



Dr. Thomas Kühne

ESA IoT4EO Workshop #2  
2024/12/03

Made in Germany

Go **BIC**

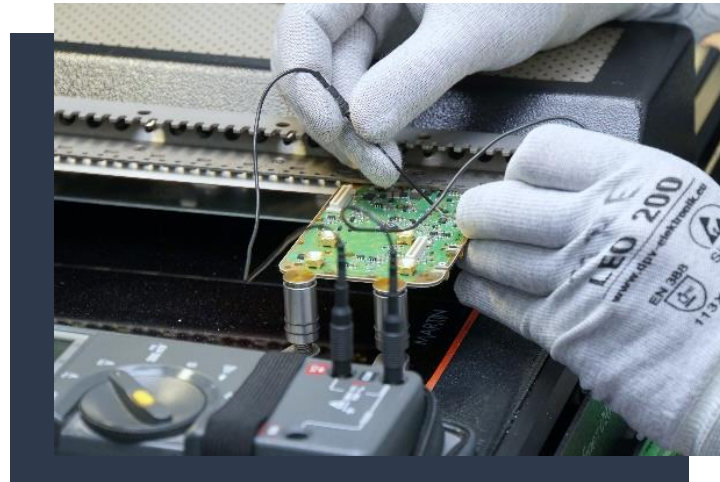
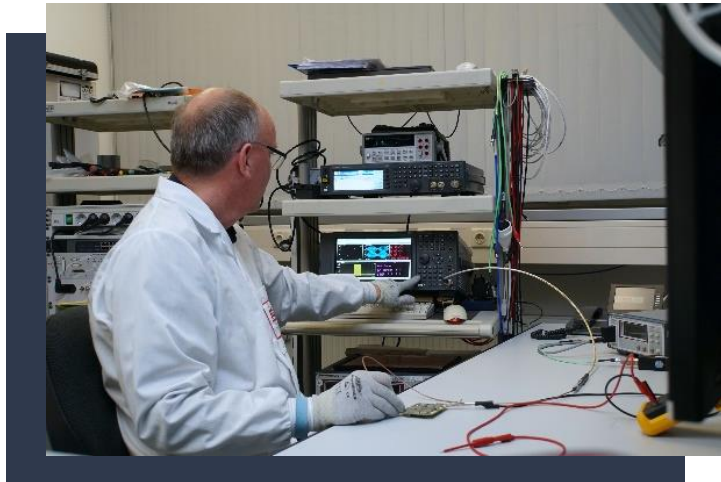
AVAILABLE - ANYWHERE, ANYTIME

