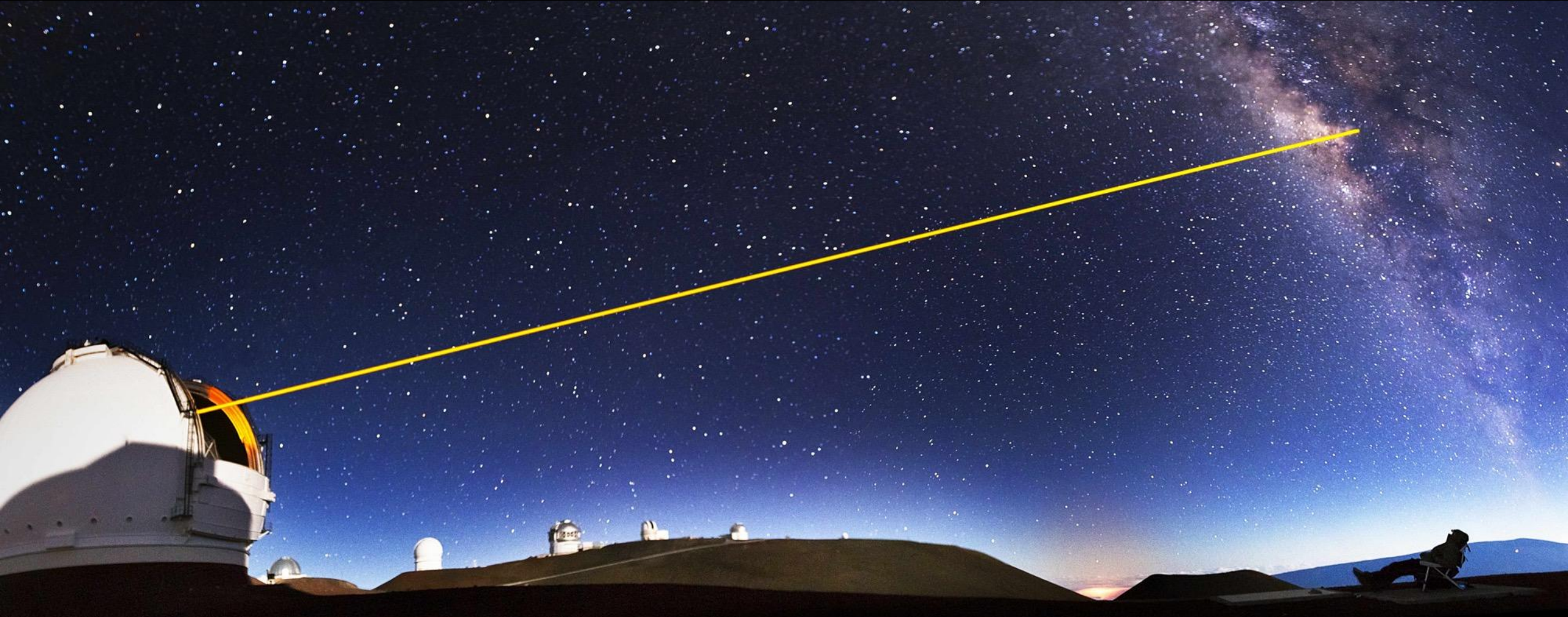




High-Power Fibre Lasers for Free-Space Optical Communication

Konstantin Holzner at EPIC Online Technology Meeting on Optical
Communication for Space



