PHOTONICS
for the next steps in Optical Communication in Space

DEFENCE AND SPACE

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EPIC Online Technology Meeting on Free Space Optical Communication and LiFi

EPIC ESA Workshop

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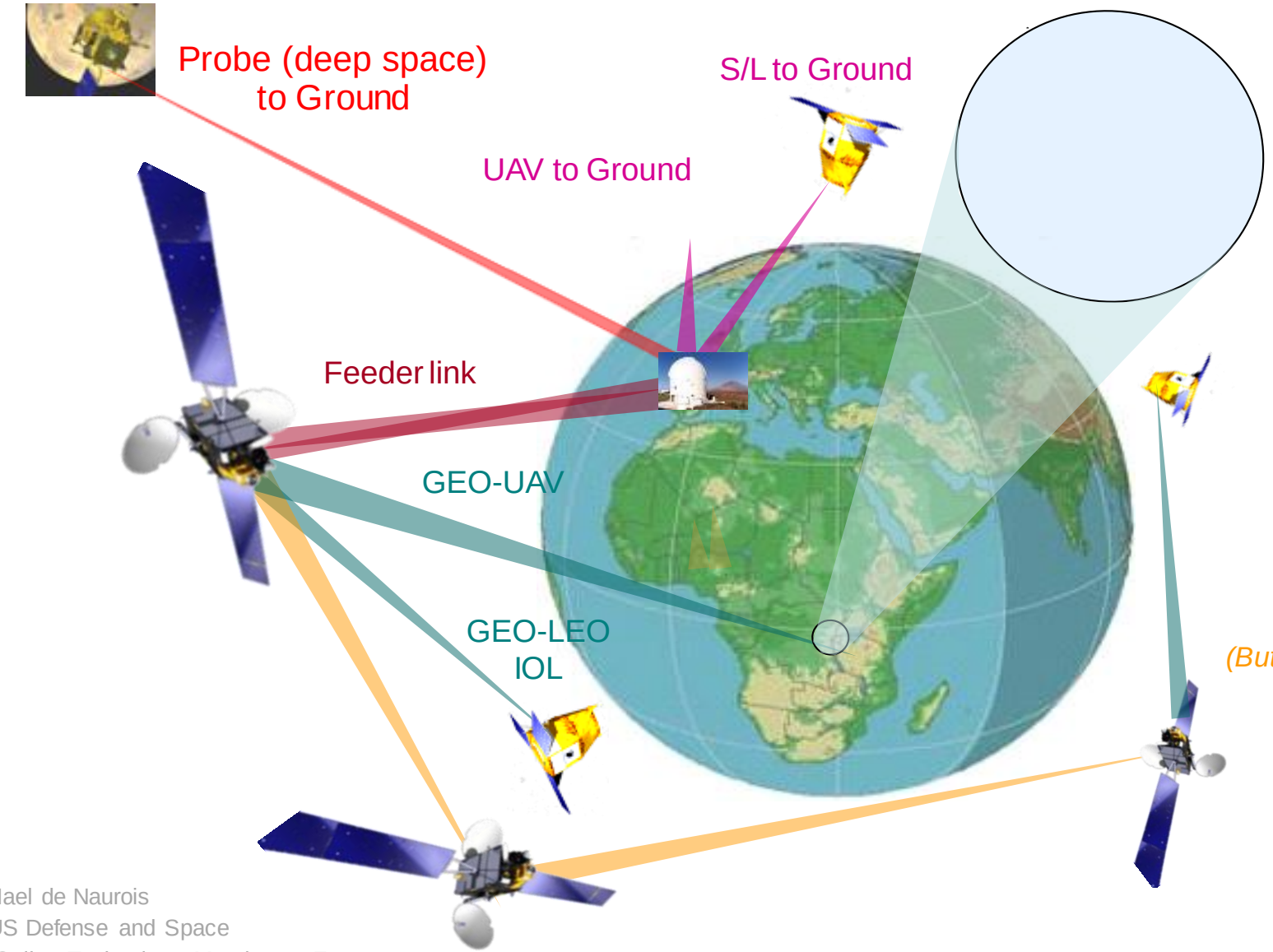
Laser communications missions