Global On-Demand  
Bidirectional Intersatellite Connection

A PRODUCT OF



## COMMUNICATION LINKS FOR **SMALL SATELLITES**



DESIGN



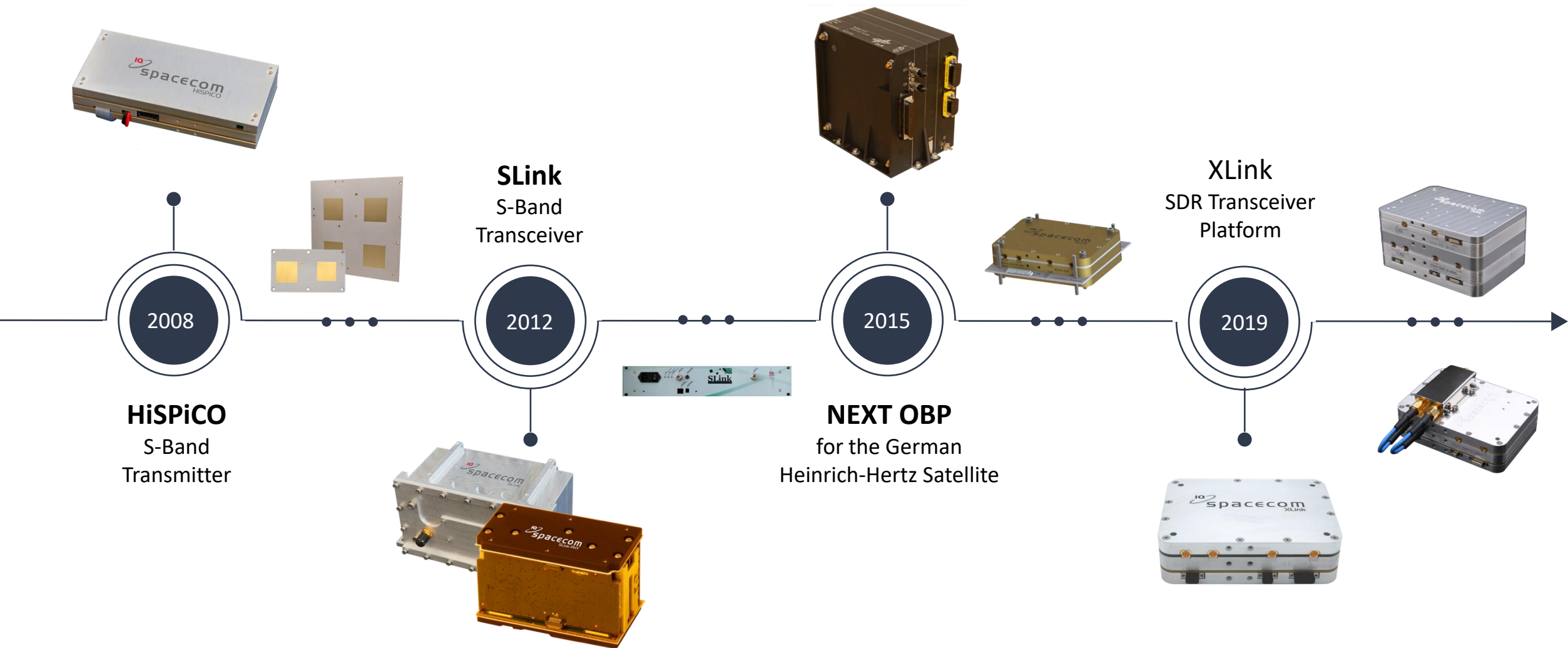
MANUFACTURING



QUALIFYING

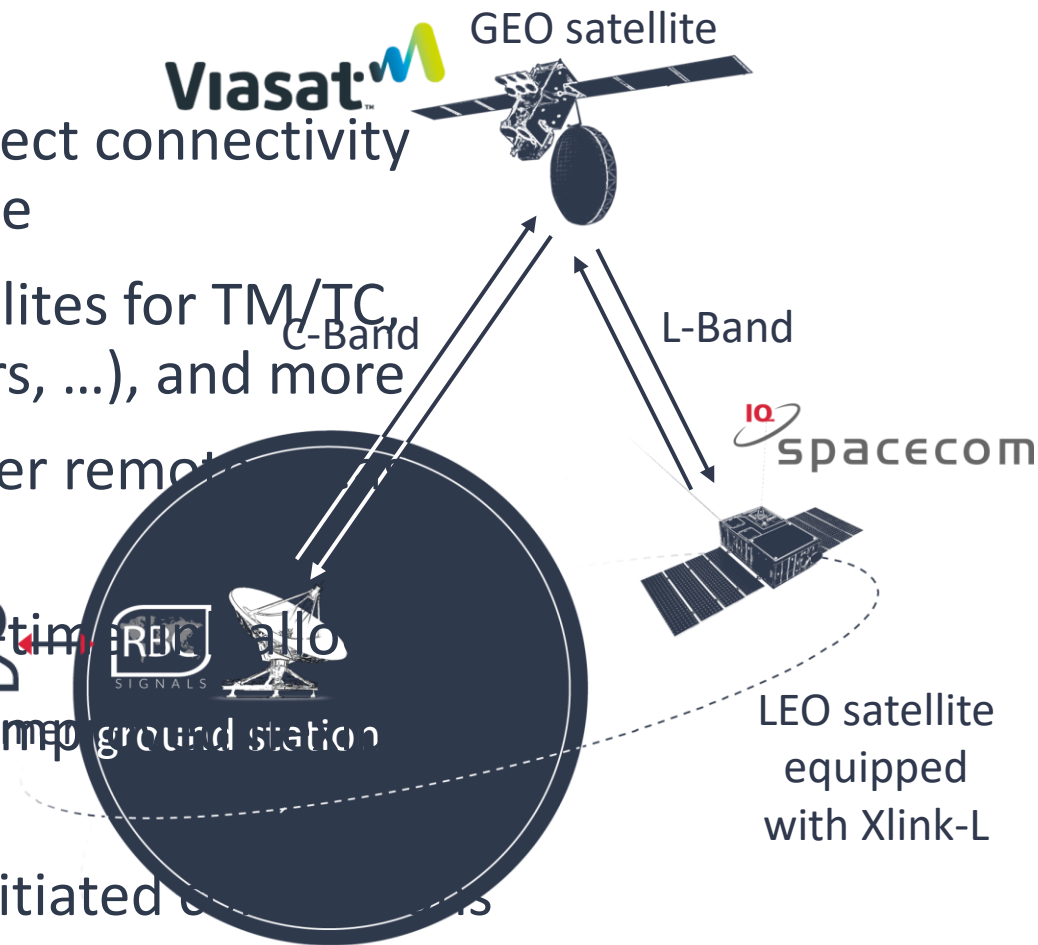


TESTING

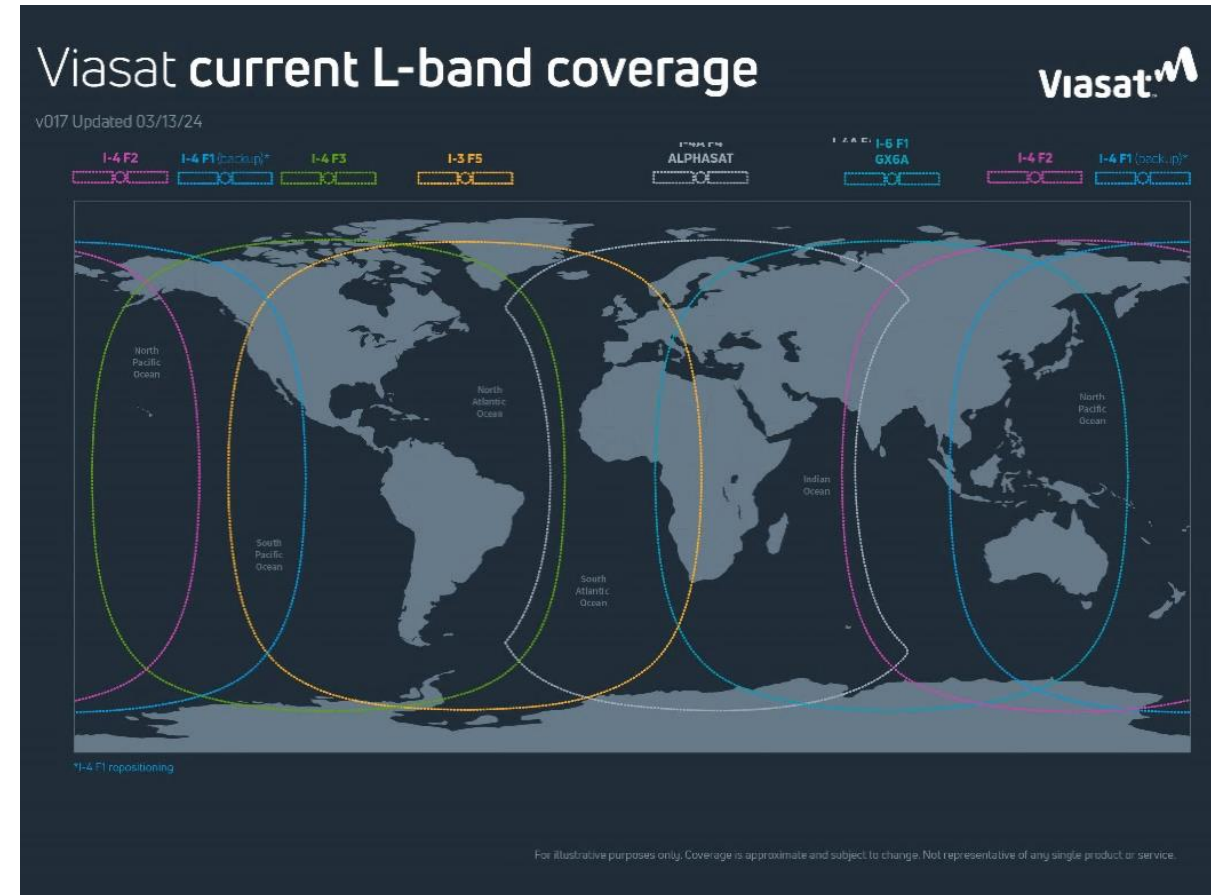


## Key facts:

- IoT4EO Service A-2: In-direct connectivity through GEO relay satellite
