

# Antwerp Space N.V. Company Presentation

November, 2016



**antwerpspace**  
An OHB Company

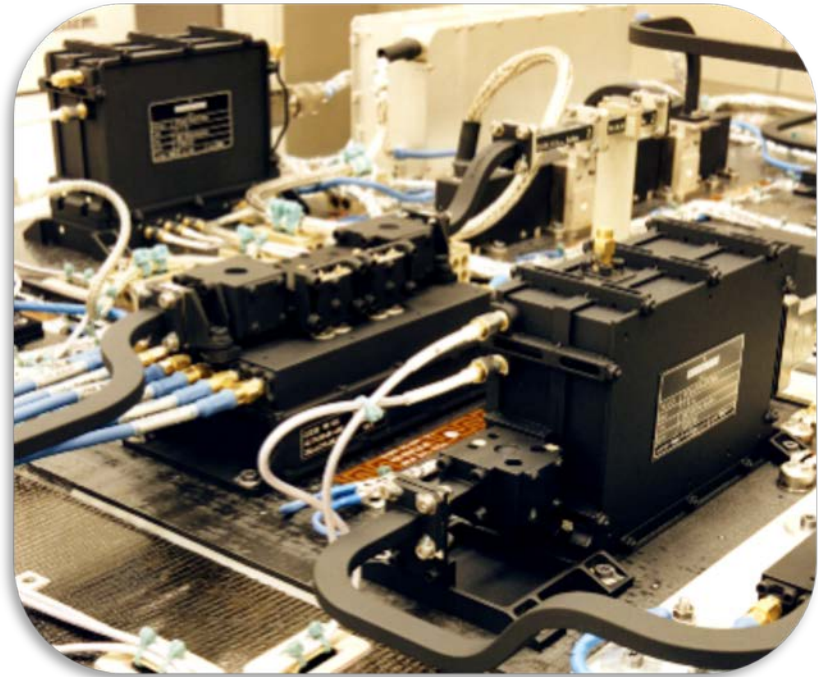


# Antwerp Space N.V. Overview

- ▶ 50+ years' excellence in satellite communications
  - Space Segment
  - Ground Segment
- ▶ Part of the OHB SE group