■ TOPTICA Projects – Laser Systems Overview

GSL

Guide Star Lasers

20 W – 50 W cw
589 nm, 10 MHz Linewidth



Astronomy, SDA/SSA,
Atmospheric Science,
FSOC/Satellite Uplinks

RFL

Raman Fiber Lasers

50 W – 100 W cw
Fixed λ 1150 nm – 1827 nm

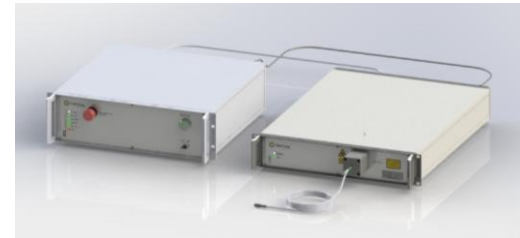


Pumplaser
at difficult λ

LMA

Large Mode Area Amp

C-Band, 15 W (Fibre-Coupled)
>40 W Free-Space



FSOC/DSOC/
Satellite Uplinks/
LIDAR

EYRIS

FSOC Fiber Laser

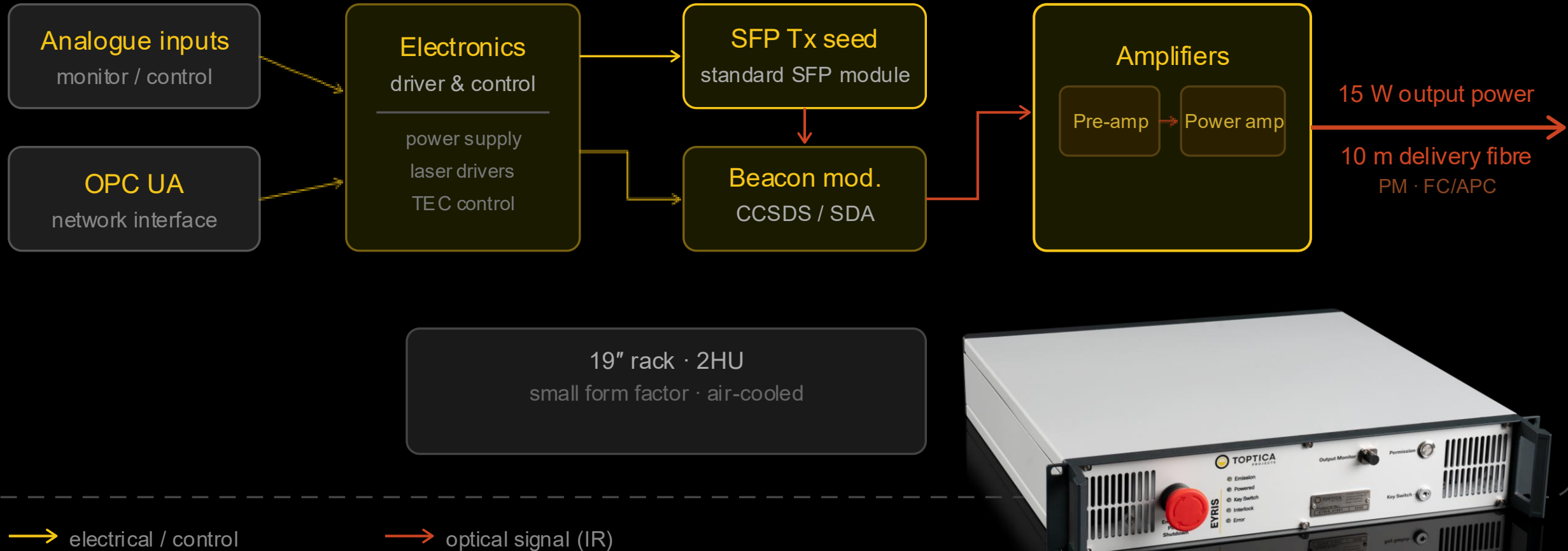
15 W, C/L-Band, PM Fibre
10 Gbit/s & Tracking Tone