- Direct transmission to ground (DTE)
- Multi users data relay for UAVs or S/L (IOL)
- Inter-satellite (ISL) for secured worldwide data transfer
- Deep space transmission to ground
- Feeder link (FL)

GEO-GEO
(But also LEO-LEO and MEO-MEO constellations)

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SPACE DATAHIGHWAY:

Airbus is already operating two laser satellites

First optical link tests **started in early 2016.** Currently, **4 Sentinel satellites** are commissioned and served **by EDRS-A and C**

> 2 Petabyte transferred until today
(equivalent to a 4,000 years long MP3 song)
up to **34** operational links/day
~18 minutes per communication session

~ 40.000 successful relay links until today
SDH service routinely **over-achieves** contractually agreed KPIs
e.g. **>99.5 % SDH service availability**

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Photo courtesy of ESA

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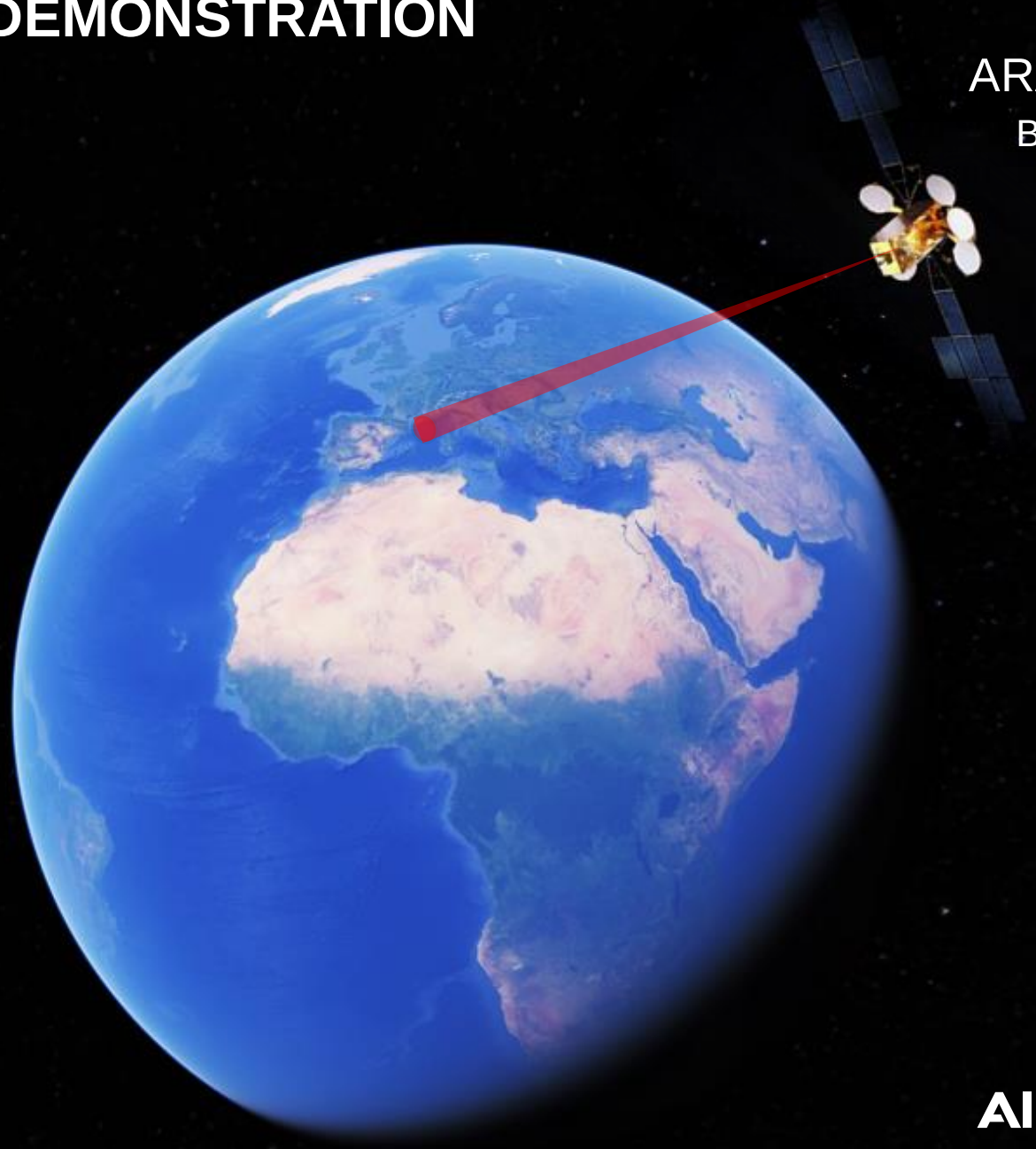
NEXT GENERATION LASER TERMINAL IN-ORBIT DEMONSTRATION

