

A satellite view of Earth at night, showing the curvature of the planet and numerous city lights glowing against the dark surface. The sky is a deep blue gradient.

Microwave Photonics for Satellite Applications

DEFENCE AND SPACE

Kasia Balakier, Senior Photonics Engineer

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Space Systems Activities



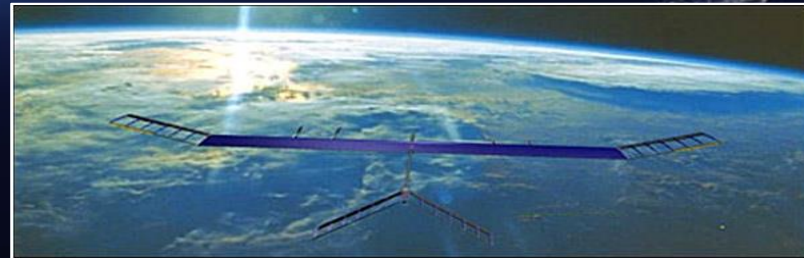
Telecommunication Satellites



Earth Observation Satellites



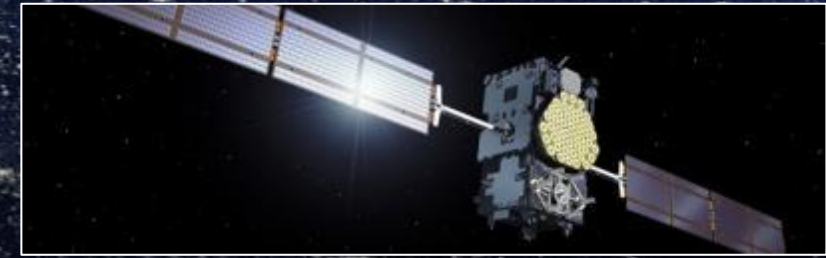
Space Equipment



High Altitude Platforms



Space Exploration & Science



Navigation Satellites



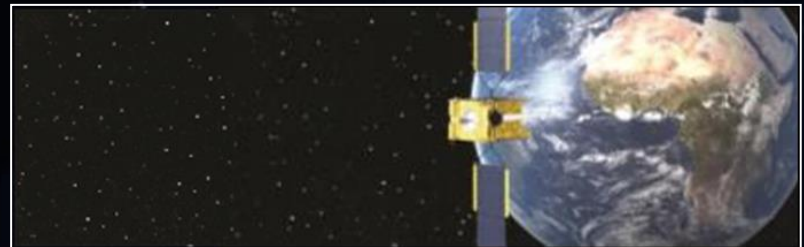
Launchers & Deterrence



New Space



Manned Spaceflight



Satcom and space-based services



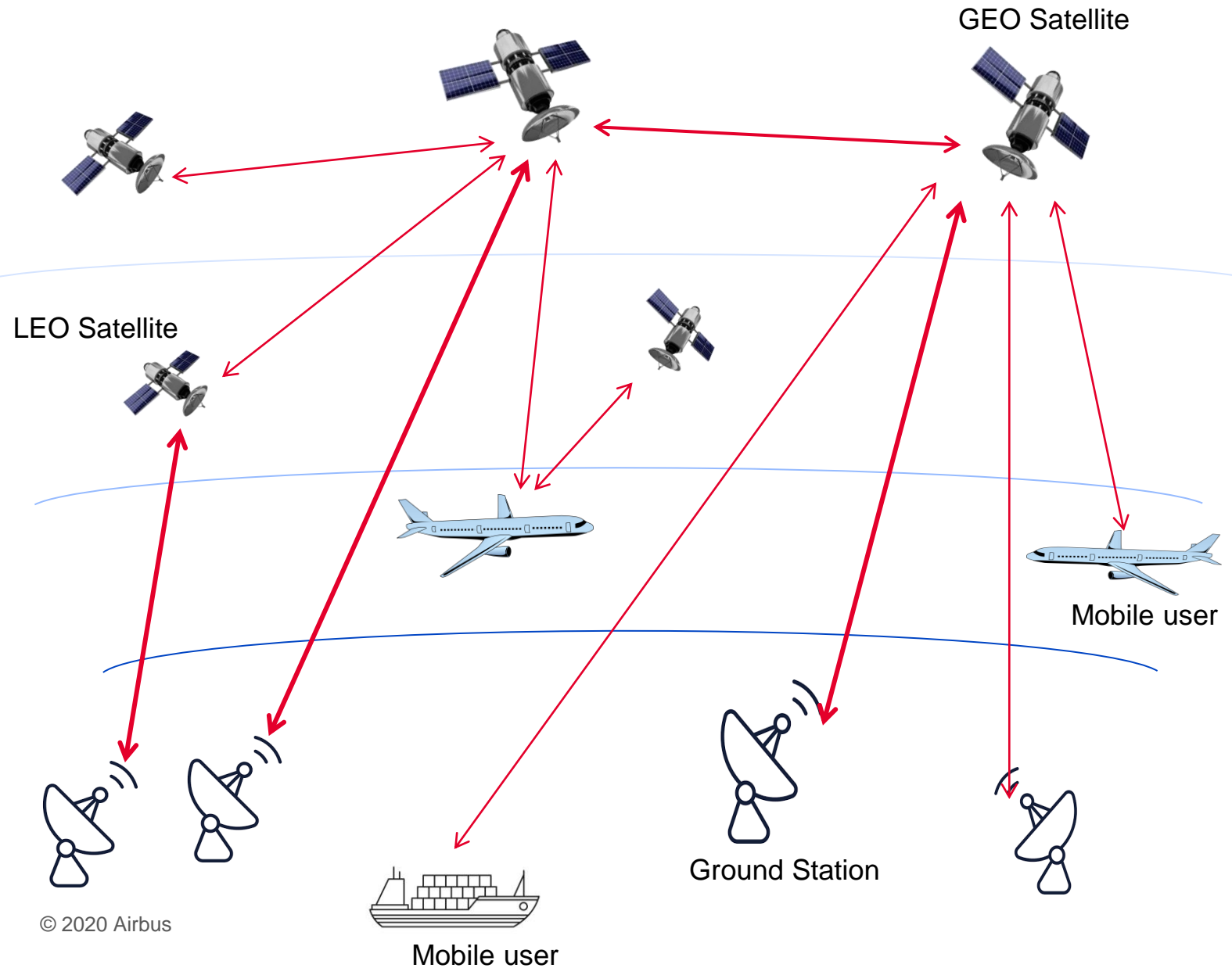
Geospatial Services



Ground Segments

... and many of these systems can incorporate microwave photonics

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Satellite communication

Main types of links:

- Direct transmission to ground
- Multi users data relay
- Broadband feeder links
- Deep space transmission
