
GREEN, SECURE & CONNECTED OHV GROWS BY CONTRIBUTING

CAPITAL MARKET DAY 2022

DR. LUTZ BERTLING, CSDO/CDO

18. JANUARY 2022

A horizontal banner with a background of green foliage. A semi-transparent dark green bar is overlaid across the middle, containing the word "GREEN" in white, uppercase, sans-serif font.

GREEN

A horizontal banner with a background of a digital circuit board. A semi-transparent dark blue bar is overlaid across the middle, containing the word "SECURE" in white, uppercase, sans-serif font.

SECURE

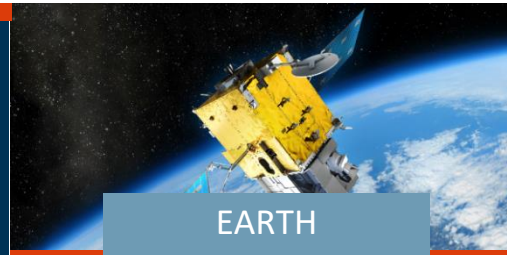
A horizontal banner with a background of a city skyline at night. A semi-transparent dark grey bar is overlaid across the middle, containing the word "CONNECTED" in white, uppercase, sans-serif font.

CONNECTED

GROWING OHB PORTFOLIO FOR GLOBAL CHALLENGES

GROWING OHB PORTFOLIO

SPACE-BASED CONTRIBUTION TO GLOBAL CHALLENGES



EARTH OBSERVATION

- Soil and vegetation analysis
- CO2 and methane tracking
- Weather Forecast
- Fire detection



NAVIGATION

- Positioning
- Time synchronization
- Track & Trace
- Autonomous driving



COMMUNICATION

- Broadband Internet
- Backbone for mobile networks
- Secure Data and Cloud Services
- Internet of Things



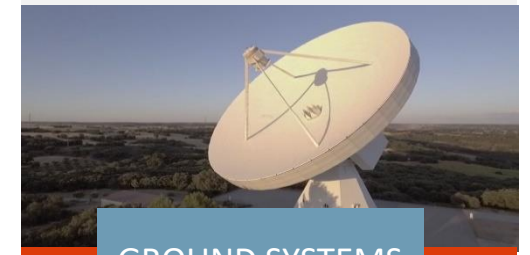
SPACE SAFETY & SECURITY

- Cyber Security & Concepts
- Secure encryption and transmission of data
- Quantum communication