- Connectivity for LEO satellites for TM/TC, monitoring tasks (disasters, ...), and more
- Global coverage – also over remote areas, e.g., oceans
- Link based with near real-time ground station
- Pay-as-you-go model for mission control
- Ground and spacecraft-initiated connections



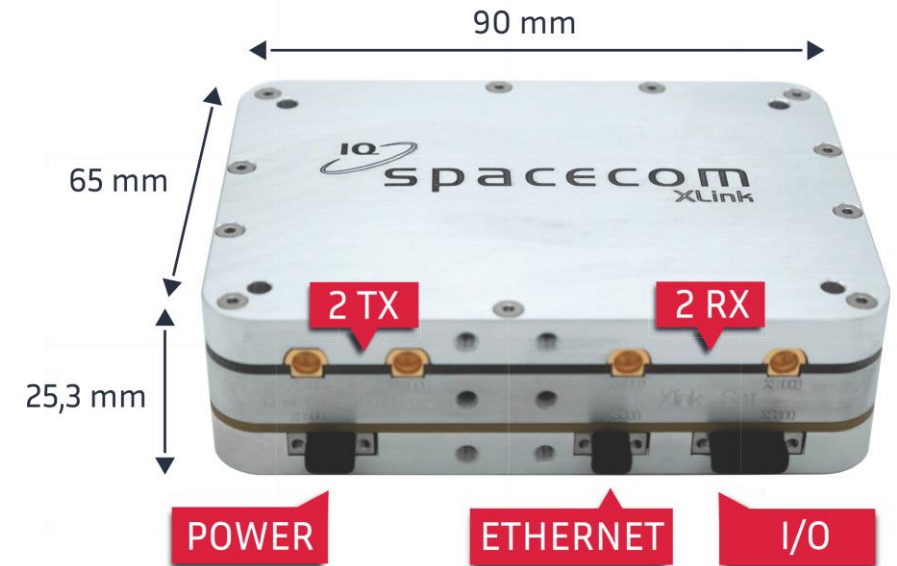
- Global coverage
- No frequency licenses required
- Link based service (not message based)
- Typical link parameters
  - Link duration: about 4 minutes
  - Link acquisition time: <30 seconds
  - Data rate: 4 kbps to 128 kbps
  - CCSDS protocol conform (BPSK/QPSK, Convolutional Coding Rate ½)
  - Doppler compensation included
  - NO limitation on:
    - Daily Data Allowance
    - Message (link) frequency