- Inter-satellite

Mission dependent:

- Link capacity
- Antenna elements
- Transmitted power
- Tunability (range, rate, speed)
- Modulation format
- Receiver sensitivity

Challenges:

- Size, Weight and Power consumption (SWaP)
- Harsh environment
- Cost

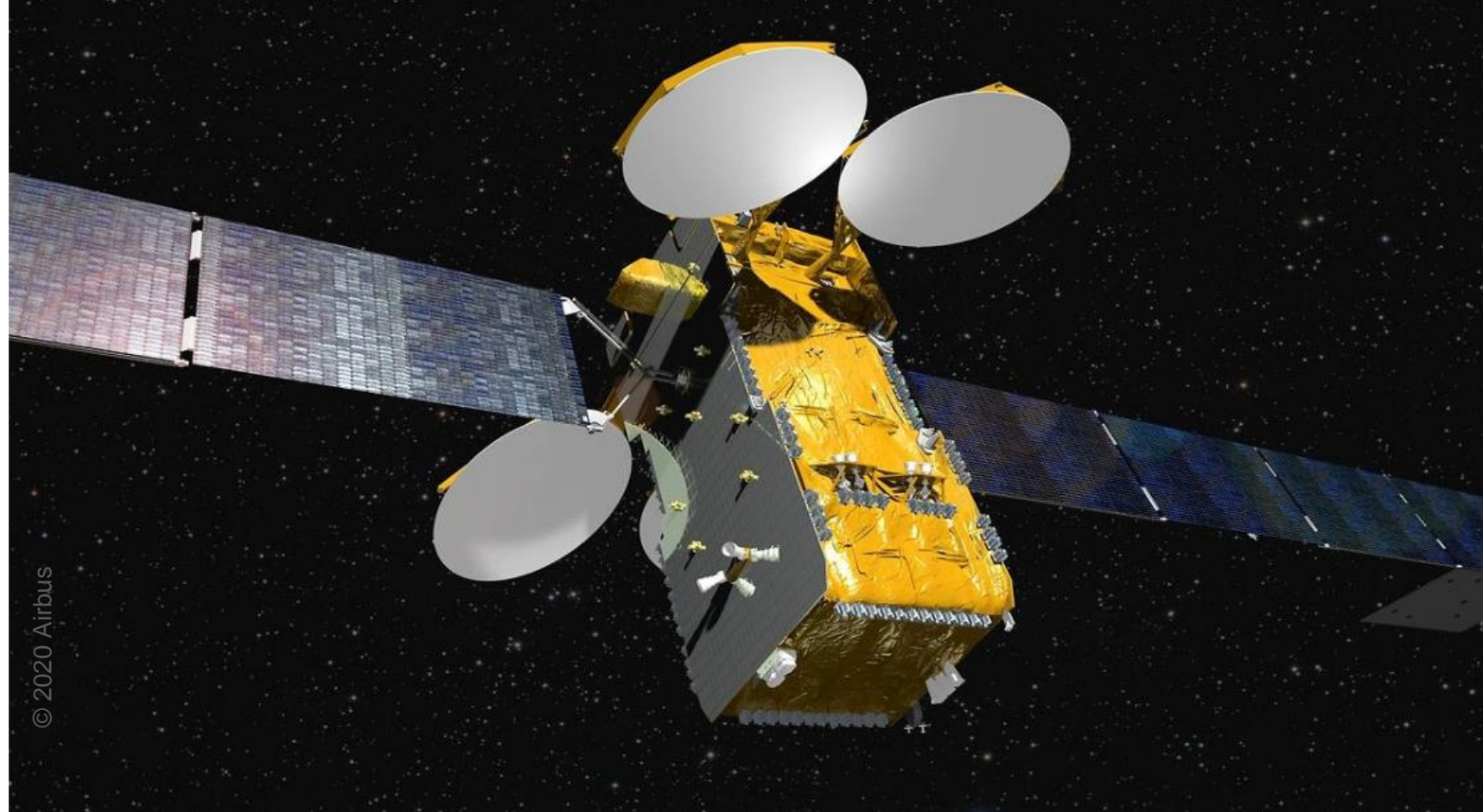
Microwave Photonics

used in satellite payload
to **detect, generate, manipulate**
and **distribute** RF/uWave signals
in optical domain

Opportunities:

- Demand for very High Throughput Satellites and low latency systems
- More Complex Payloads (Processors and Active Arrays)
- Increasing Bandwidth and Capacity (Tbps)
- Use and generation of higher frequencies (Q- V- W- band, THz)
- Tunable local oscillators with low phase noise
- Integrated photonics
- Efficient laser sources
- Beam steering / beamforming
- Optical switches
- Tunable MWP filters
- others...

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Thank you

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Kasia Balakier

katarzyna.balakier@airbus.com

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