DOWNSTREAM & SERVICES

- Digital Twins
- Data Analytics
- Big Data Management



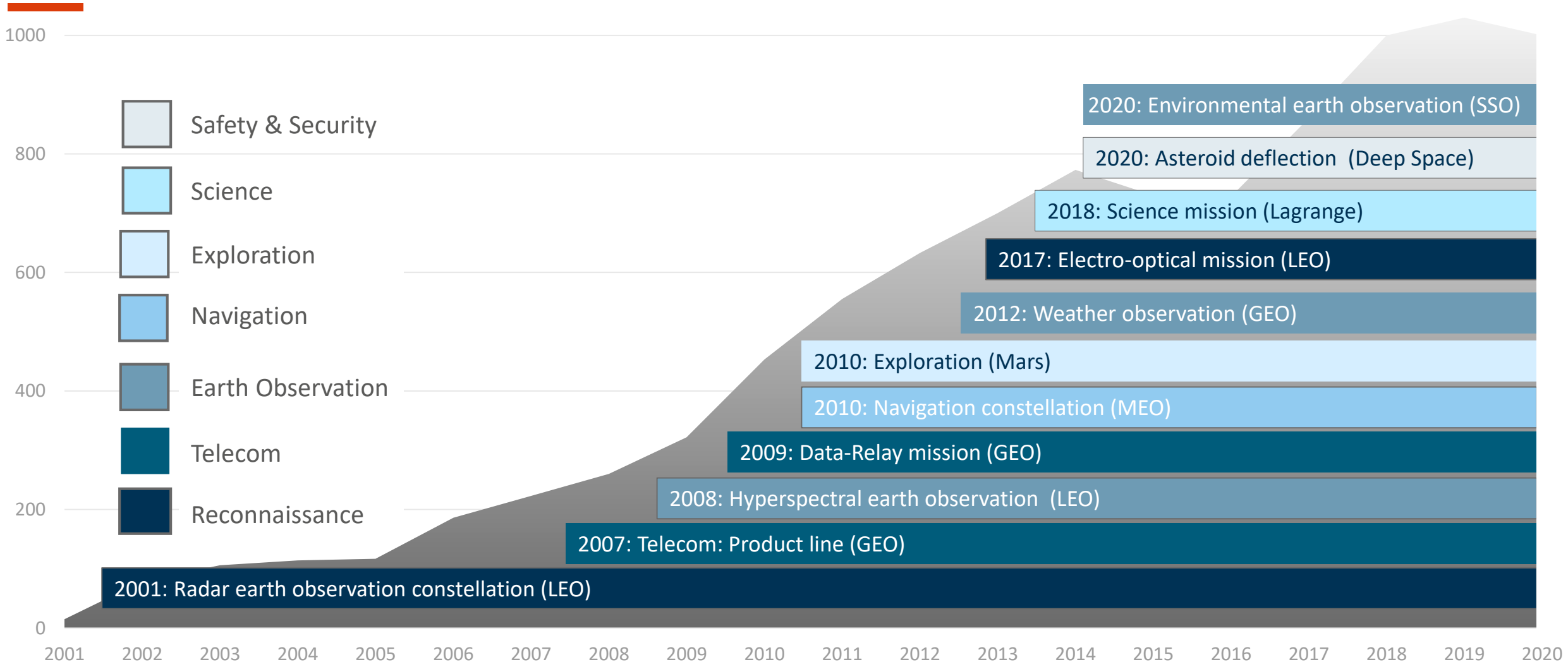
GROUND SYSTEMS

- User Terminals
- Data Processing
- Operations & multi-mission center

GROWING OHB PORTFOLIO

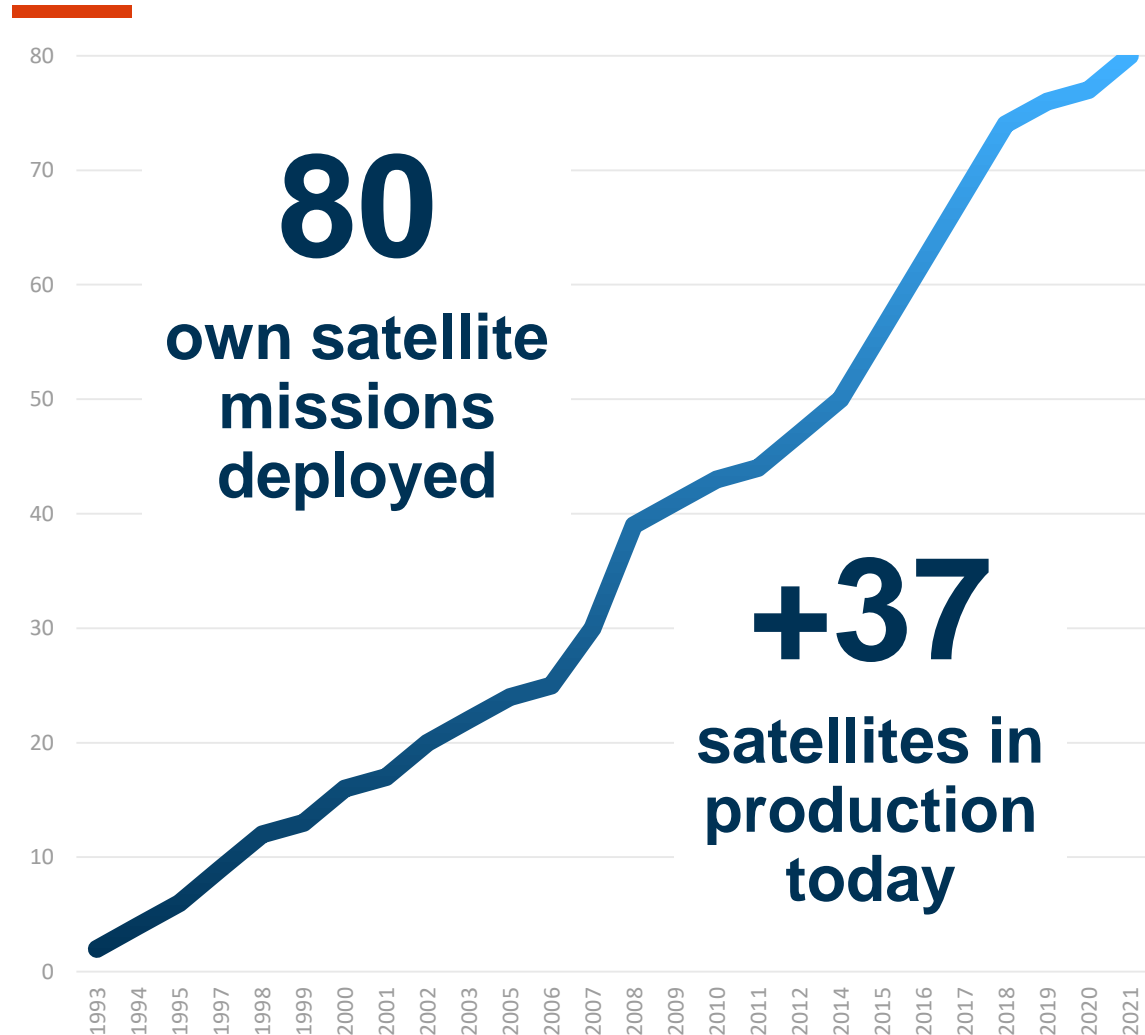


MISSION TYPE MILESTONES



GROWING OHB PORTFOLIO

SPACE SYSTEMS IN ORBIT HERITAGE



GROWING OHB PORTFOLIO

OHB DIGITAL - ADDING VALUE TO SATELLITE DATA



Becoming a relevant player in the strong growing downstream market by contributing to global challenges