- In-flight demonstration of large telescope systems and innovative pointing mechanisms
- High capacity link through turbulence
- Complete E2E telecom system from Gnd to Space
- Demonstrate analog link through the atmosphere
- Ground station development

Launch by 2023



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How can photonics help? Photonics building blocks for lasercomm

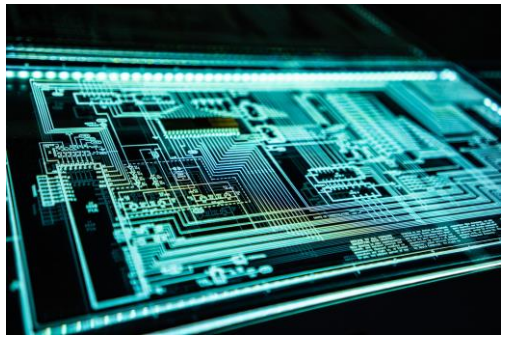
KEY BENEFITS TO ACHIEVE

- Power efficient payloads
- Compact systems
- Robust toward Space environment
- High modulation performance
- Competitive price

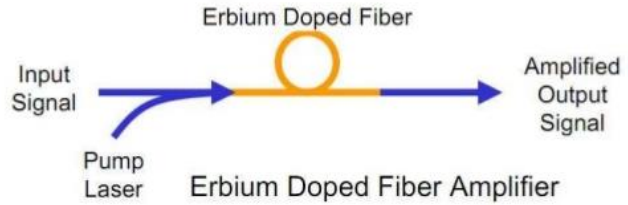
KEY PROBLEMS TO SOLVE

- Light injection: From cm to µm
- Power consumption efficiency
- Photonics packaging, and Space qualifications: Thermal and radiation

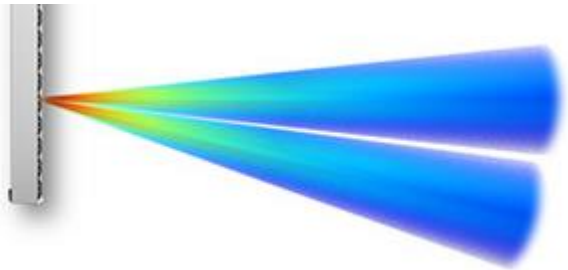
Photonic Integrated telecom chain



- **High power boosters (>100W)**
- **Low noise, low power amplifier**



Phased array and Metamaterials



Large area, low noise photodetectors

MISSION REQUIREMENTS TO STEER THE PHOTONICS SPECIFICATIONS

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AIRBUS IS OPEN TO COLLABORATE ON PHOTONICS TO TURN TECHNOLOGY INTO PRODUCTS

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