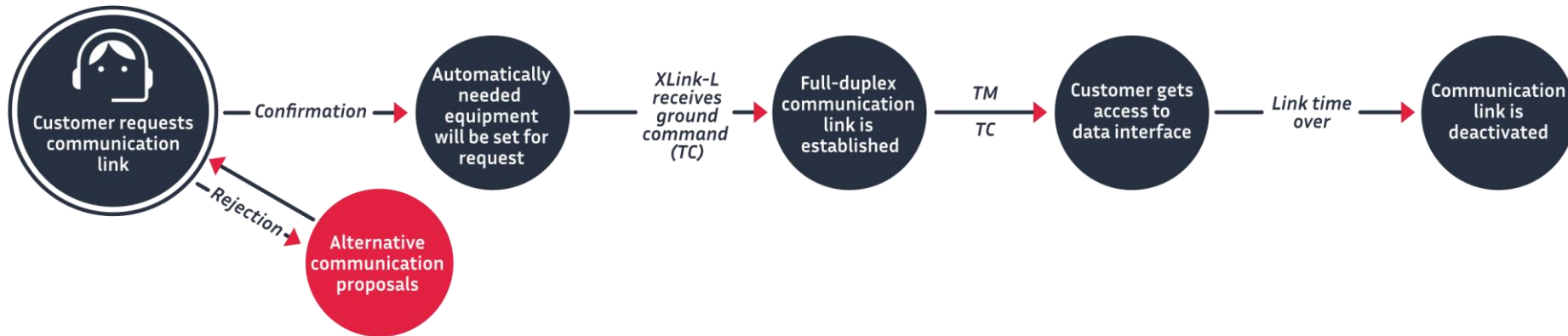
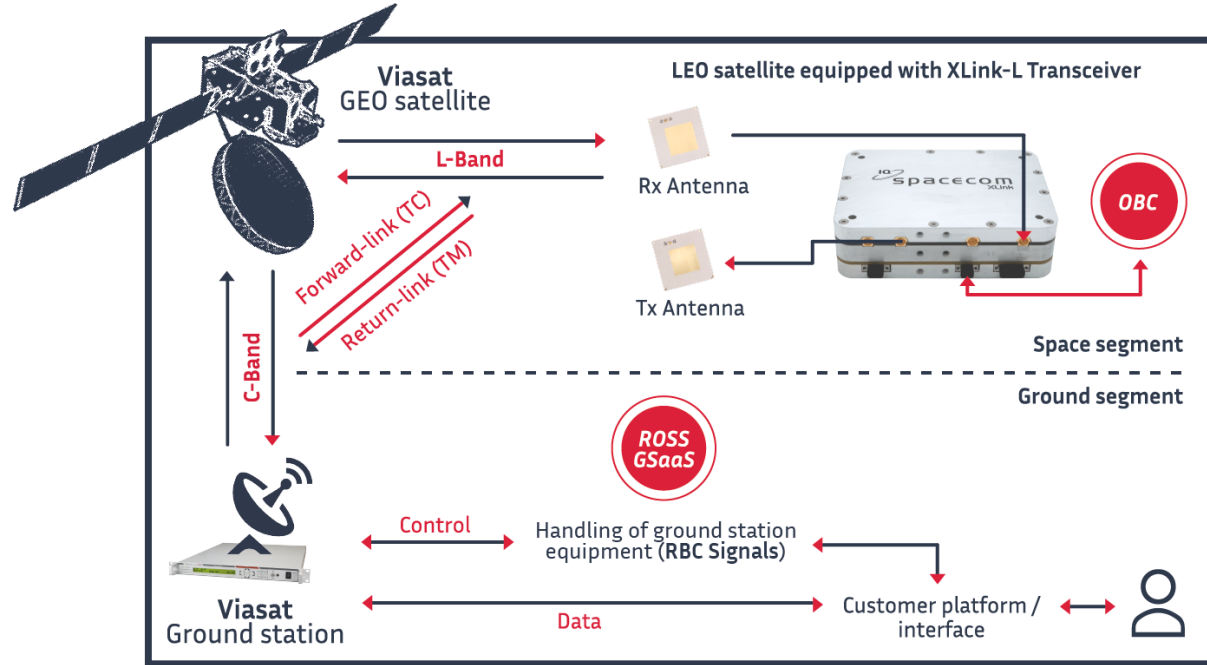