GREEN

SECURE

CONNECTED



Access to Space



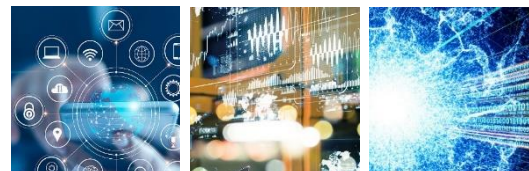
Critical Infrastructure



Information Technology



Downstream Services

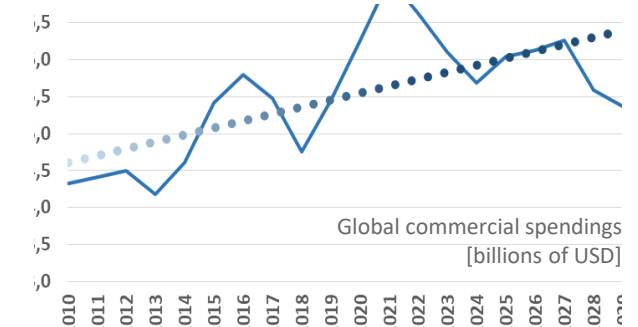
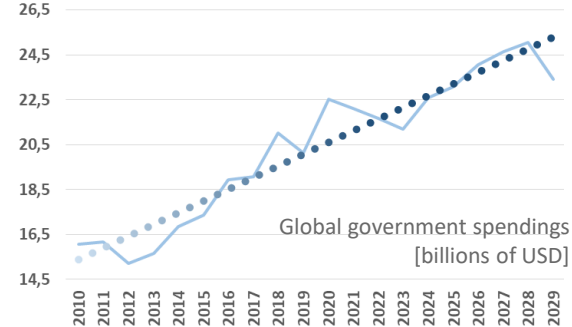
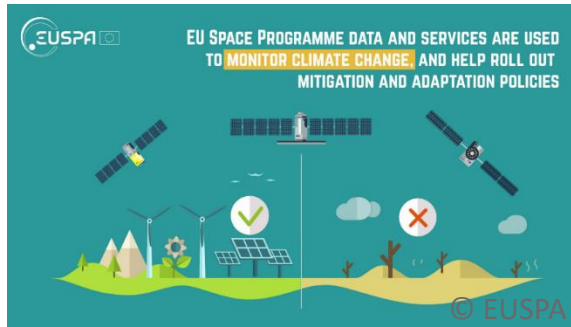


A short, solid orange horizontal line centered above the main text.

WELL FILLED ORDER PIPELINE

INSTITUTIONAL SPACE CAPABILITY BOOST

PROGRAMMES, INFRASTRUCTURES, PROJECTS



ESA

- Ministerial Conference 22 continued & new programmes

ESA Accelerators

- “Space for a Green Future”
- “Rapid and Resilient Crisis Response”
- “Protection of Space Assets”

ESA Inspirators

- Icy moon sample return mission
- Human space exploration

EUSPA

- European Flagship Programmes like ESSCS, EUROQCI, Copernicus, Galileo, EGNOS, GOVSATCOM
- Horizon Europe
- COVID recovery funds

Governmental space market

- New countries with own space programmes
- Increased budgets of existing programs.
- Two decades growth (2010-2019 vs. 2020-2029):
x 2,4 number of satellites
+30% value of satellites

Commercial space market

- Commercial market dominated by telecommunications (70%)
- Strong increase in number of satellites with low value
- Two decades growth (2010-2019 vs. 2020-2029):
x 7,3 number of satellites
+25 % value of satellites.

Source: Euroconsult; 2020

OHB GROUP ORDER INTAKE PIPELINE

OUTLOOK 2022 , TOP 7 ACQUISITIONS



> **1,3 bn Euro**

expected order intake in 2022

Book-to-bill ratio > 1

Top 7 acquisitions



SARah
Mission Operations



SPACELINK
Constellation Satellites



LYNX
Hyperspectral Constellation



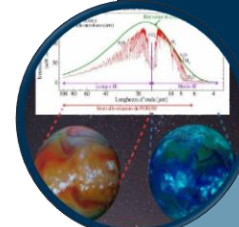
ELECTRA
Mission Phase 3 Satellite



Heinrich Hertz
Mission Operations



ARIANE 6
Launcher Subsystems



EE9 FORUM
Far Infrared Observation

A rectangular button with a white border. The background is a blurred image of green foliage. A semi-transparent dark green horizontal bar is overlaid across the middle, with the word "GREEN" in white, bold, uppercase letters centered on it.

GREEN

A rectangular button with a white border. The background is a dark blue image of a circuit board with glowing nodes. A semi-transparent dark blue horizontal bar is overlaid across the middle, with the word "SECURE" in white, bold, uppercase letters centered on it.

SECURE

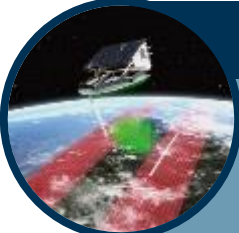
A rectangular button with a white border. The background is a dark blue image of a globe with glowing lines. A semi-transparent dark blue horizontal bar is overlaid across the middle, with the word "CONNECTED" in white, bold, uppercase letters centered on it.

