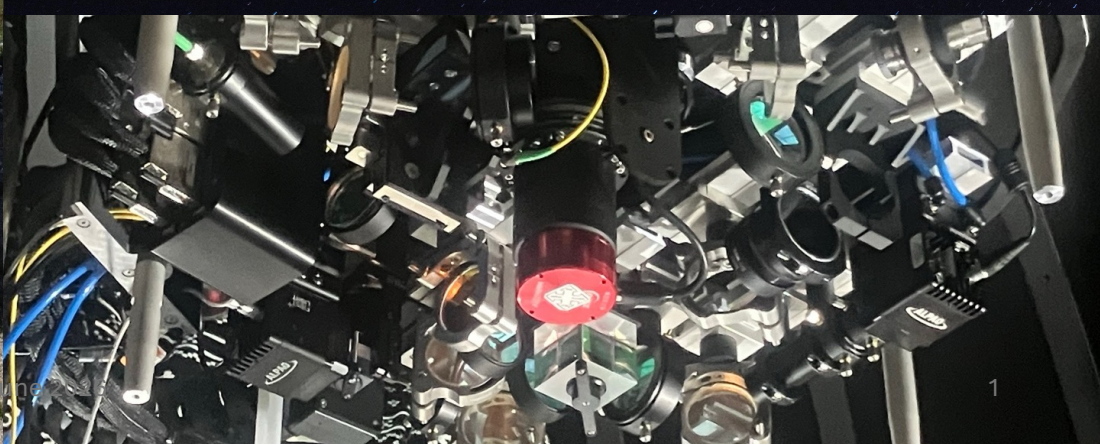




LEO DTE CO3D/LASIN to FrOGS



LASIN on-board CO3D

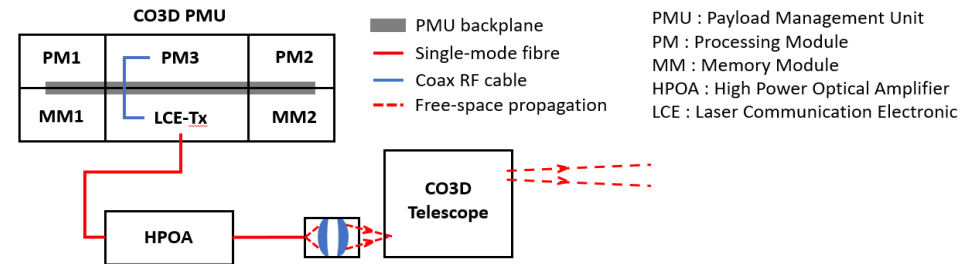
- CO3D : ADS / CNES **constellation** – 4 LEO satellites producing 50cm **3D imagery**. Launched in July 2025.
- LASIN (LASer through the INstrument) is a **Direct-to-Earth LaserCom demonstrator**, co-funded by ADS and CNES, flying as a technological experiment on one CO3D satellite
- The LASIN beam is emitted through the imagery **instrument**, by an optical Com chain seamlessly integrated in the CO3D payload
- LASIN uses high-performance **guidance** and **pointing** capabilities of the CO3D platform to target the OGS, and performs “semi-open loop” body pointing
- Image of the **OGS beacon** are acquired on-board by the imaging sensor to enhance pointing performances
- LASIN is fully compliant with CCSDS 141.0-B2 & 142.0-B-2 O3K LDPC, with symbol rate 10Gsps
- **In-orbit tests** (IOT) are on-going in partnership with the FrOGS ground station