FSOC/
Satellite Uplinks

EYRIS – System Overview

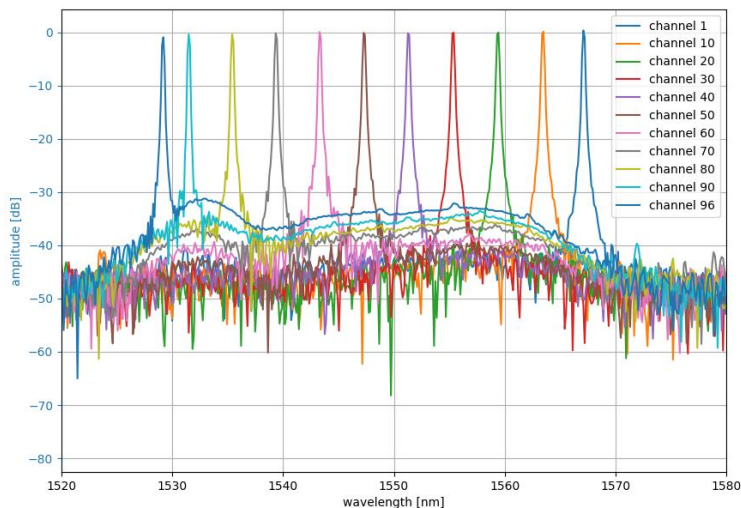
EYRIS FSOC LASER SYSTEM



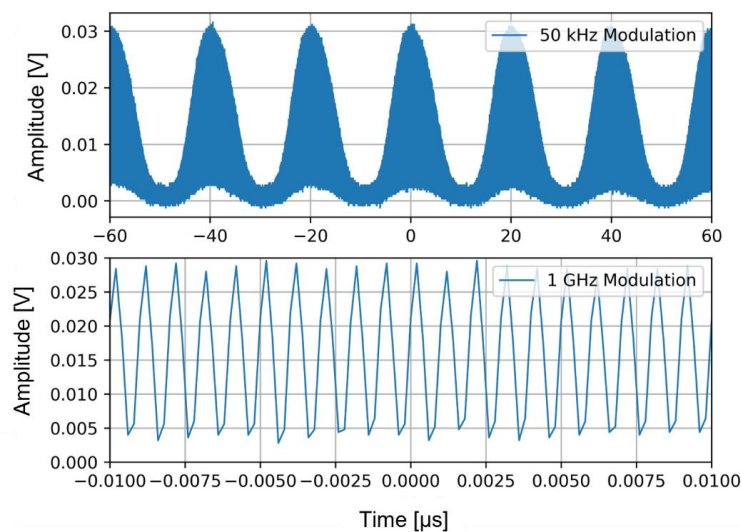
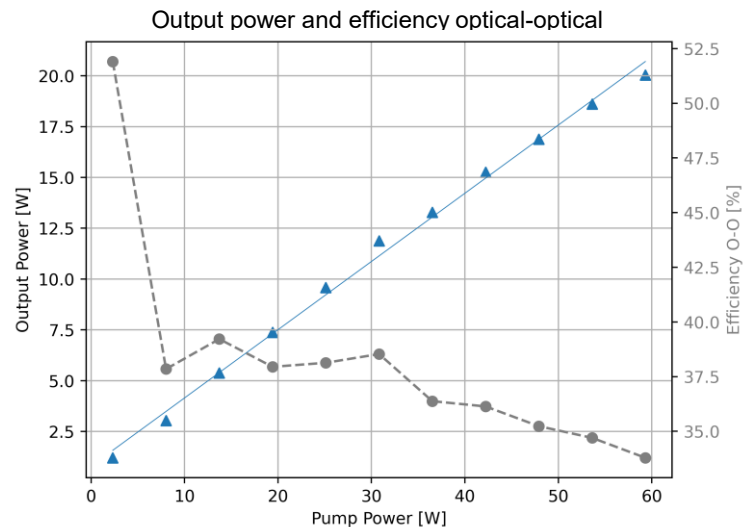
EYRIS – System Overview

Specs

- **C- & L-Band** System for **FSOC**
- **Tx Seed** - Analog Modulation Input
- Multi-Stage **Amplifier** (low ASE)
- **ITU-Grid** - (C-Band tunable, L-Band selectable)
- **CCSDS/SDA** Standard Compatible
- C-Band: **15W**; L-Band: **5W**
- Data Rates: **1Mbit/s – 2.5Gbit/s / 10Gbit/s**