CONNECTED

THE URGENT NEED TO ADDRESS CLIMATE CHANGE

ADDRESSING CLIMATE CHANGE

OHB'S EXCEPTIONAL HERITAGE IN EARTH OBSERVATION



SAR-Lupe
VHR RADAR
Mission
Satellite + Payload



OPTSAT
VHR Optical
Satellite + Payload




Arctic Weather
Microwave
Satellite



CO2M
Optical
Satellite



ConstellR
Thermal Infrared
Payload



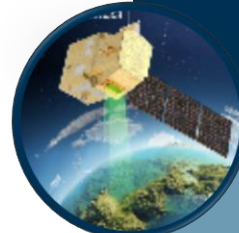
EnMAP
Hyperspectral
Satellite + Payload



NAOS
VHR Optical
Satellite




FORUM
Infrared
Interferometry
Payload



CHIME
Hyperspectral
Payload




LYNX
Hyperspectral
Constellation



MTG
Meteorology
Atmosphere
Satellites + Payload



Eaglet
HR Optical
Satellite + Payload



MetOp-SG MWI
Microwave
Radiometer
Payload




CIMR
MW Radiometer
Payload



SeaRoutes
CO2 prediction
Service



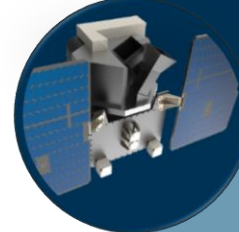
SARah
VHR RADAR
Mission
Satellites + Payload



PRISMA
Hyperspectral
Satellite



FLEX - FLORIS
Hyperspectral
Payload



EIS
Hyperspectral
Satellite



Next
... to come

TECHNOLOGY ADDRESSING CLIMATE CHANGE

OHB. THE WORLDWIDE LEADER FOR HYPERSPECTRAL IMAGING



- Booming services for climate change, food security and water management are fuelling the demand for hyperspectral data from space
- PRISMA and EnMAP paved the way towards the Copernicus CHIME mission
- OHB's compact satellite solutions are ideally positioned for next generation systems