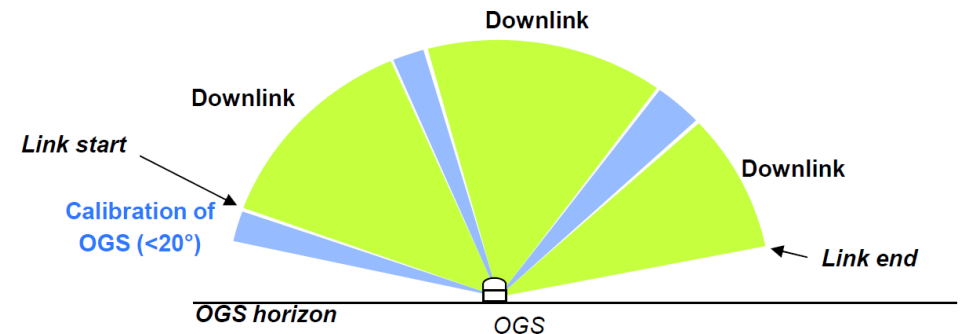
CO3D satellite



Pic du Midi – CO3D IOT Image



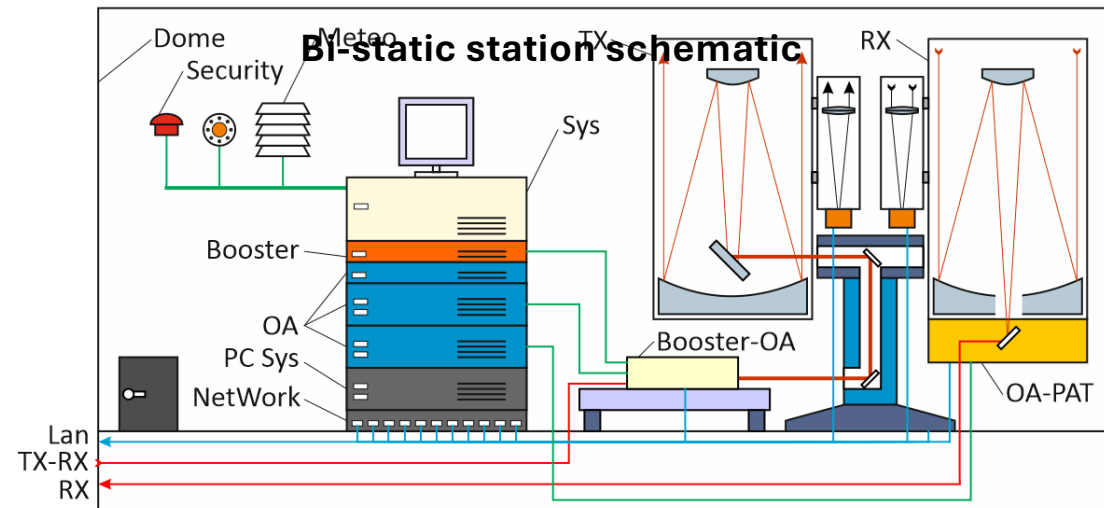
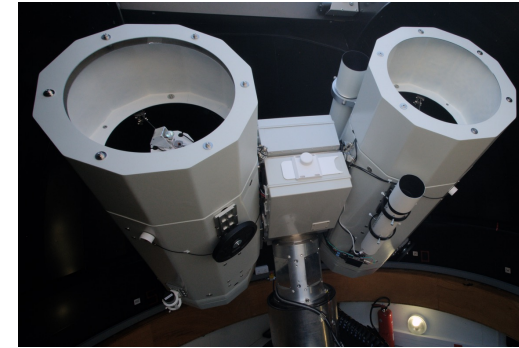
LASIN on-board architecture



