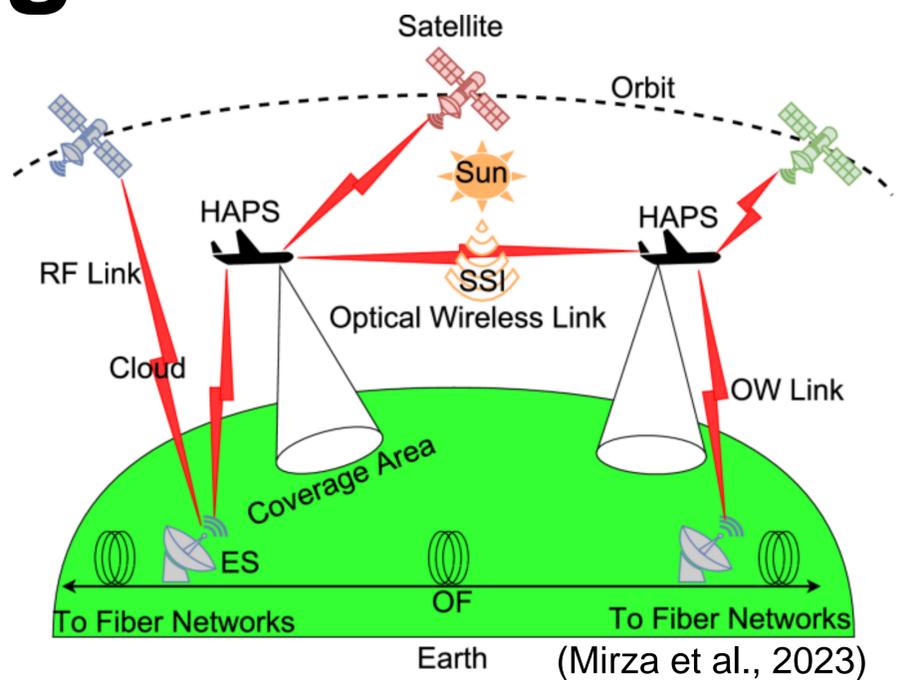


PULSE – PCSEL for Ultra-Long-distance Signal Emission

FSOC Problem: Free Space Optical Communication (FSOC) delivers high-speed links but suffers from weather sensitivity, alignment challenges, and poor network resilience, limiting its real-world reliability and scalability. Optical vertical networks boost FSOC reliability and scalability through integrated, adaptive routing but require a laser emitter which produces light that allows for

Applications:

- High Altitude Platform Station (HAPS) for 5G/6G networks
- Satellite/UAV communications
- Military and secure comms
- Broadband for Rural & Remote Areas
- Smart City / National IoT Infrastructure

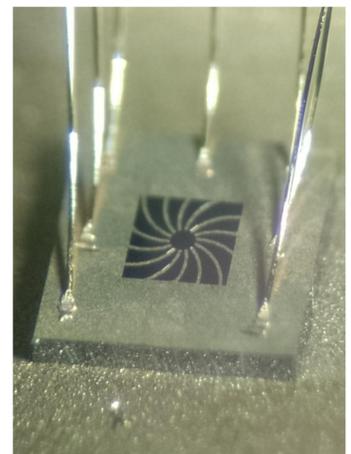


PCSELS: Beam Quality, Power, Reliability

Photonic crystal surface-emitting lasers (PCSELS) are a novel semiconductor laser that use a photonic crystal (PC) in the cavity to emit coherent, single-mode light vertically with high beam quality, combining high power and precise beam control.

PCSELS have:

- Large-area single-mode emission – reduces phase noise, critical for advanced modulation.
- Ultra-narrow beam divergence – reduced optical loss through atmosphere over vertical point-to-point links with efficient coupling into receiver optics.
- On chip beam steering using arrays – remove cost/size/weight of mechanical fine beam-steering.
- Wavelength tunability with PC – Fine wavelength giving have low attenuation, use of telecom components, and avoid water absorption wavelength peaks.



Partners

- Vector Photonics : Design and fabricate PCSEL arrays to be used as the laser emitter in the system.
- Fraunhofer HHI: Specialising in communication protocol and the data transfer optimisation.
- Fraunhofer CAP: System integration build, including pointing and tracking system, optical tests, link uptime, resilience.

PARTNERS needed FOR:

- Driving Circuitry
- Platform user for demonstration for specific application



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