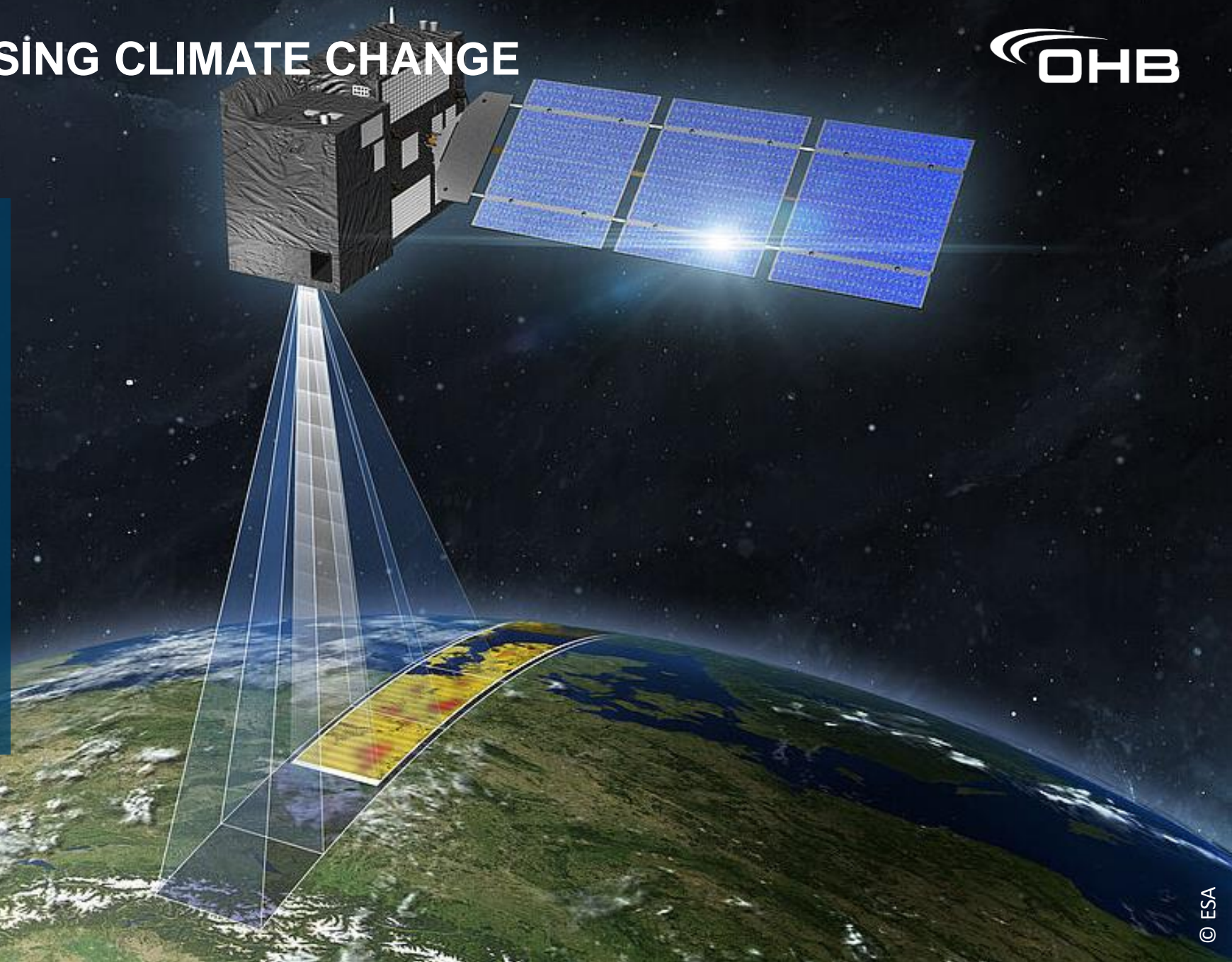


TECHNOLOGY ADDRESSING CLIMATE CHANGE

ATMOSPHERIC MONITORING



- OHB is prime contractor for the European CO2M Mission
- Revolution in monitoring of CO2 and NO2 emissions combined with atmospheric data
- Allows for emission tracking at global, national, regional and local level
- CO2M will provide observation-based evidence for the second global stocktake in 2028



TECHNOLOGY ADDRESSING CLIMATE CHANGE

INSTITUTIONAL ACTIVITIES – TECHNOLOGY LEADERSHIP IN ATMOSPHERIC SOUNDING

■ Arctic Weather

- Constellation of satellites, with Arctic coverage
- First near real time weather forecasting (nowcasting)
- Atmospheric humidity and temperature for global weather forecasts.

■ Geostationary Observation Export

- Unique OHB sounder technology
- 3D atmospheric layer composition
- Export programmes in preparation



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SECURE

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CONNECTED

THE TRUSTED NATIONAL SYSTEM PRIME IN EUROPE

TRUSTED NATIONAL SYSTEM PRIME IN EUROPE

A LONG AND SUCCESSFULL HERITAGE

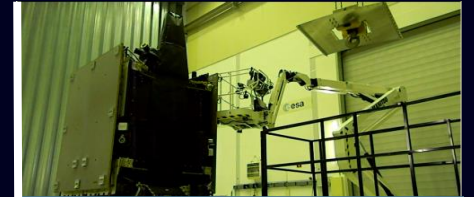
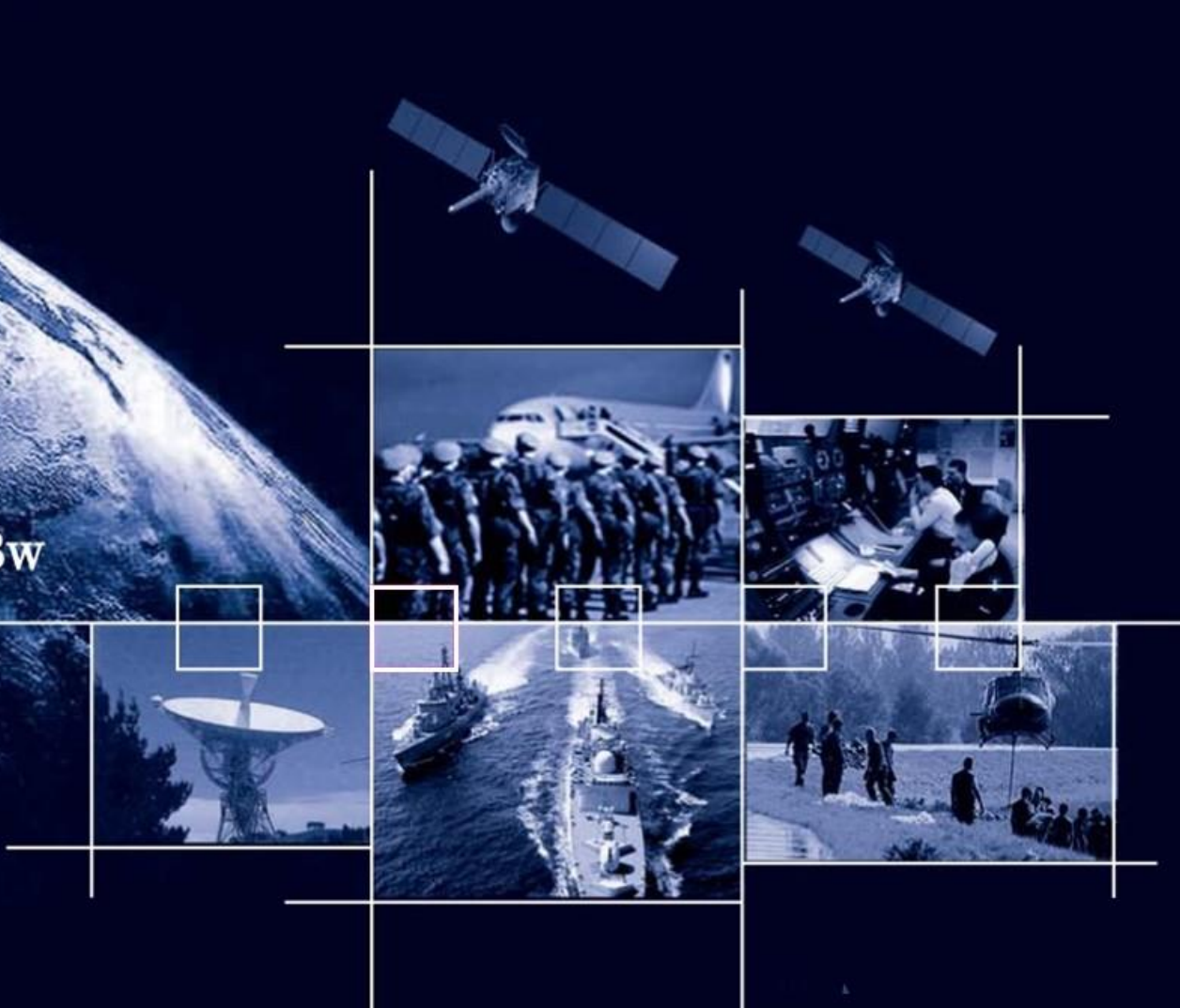


