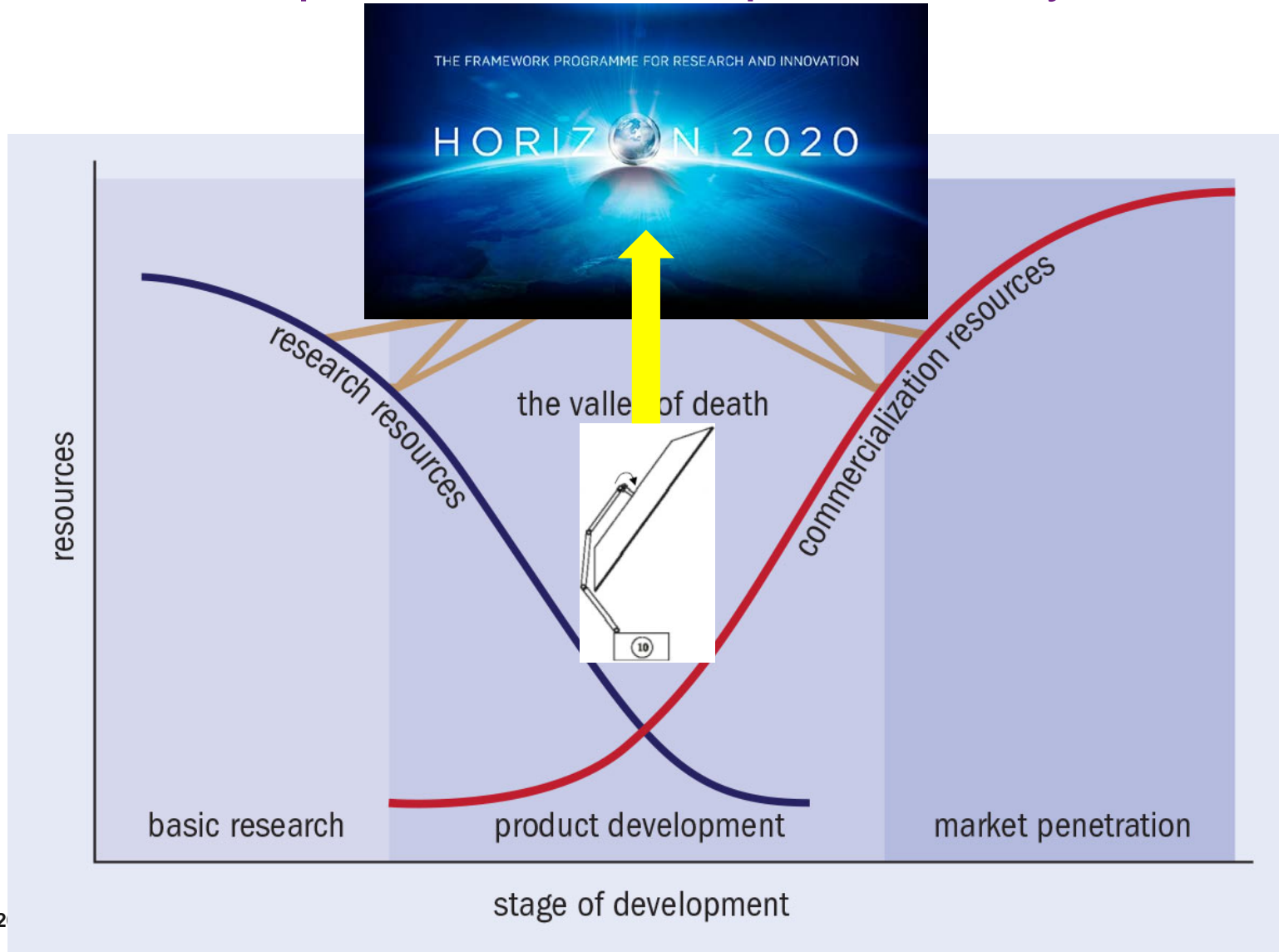
Large Deployable Antennas

Valley of Death - 2007 to 2017

- No European activities for LDA flight hardware development due to lack of funding
- LDAs for two ESA projects procured in the US
 - Alphasat/AlphaBus 11m L-band reflector (Northrop Grumman)
 - BioMass 12m P-band SAR reflector (Harris)
- Various technology developments at component/subsystem level, e.g.
 - Mesh material for reflector
 - Booms for deployment
 - General studies for Large Deployable Structures and LDAs
- Three major players:
 - Thales Alenia Space, Italy (Rome)
 - HPS GmbH, Germany
 - Large Space Structures (LSS), Germany (former Energia-GPI Space, EGS, employees)