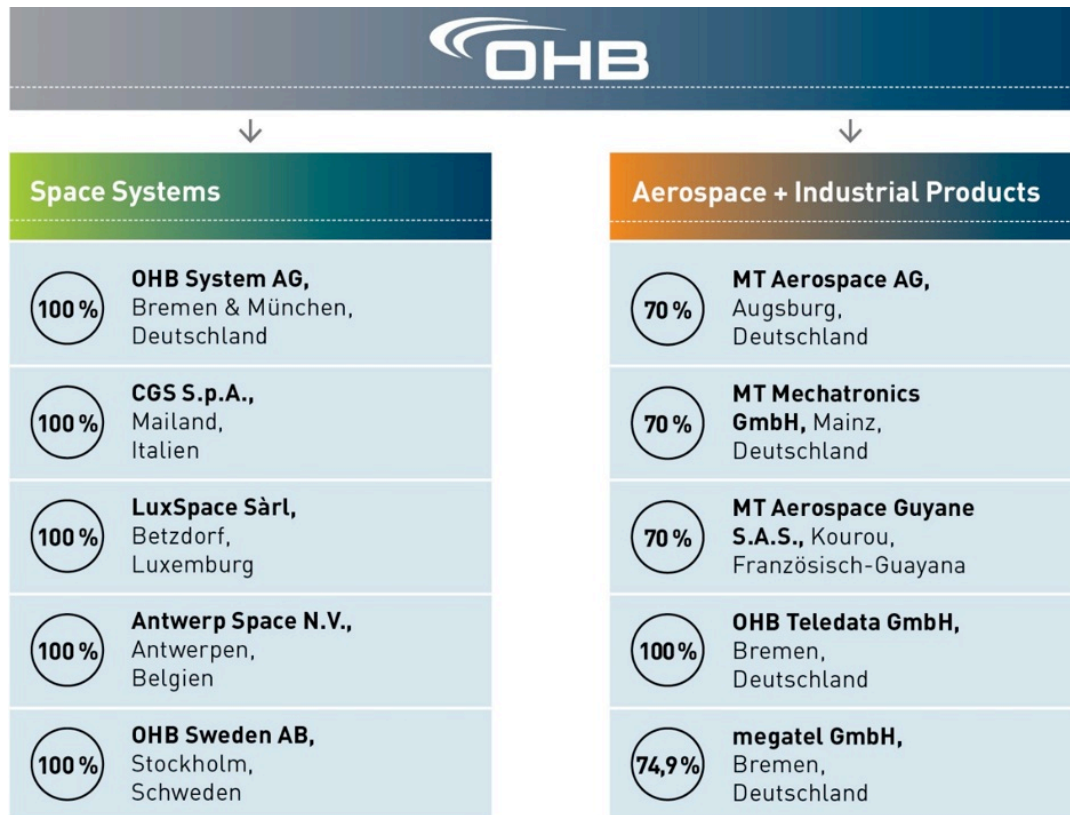


Ground Station for Reception of Ka-Band



Polar PlatForm (PPF) Communications Subsystem

# OHB SE Group Organisation

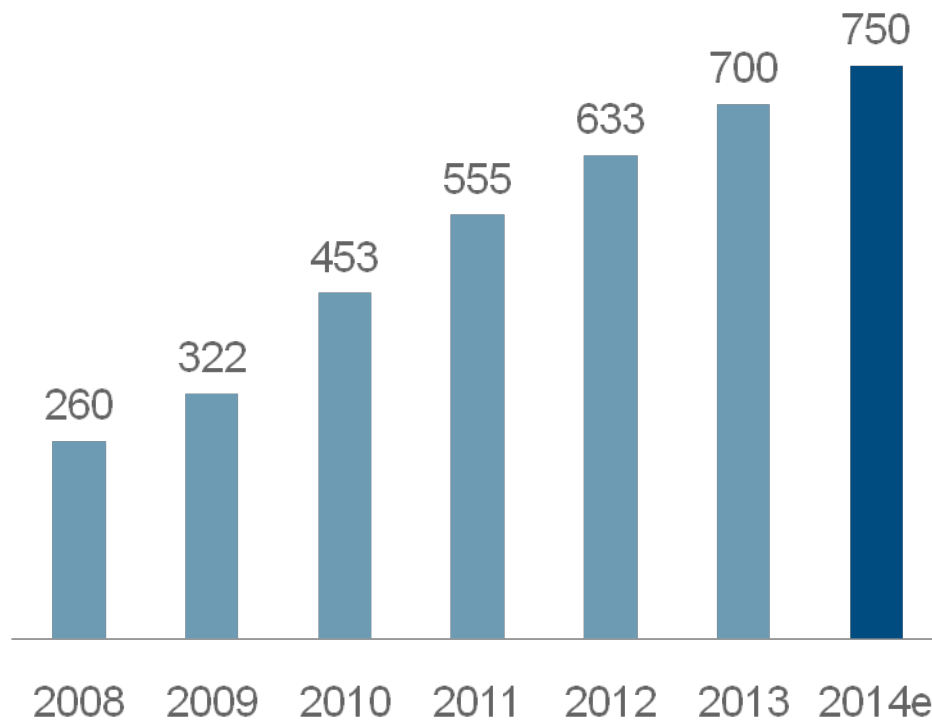


# OHB SE

## Facts & Figures

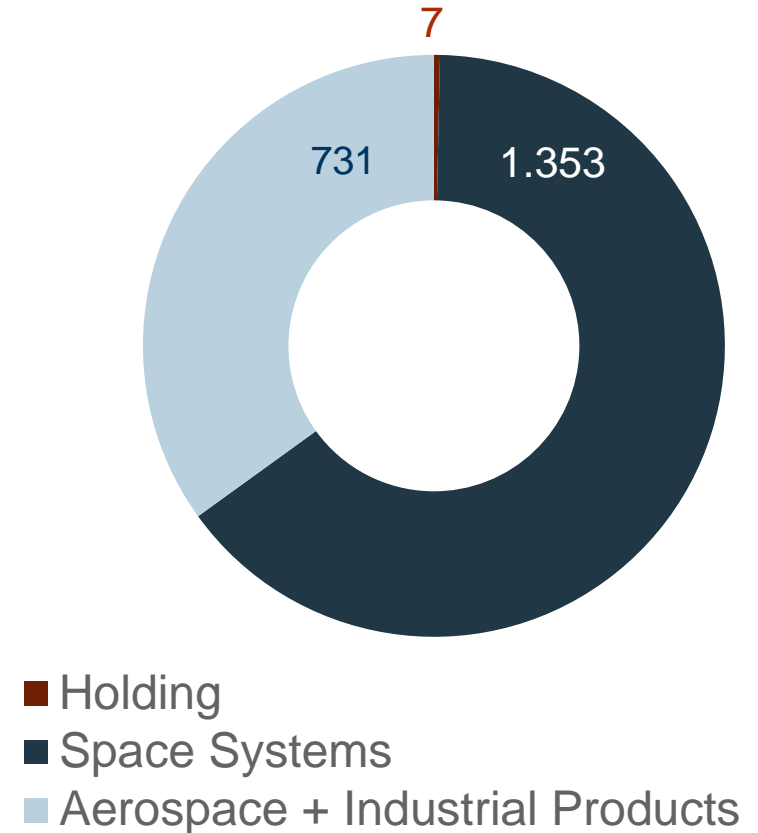
### Total Revenues

EUR million