TRUSTED NATIONAL SYSTEM PRIME IN EUROPE

NATIONAL PROGRAMMES SATCOMBW / HEINRICH HERTZ



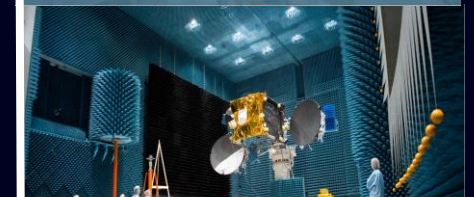
SATCOM^{Bw}



Hispasat 36W-1



Heinrich Hertz



EDRS -C



Electra

TRUSTED NATIONAL SYSTEM PRIME IN EUROPE

QUANTUM KEY DISTRIBUTION TO PROTECT SOVEREIGN INTERESTS



EC and ESA are building the European Quantum Communication Infrastructure (QCI) with its Space-based component / SAGA (Secure and Cryptographic Mission)

OHB has achieved:

- Lead in space-based Quantum Communication
- Involved in terrestrial Quantum Communication

Supplier for Quantum Key Distribution (QKD) Products:

- Constellations
- Spacecraft
- Payloads
- Ground Stations
- Quantum Random Number Generator



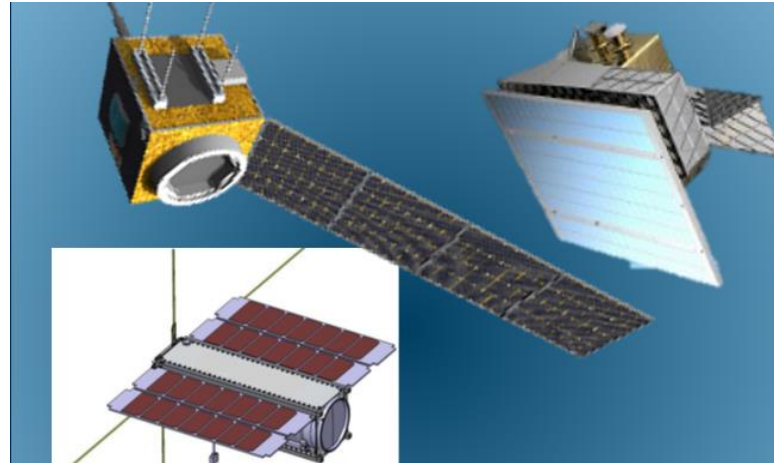
TRUSTED NATIONAL SYSTEM PRIME IN EUROPE

RESPONSIVE SPACE



Responsive Space will become a new element in the European Defence Strategy

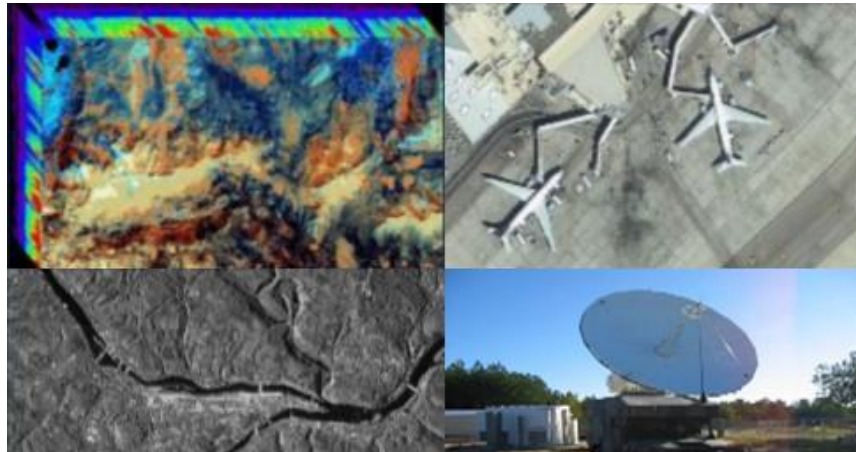
- Level of ambition: compact satellites in orbit within 7 days
- Security use cases comparable to US missions in preparation



Small Satellites



Access to quick launch



Various Payloads and Groundterminals



Rapid Integration and Satellite Storage



Available Minilauncher

A rectangular button with a dark green background and a lighter green horizontal band across the middle. The word "GREEN" is centered in white, uppercase letters.