Large Deployable Antennas

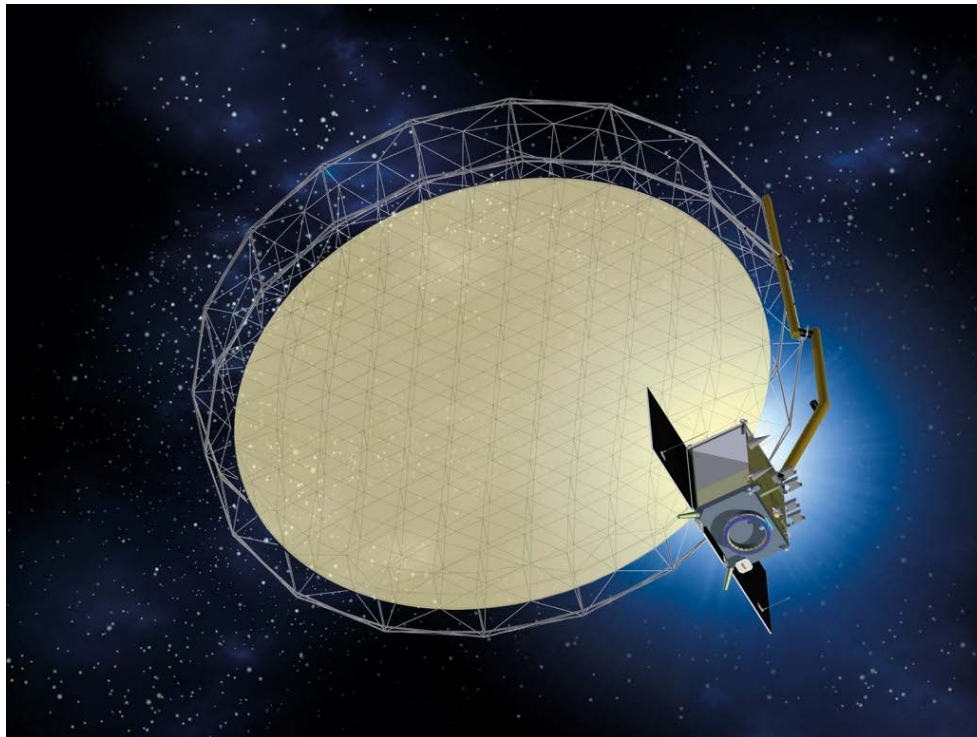
H2020 non-dependence – Escape the Valley of Death



Large Deployable Antennas

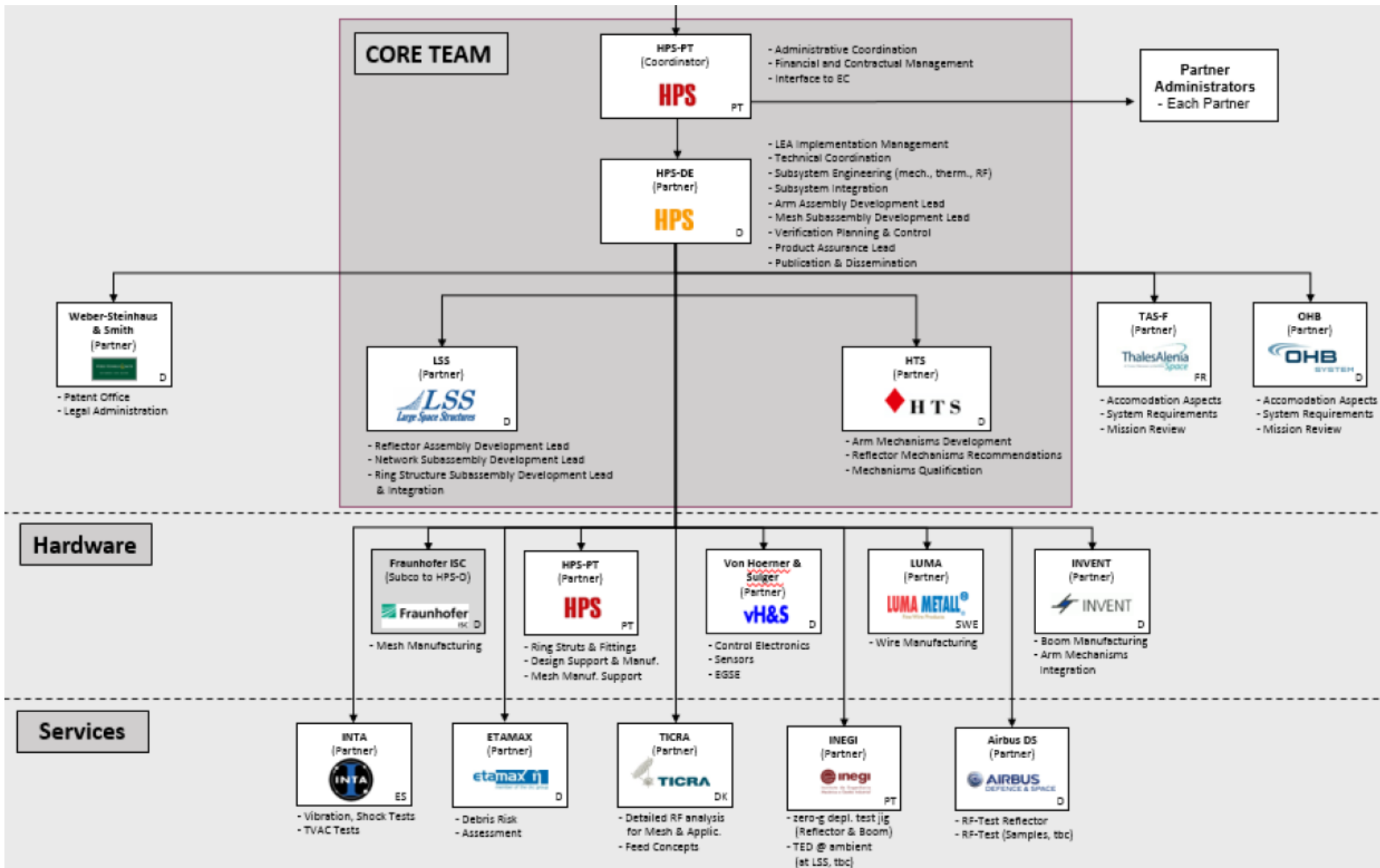
H2020 – Large European Antenna (LEA)