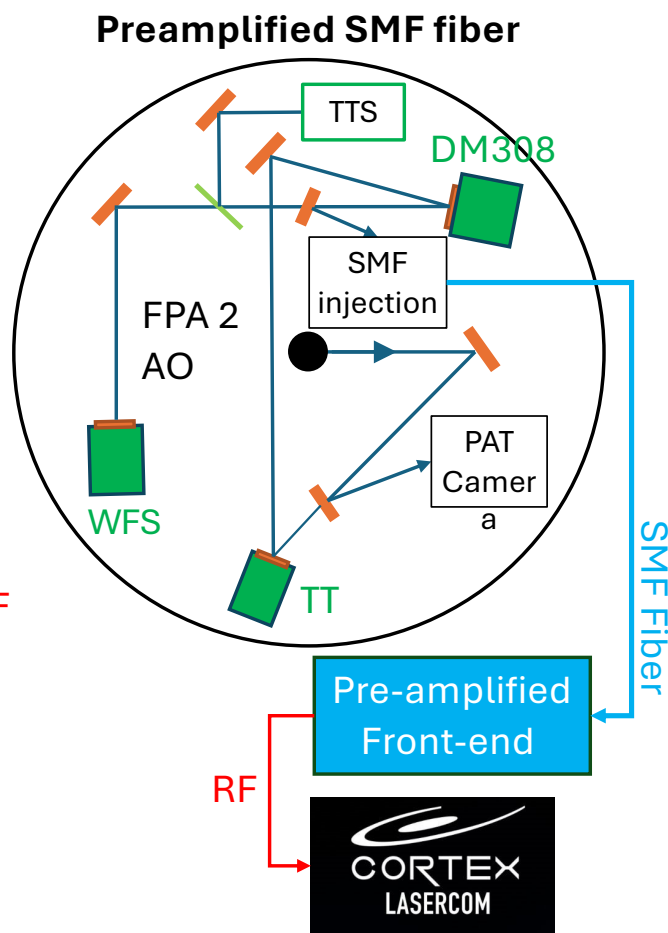
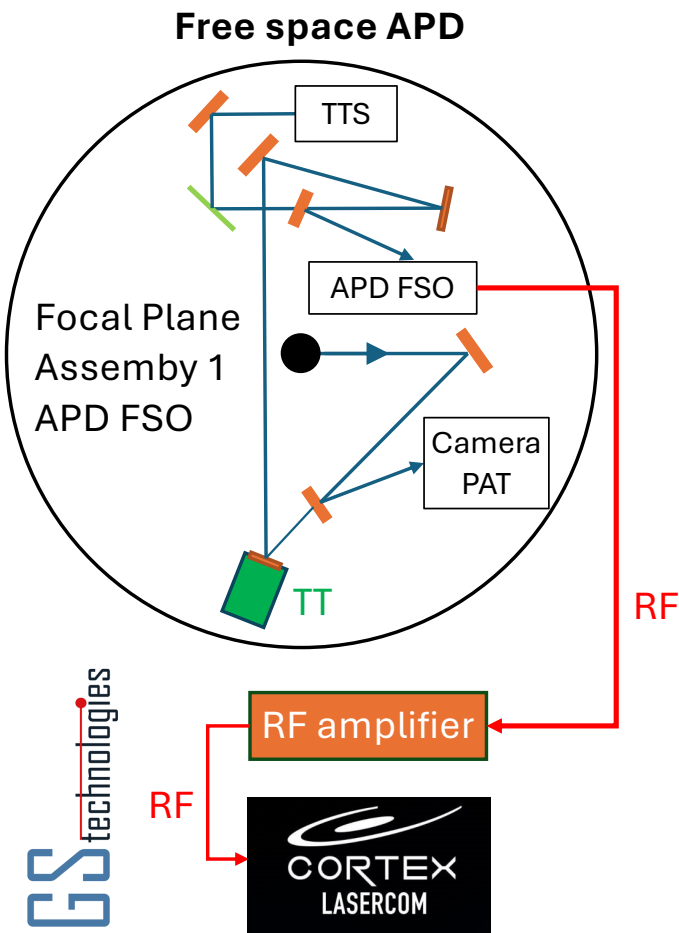
French Optical Ground Station (FrOGS)



