In space manufacturing and assembly of large systems

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AIRBUS
Customer pains

- 15 Years
- 15 Min
- No Re-use
- No Repair
- Over-qualified Structures
- Expensive Deployable
- Time to Market
- High Qualification
- Limited Size
- 5 m
- Custom Design
- No COTS
Market Opportunities

Useful Mass (UM): Mass that generates customer value

Necessary Mass (NM): Mass required for the mission

Total Mass (TM): Mass at launch

Mission:
- Telecom
- Observation
- Exploration
- Scientific

Application:
- Telecom
- Navigation
- Exploration
- Scientific

Use case Name:
- End-to-End Antennae for Telecom (Large antenna)
- End-to-End Trusses in Geo (Geo Hub)
- End-to-End Trusses in Leo (Leo Hub)
- End-to-End Antennae for Exploration
- End-to-End Antennae for Navigation
- End-to-End Antennae for Telecom (Double capacity)

Percentage:
- 60%
- 45%
- 11%
- 20%

Spacecraft Use case:
- Telecom
- Exploration
- Observation
- Scientific

What about Lunar Gateway?

ISS: 420 Tons / 12 years of assembly

$50b-1$100b

18 Business cases investigated

3 Business cases more deeply studied
Way forward/Future applications

New Frontiers

Airbus constellation: 600 spacecrafts, 30% mass saving, 9,6 m² antenna dish (51 kg), 5.4 T & $80 M / launch

Lunar orbital PF gateway, LOP-G, 30% mass saving, 130 kg/m³ volume = 200 m³, $50 K / kg Moon orbit, $30 K / kg Earth orbit

Geo-Information / Earth Observation

Astronomy

JWST (5.6 m), 10 payloads

XO-ExoEarth, $9B, 70% payload utilization rate, double antenna capacity / Satcom

Next one: 12 m to detect more ExoEarth, Foldable parts telescope only, 30% mass saving

$27 B = $22 B for the telescope only, $5 B, 5,4 T & $80 M / launch

Double antenna constellations 600 s/c, Upgradable, scalable, repairable

90 kg/m³, 130 kg/m³ volume = 200 m³, $50 K / kg Moon orbit

Space Hub

IoT Connectivity

80 payloads of 200 kg on a single PF, 80 payloads of 200 kg on a single PF

SC payload utilization rate 70%
Roadmap

2017-2018: Develop facilities:
- Simulator
- Manufacturing space lab (DEMETRA)
- Engineering Model Metal3D (3D printer)

2018-2019: Develop demonstrator:
- Process definition & validation
- Antenna reflector assembly

2020-2022: Qualification:
- Metal3D PFM delivery
- Robotic Factory Qualification
- Robotic Factory delivery

2022-2023: In Orbit demonstration
- SpaceSat experiment delivery
- Antenna reflector assembly
- Process definition & validation

2018-2019: Develop demonstrator:
- Engineering Model Metal3D (3D printer)
- Simulator: Manufacturing space lab (DEMETRA)
Understand where we come from to prepare where we go!
Join us to make the future a reality.