- Call won by an international team consisting of most of the European LDA key players and all Large System Integrators (LSI)
- Project Coordinator is HPS Portugal, supported by HPS Germany



Large Deployable Antennas

Large European Antenna (LEA) – Project Team



Large Deployable Antennas

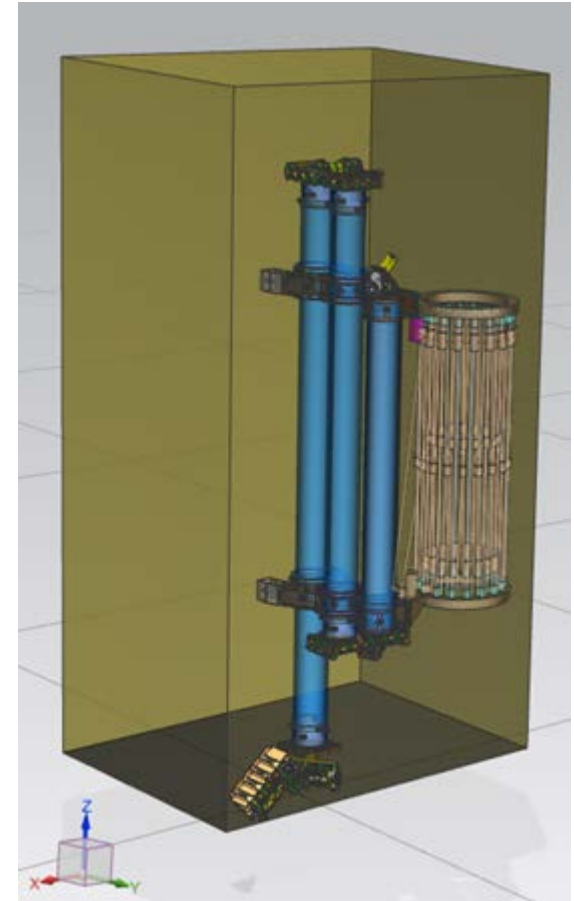
Large European Antenna (LEA) – Project Overview

- Development of a Proto-Flight Model (PFM) with 6m diameter
- Scalable design for reflectors up to 25m (LEA-FO, follow-on products)
- The LEA PFM is offered for free to a satellite program in exchange to flight opportunity
- Possible applications:
 - Earth Observation
 - Telecom
 - Science
 - Defense
- Start TRL 5, end TRL 8

Large Deployable Antennas

Large European Antenna (LEA) – Project Status

- Preliminary design of all components completed
- Very challenging schedule
 - PDR July 18
 - CDR Apr 19
 - ARR Aug 19
 - TRR Feb 20
 - FR Oct 20
- Ready to launch mid 2021



Large Deployable Antennas

H2020 – added Value for Space Industry

- H2020 Space Calls are complementary to the ESA Technology Development Programs (TRP, ARTES, GSTP)
 - ➔ additional accessible funding
- Companies outside ESA business
 - ➔ new business connections, added value to project
- Large(r) consortiums
 - ➔ broad know-how/knowledge concentrated in one project, take the best for each task
- Multi-national
 - ➔ new business contacts, often in emerging markets