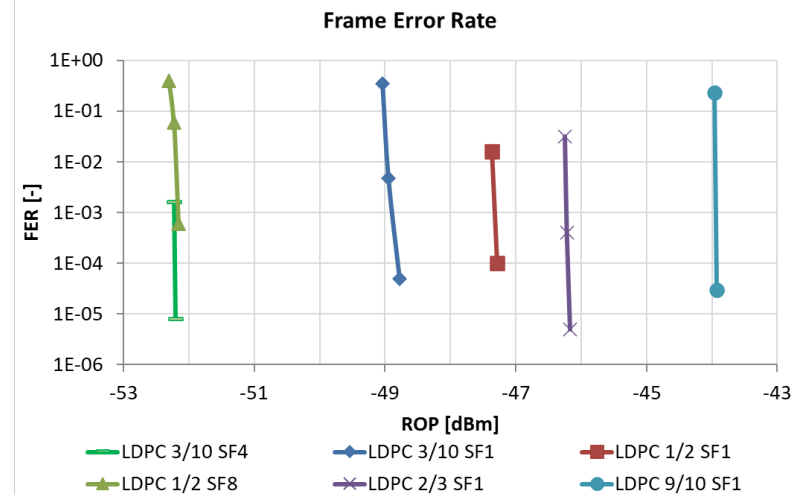
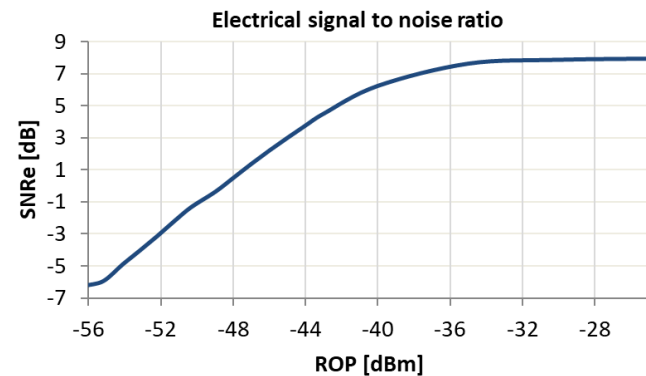
- CNES procured a versatile OGS designed and built by a French consortium (OGS Tech, Bertin Alpao, Safran DS)
- Used to demonstrate various FSO missions: LEO DTE, GEO Feeder, QKD, ...
- Located at the French Riviera observatory
- In operation since May 2024
- Used for flight demonstrations: TELEO, LASIN, and in the future SOLiS
- 2 tubes of 50 cm on Alt-Az mount
- coudé and cassegrain FPA with D/L and U/L Adaptive Optics systems
- Compatible reception: OOK APD and OOK preamplified, DPSK, coherent



Receiver architectures for O3K LDPC LASIN



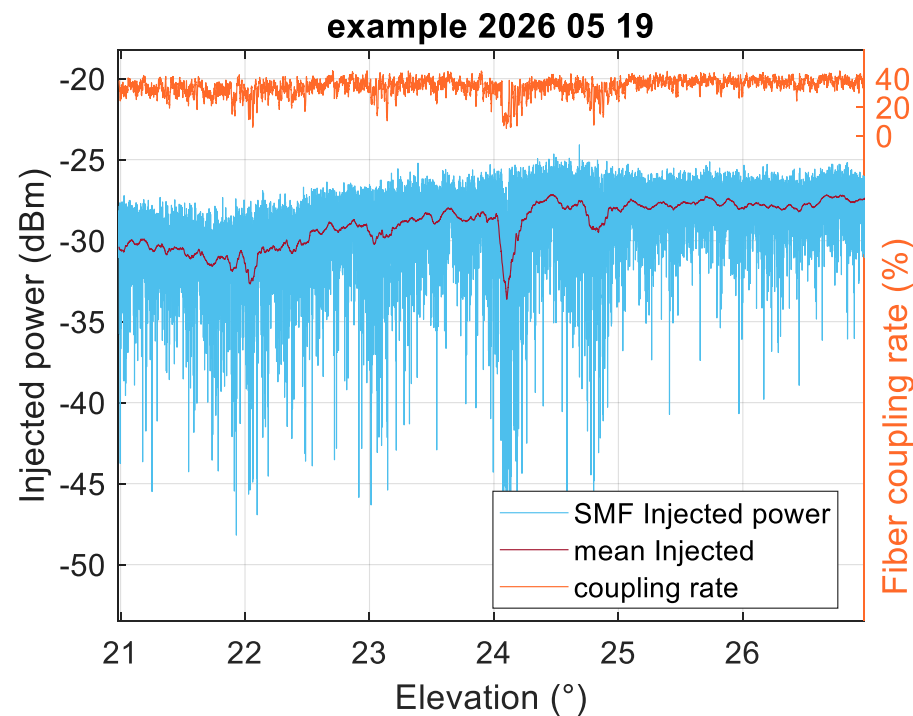
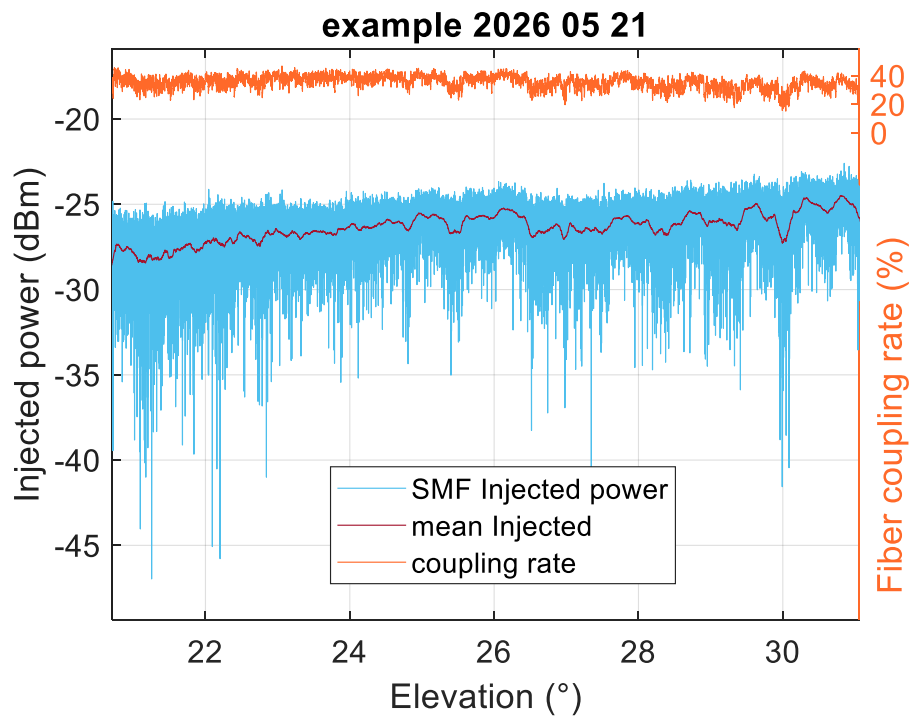
Reference Measurements for preamplified receiver