### Total personnel 2,091

Status on 30 September 2014



# OHB SE Flagship Programmes

## OHB involved in most major European Space Programmes



SAR-Lupe & SARah



Small Geo:  
EDRS-C & Electra



Galileo



Ariane 5



MTG

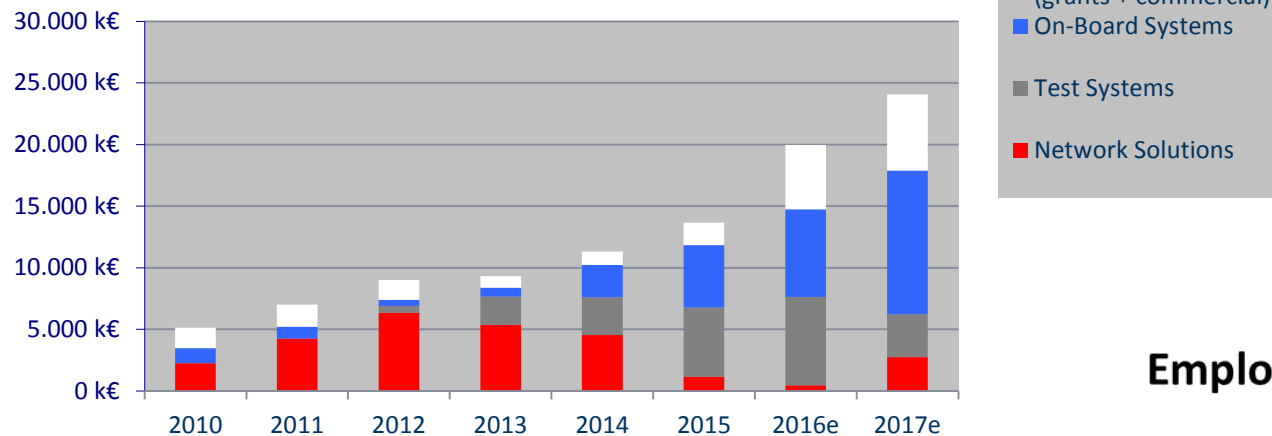


ISS

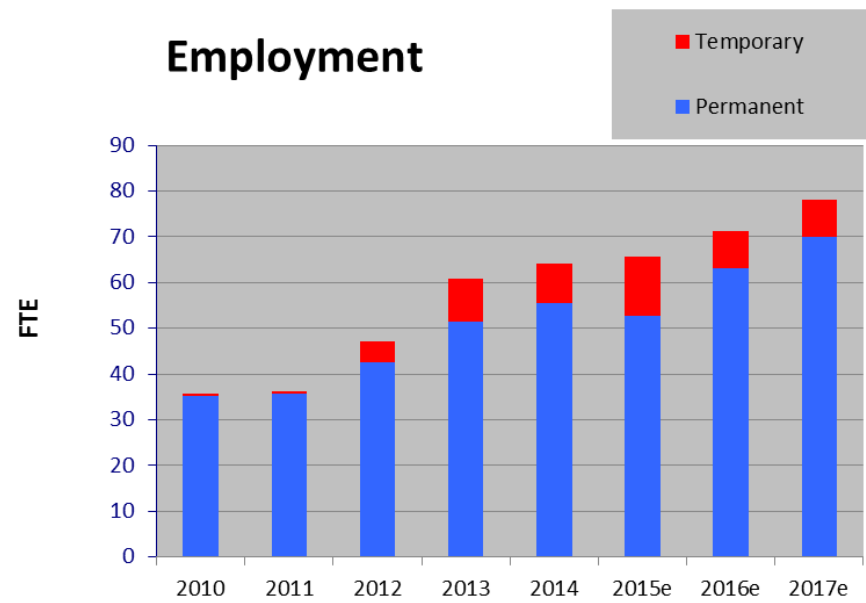
# Antwerp Space N.V.