## LEO satellite equipment based on our XLink platform

<b>Ultra-small Volume</b> < 0.2U	<b>Low Mass</b> 200 grams
<b>Frequency Options</b> L S X Ka-band	<b>Operational Mode</b> FDD, Full duplex, Half Duplex
<b>Tx Data Rate</b> 4 kbps up to 200 Mbps	<b>Rx Data Rate</b> 4 kbps up to 1024 kbps
<b>Linear RF output power</b> 2 x up to +30 dBm	<b>Rx Doppler shift compensation</b> up to +/-200 kHz
<b>Power Supply</b> 6-18V or 16-35V	<b>Low power consumption</b> max 11 W (1 Tx + 1 Rx)

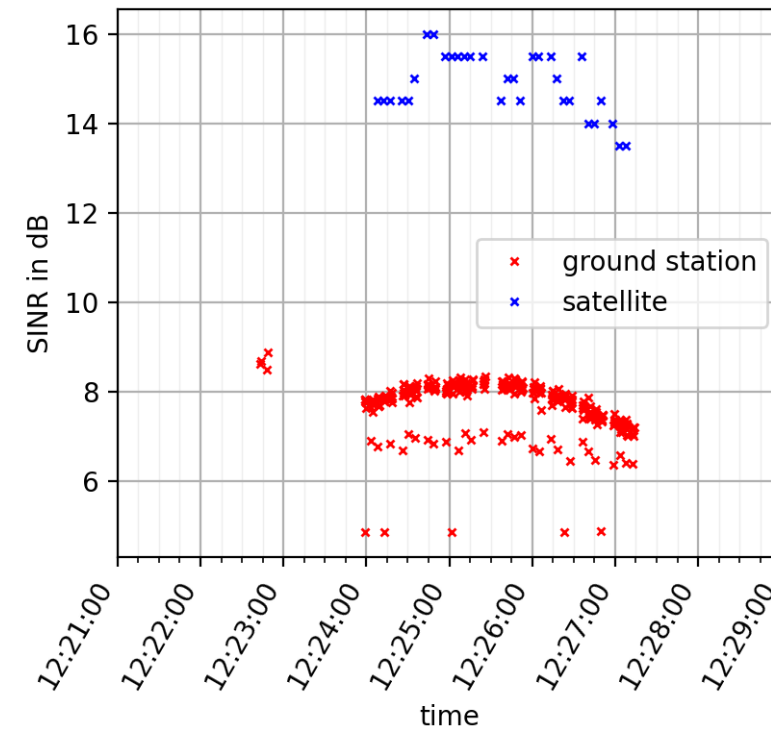
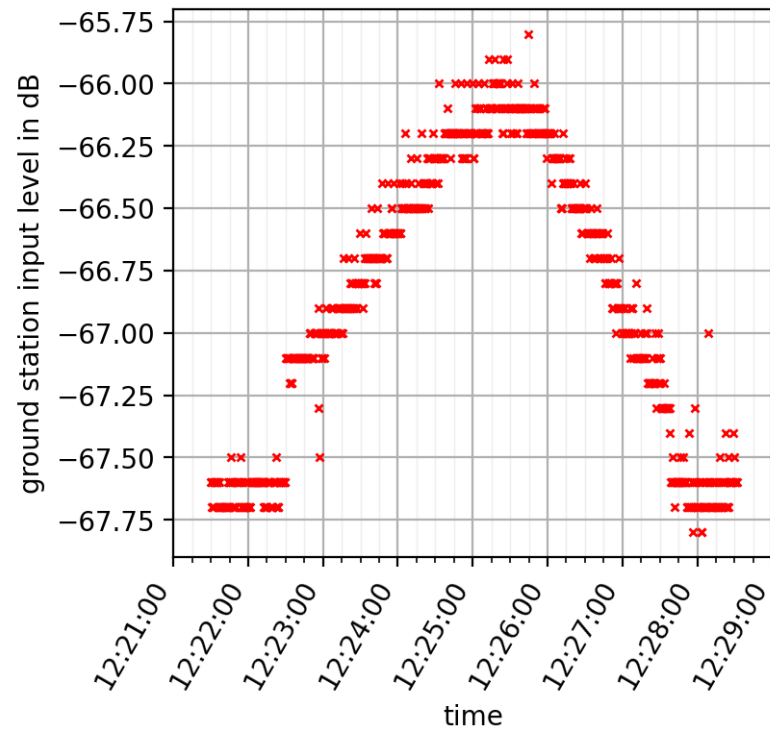
FLEXIBLE AND **FLIGHT-PROVEN**