GREEN

A rectangular button with a dark blue background featuring a faint, glowing circuit board pattern. The word "SECURE" is centered in white, uppercase letters.

SECURE

A rectangular button with a dark background featuring a glowing, starry space scene. The word "CONNECTED" is centered in white, uppercase letters.

CONNECTED

FROM TV BROADCAST TO GLOBAL DATA INFRASTRUCTURE

DIGITALISATION AND CONNECTIVITY

BACKBONE FOR NETWORKS



Satellites are enabling new service and business models, especially delivering unique capabilities for:

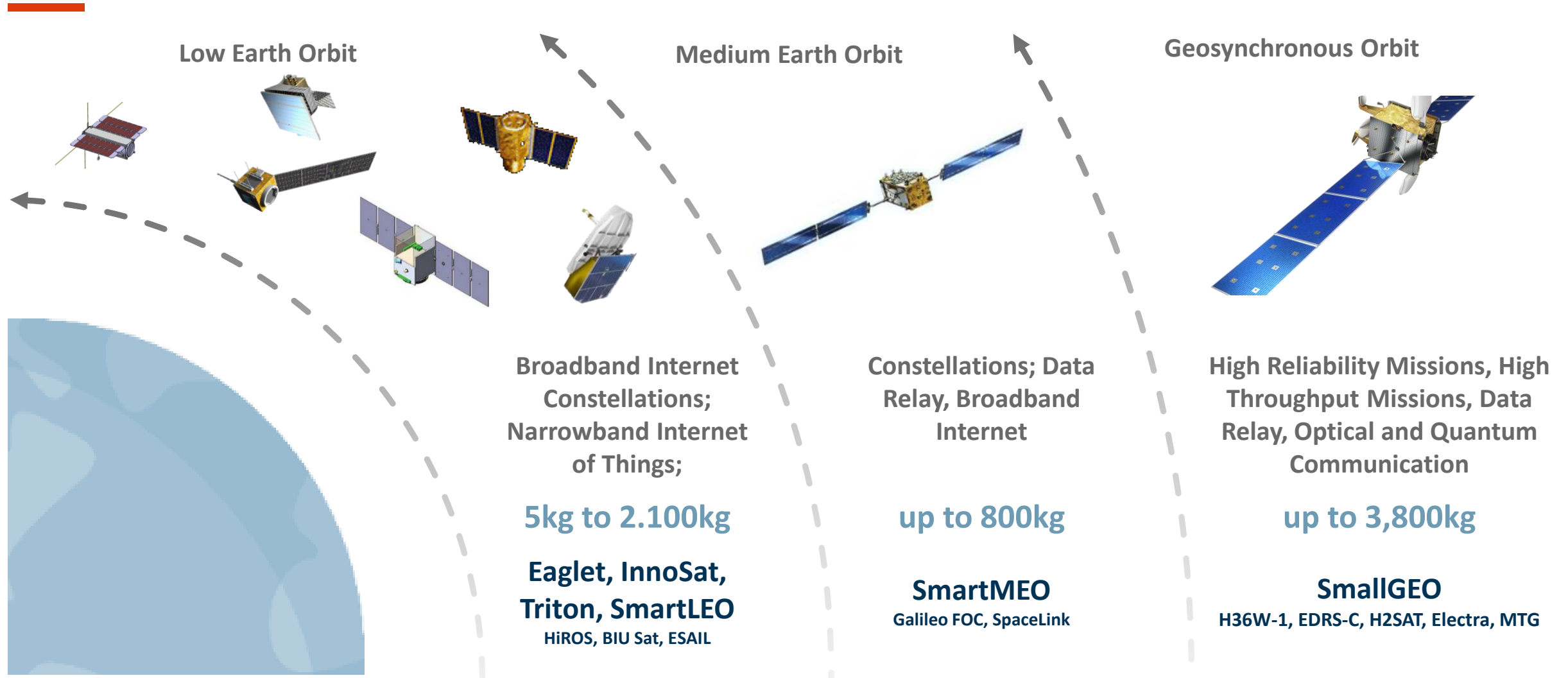
- coverage without gaps*
- secure transmission*
- resilience against disruption*