## Facts & Figures

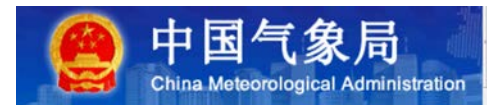
### Revenues



### Employment

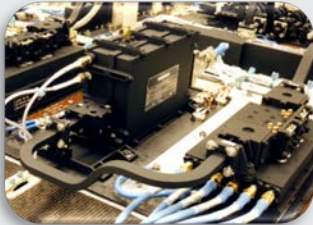


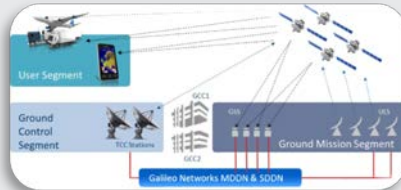
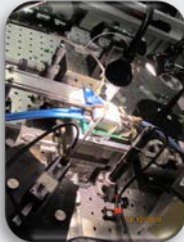



# Antwerp Space N.V. Customers



# Antwerp Space N.V.

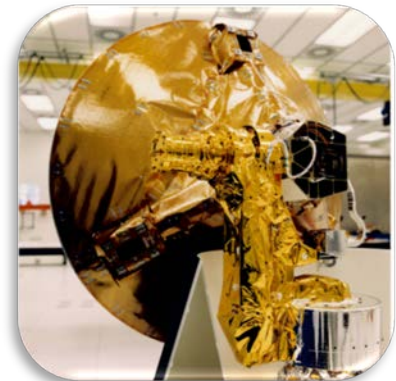
## Business Organisation

Space Communication	Ground Communication
Satellite Communication Subsystems	Ground Stations & Equipment
	
Communication Equipment	Secured Communication Networks
	
Telecom Payload Technology	Satellite Test Systems
	

# Antwerp Space N.V.

## Satellite Communication Subsystems

- ▶ Communication Subsystem Lead (Satellites, Space Segment)
  - ESA mainstream programmes: Science, Earth Observation & Exploration
  - Antwerp Space in core team of ESA programmes
- ▶ Completed Programmes
  - Lunar Lander Phase B1
  - Exomars Carrier 2020 Phase B
- ▶ Ongoing Programmes
  - Exomars Carrier 2020 Phase C/D
  - JUICE COMS Phase B2/C/D
- ▶ Planned Programmes
  - Several ESA Science & Earth Observation Satellites



Ka-Band Steerable Antenna

# Antwerp Space N.V.

## Satellite Communication Equipment

- ▶ Satellite Communication Equipment Supplier
  - Positioning in commercial markets
  - Differentiated communication equipment
  - Leverage on ground engineering capabilities (Modem, microwave)
- ▶ On-going Activities
  - Development of a signal processing platform : ARGO
    - Supporting modem application (TM\*, TC\*)
    - Application Col-Ka (Modem on-board ISS\*)
    - Future applications ( ADS-B\*, VDES\*, ..)