- In-orbit verification is ongoing
- Communication link is working → key features are verified

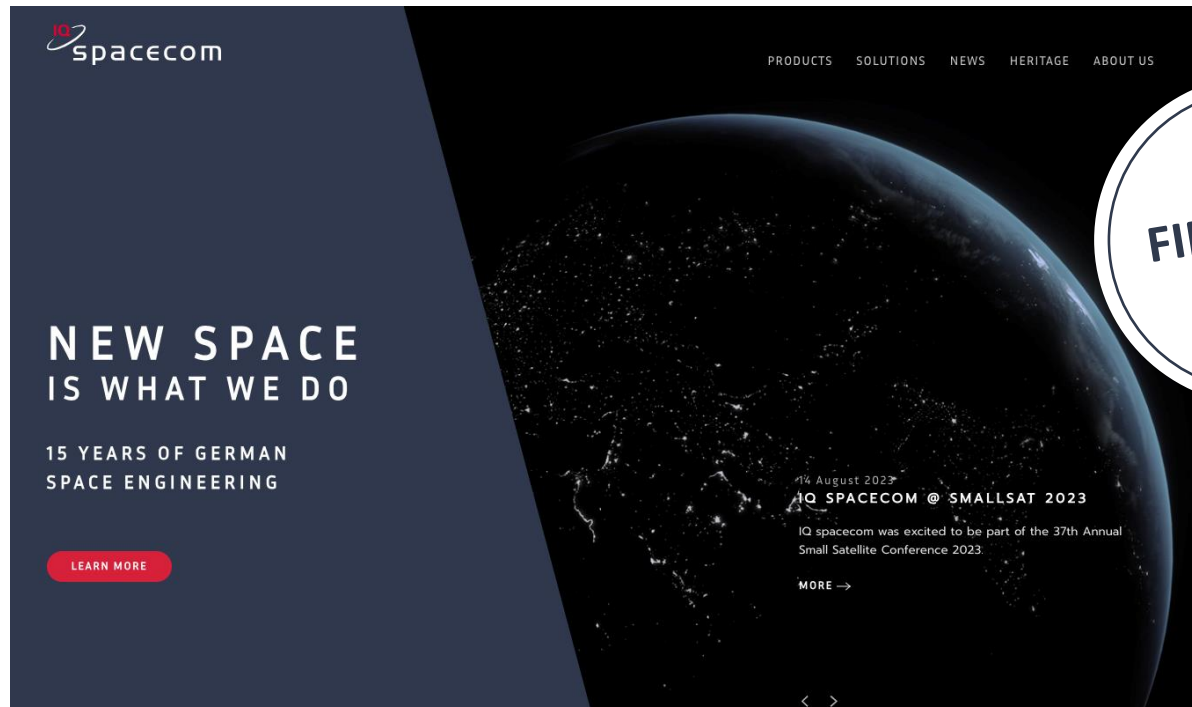
Result for one link with 4 kbps forward link and 64 kbps return link





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