Initial Results (1/2)



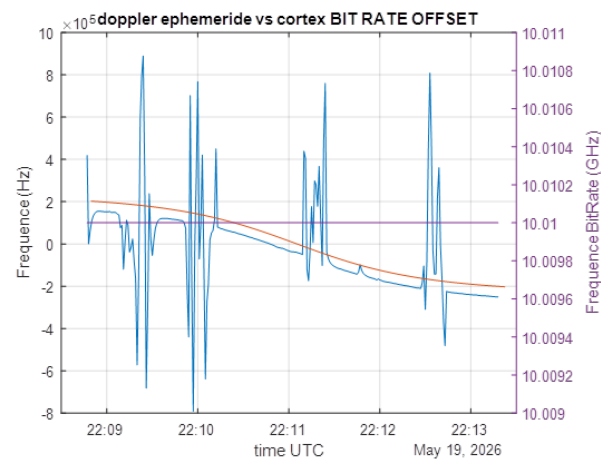
- ✓ OGS validation:
 - ✓ Satellite acquisition and tracking
 - ✓ Satellite Reacquisition during pass
 - ✓ AO loop and SMF fiber injection
- ✓ Robust AO loops
- ✓ Typical SMF injection: 35%
- ✓ Mean ROP > -30 dBm



Scylight June 2026

Initial Results (2/2)

- Firsts tests of pre-amplified front-end & modem
 - Bit sync => OK
 - Frame sync =>OK
- Data decoding expected after onboard SW update



Further work

- Satellite precise Line Of Sight calibration
- End-to-end data transfer performance assessment with
 - Pre-amplified receiver
 - APD FSO receiver

Measures			
SNRle	-1.23 dB	ADC Level	-17.25 dBfs
Electrical Level	3.00 dBm	ROP	-42.05 dBm
BER	1.66e-007	Marks Mean	317.47
Nbr of errors	72,860,372,706 bits	Spaces Mean	-342.51
		Var.	168979.75
Decoder Frames	28,732,177	FEC	
Decoder Good Frames	0	Interleaver	0x00000000
Decoder Bad Frames	28,732,177	Interleaver overruns	155,393,153
FER	1.00e+000	Mean Iterations Nb	17.0