DIGITALISATION AND CONNECTIVITY

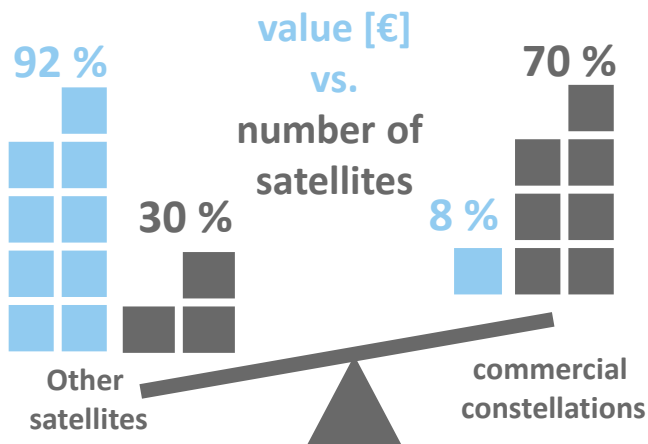
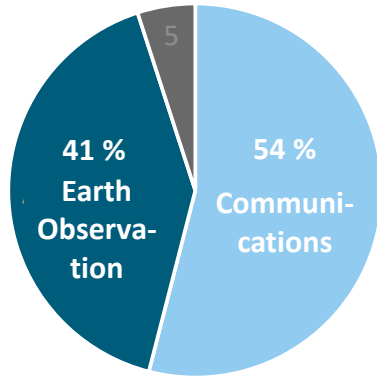


SMALL, MEDIUM AND LARGE SYSTEMS FOR LEO, MEO AND GEO CONSTELLATIONS



APPROACH TO COMMERCIAL CONSTELLATIONS

291
Constellations



Sources: NewSpace Global, Euroconsult

OH B's Heritage is primarily built on

- Reconnaissance LEO constellation (SARLupe and SARah)
- Galileo FOC MEO constellation
- SpaceLink high throughput optical data relay MEO constellation

OH B's specific technical approach is on

- Satellite Product Lines
- High reliability space systems
- Series and parallel manufacturing
- "Made in Europe"

Commercial and institutional customer missions

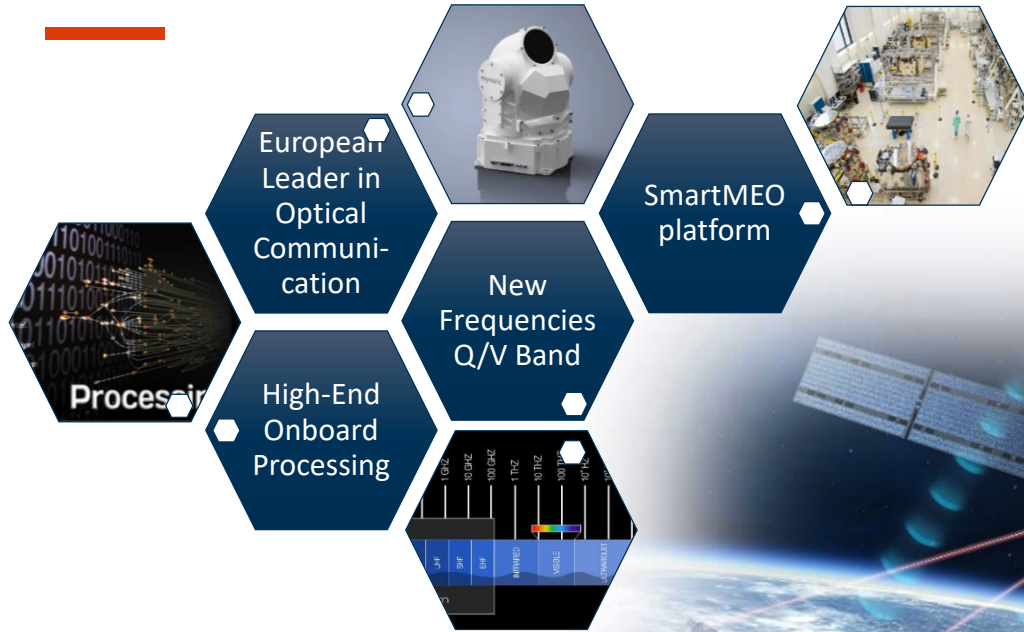
- Multi purpose constellations covering telecommunications, earth observation, and further payload
- Multi orbit constellations using LEO, MEO and GEO
- Multi platform constellations using best fit for each "functional layer"
- High performance systems for communications, data relay and earth observation
- Cubesats for Narrowband Communications, AIS, and Earth Observation

▪ Focus on High Value Constellations as LYNX, Spacelink, ESSCS

▪ Trend toward less vertical integrated constellation operators and more complex satellites create business opportunities

DIGITALISATION AND CONNECTIVITY

COMMERCIAL MARKET - SPACELINK



Spacelink boosts new market segments

OHB sets new technology benchmarks and becomes European technology leader



DIGITALISATION AND CONNECTIVITY

EUROPEAN SECURE SPACE CONNECTIVITY



SECURE
GOVERNMENTAL
SERVICES

CONNECTING KEY
INFRASTRUCTURES



CRISIS MANAGEMENT
& EXTERNAL ACTIONS



SURVEILLANCE



SECURE
COMMERCIAL
SERVICES

MASS-MARKET



EUROQCI

EUROQCI



Preparation
Team



Multi-orbital constellation: LEO, GEO
and MEO

Secure: Encryption (quantum keys),
proactive and reactive cyber resilience

Coverage: Europe and regions of
strategic interest, e.g. Arctic and Africa

Innovative: Innovative and disruptive
technologies and services

Scalable: Adaptable to demand and
growth



THANK YOU!

OHV SE

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