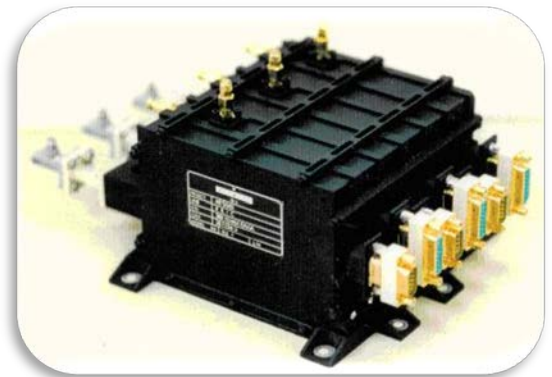
\*TM: Telemetry

\*TC: Telecommand

\*ISS: International Space Station

\*ADS-B: Automatic Dependent Surveillance-Broadcast

\*VDES: VHF (Very High Frequency) Data Exchange System

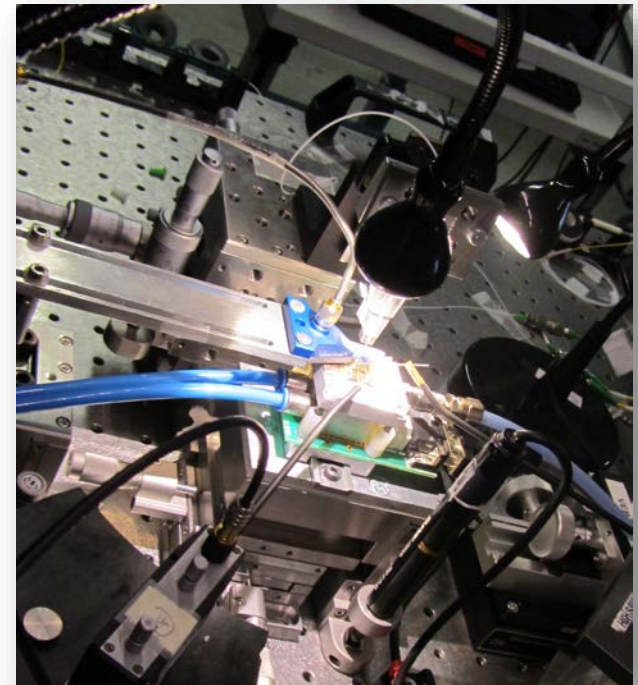


Master Local Oscillator

# Antwerp Space N.V.

## Telecom Payload Technology

- ▶ Advanced Communication Payload Equipment
  - Equipment delivery for telecommunication payloads in commercial market
    - Volume market
    - Highly competitive & mature market
- ▶ On-going
  - ESA ARTES 5.1 programme
    - Electro-Photonic Frequency Converter: Ka-Band frequency converter in microwave photonics



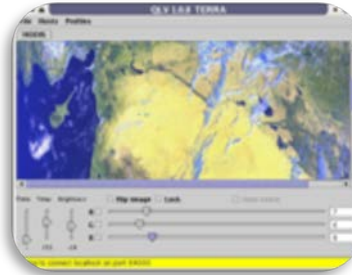
Photonic Test Set-up

# Ground Stations: Earth Observation (EO) Receiving Station & Satellite Control

- ▶ Started in 1962, first ESRO (European Space Research Organisation) Ground Station
- ▶ Focus on turnkey / customised stations
- ▶ Next generation Earth Observation Ka-band downlink stations



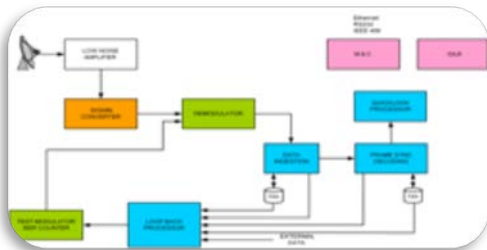
Ka-Band EO Image Reception via Artemis Satellite



Station Automation Operation & Diagnostics



Solid State Power Amplifier (SSPA)



Integrated Processing Subsystem



Integrated Data Reception & Processing Product for EO Market



Frequency Convertors

# Antwerp Space N.V.

## Ground Station Equipment



- ▶ Ground Station Product Engineering
  - Modems
  - Decoding/Processing/Recording
  - Frequency conversion
- ▶ Ground Station Equipment
  - **OMNISAT**: data acquisition system for Earth Observation & Scientific satellites
  - **IBB (Integrated Base Band)** for Telemetry, Tracking & Control (TT&C\*) for satellite monitoring & control
  - **BMD (Burst Mode Demodulator\*)**: DVB-RCS multicarrier demodulator for satellite communication networks
  - **High-end RF equipment** for Earth Observation & Deep Space Navigation
  - Turnkey customised equipment

\*TT&C: Telemetry, Tracking & Control

\*BMD: Burst Mode Demodulator

# Antwerp Space N.V.

## Secured Communication Networks

- ▶ Advanced Studies
  - Usage of telecom technologies, combined terrestrial - space data links
  - Security analysis
  - Networks monitoring & management
- ▶ Implementation
  - Turnkey delivery of secured communication networks
- ▶ Exploitation
  - Technology upgrade
  - Obsolescence resolution during operations
- ▶ Relevant References
  - Delivery of Communication Networks for Galileo programme
    - Mission Segment & Control Segment
    - ESA Galileo Phase B1- C0 / Galileosat IOV\* Network Delivery
    - EC Galileo FOC\* Network Enhancement

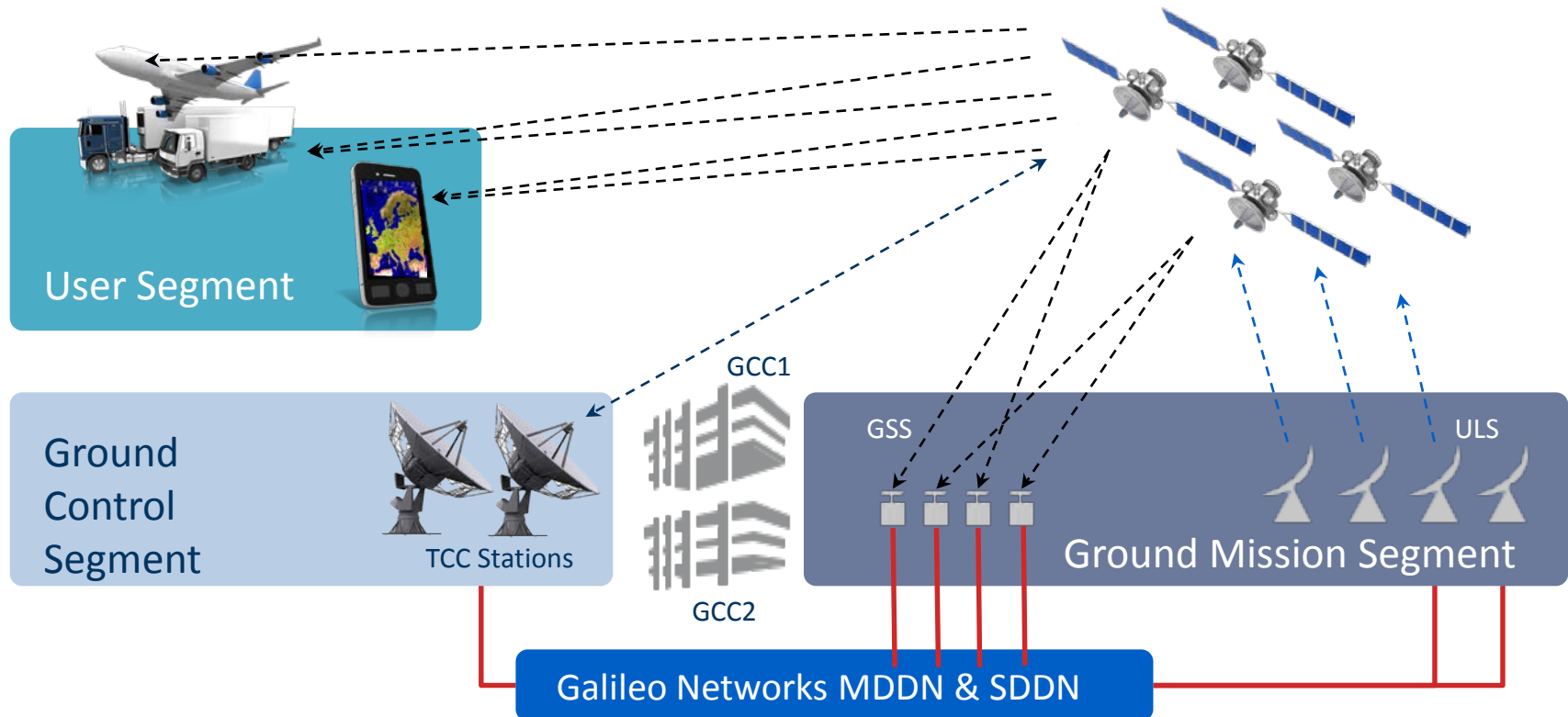
\*IOV: In Orbit Validation

\*FOC: Full Orbital Constellation

# Antwerp Space N.V.

## Secured Communication Networks

### Antwerp Space, Prime Contractor for Galileo Secured Communication Networks



# Antwerp Space N.V.

## Satellite test systems

### ► Turnkey EGSE

- Definition, specification, integration & delivery
- Major ESA programmes
  - Multi Purpose Crew Vehicle (MPCV)
  - Automated Transfer Vehicle (ATV)
  - Columbus

### ► SCOE\* for Communications

- TT&C SCOE
- RF Suitcase
- PDHT/PDD\* SCOE
- RF SCOE

\*SCOE: Special Check-Out Equipment

\*PDHT: Payload Data Handling & Transmission

\*PDD: Payload Data Distribution



Test System for Columbus



Solar Orbiter TT&C SCOE

# Antwerp Space N.V.

## Contact

### ► Management:

- Marco Fuchs – Chairman Board of Directors
- Oliver Salisch – Managing Director
- Roberto Aceti – Managing Director
- Guy Van Dijck – Chief Financial Officer
- Koen Puimège – Chief Operating Officer

### ► External Communication: Vanessa Peeters

### ► Institutional Market: Vincent Bath, Jeffrey Apeldoorn

### ► Products: Stefaan Serlet, Milo Van Riel

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