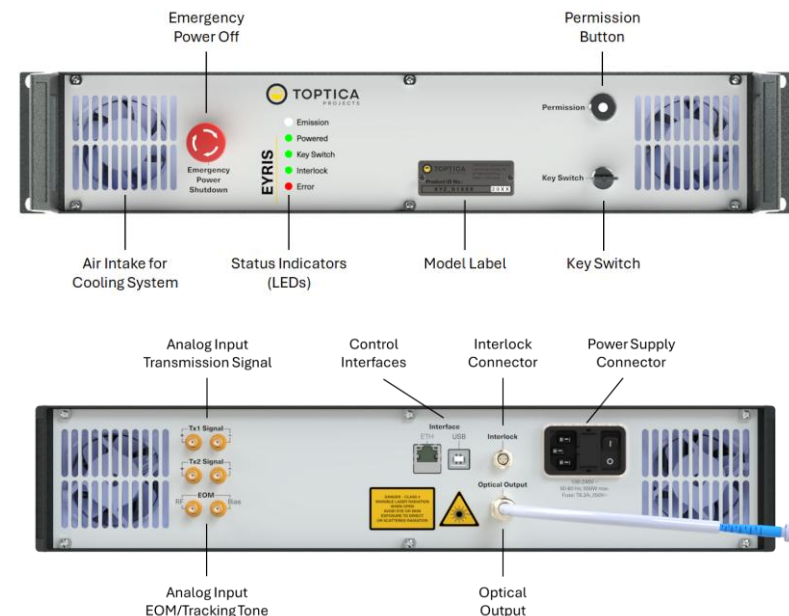


Lab Results

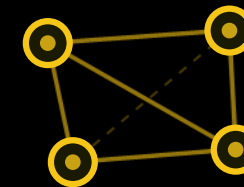
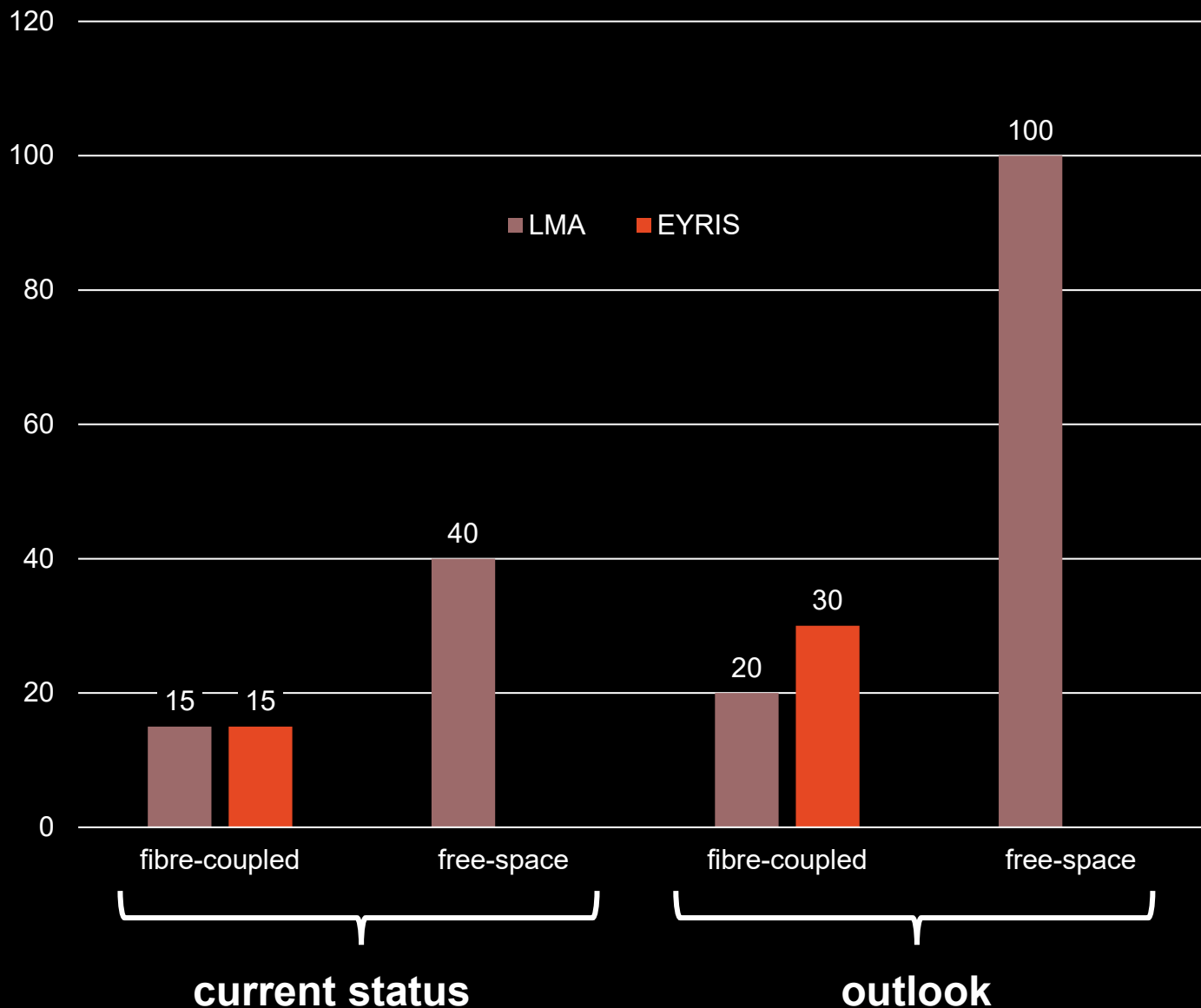


Module Design

- **10m Delivery Fibre @ 15W**
- Flexible Analog Modulation Interface
- Data + Tracking Tone Modulation
- Energy-Chain Compatible
- **Air-Cooled**
- 19" Rack, 2HU
- Remote-Controllable

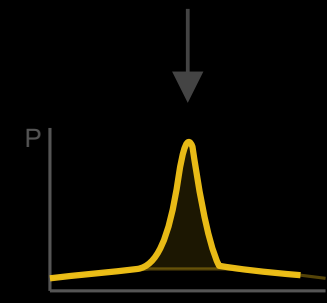


Outlook & Customisation



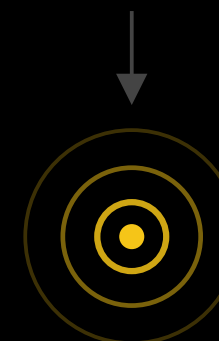
Parameter interdependence

wavelength · output power · OSNR · fibre length



Comprehensive characterisation

real lab data across wavelengths & configurations



Informed custom design

optimised system for your wavelength & mission

Summary



Wavelength flexibility

tunable across C-band ITU grid



Fibre-coupled output

10 m PM delivery fibre, FC/APC



Air-cooled

no liquid cooling infrastructure required



Small form factor

19" rack, 2HU — minimal footprint



Turn-key system

SFP seed, amplifier chain, OPC UA control



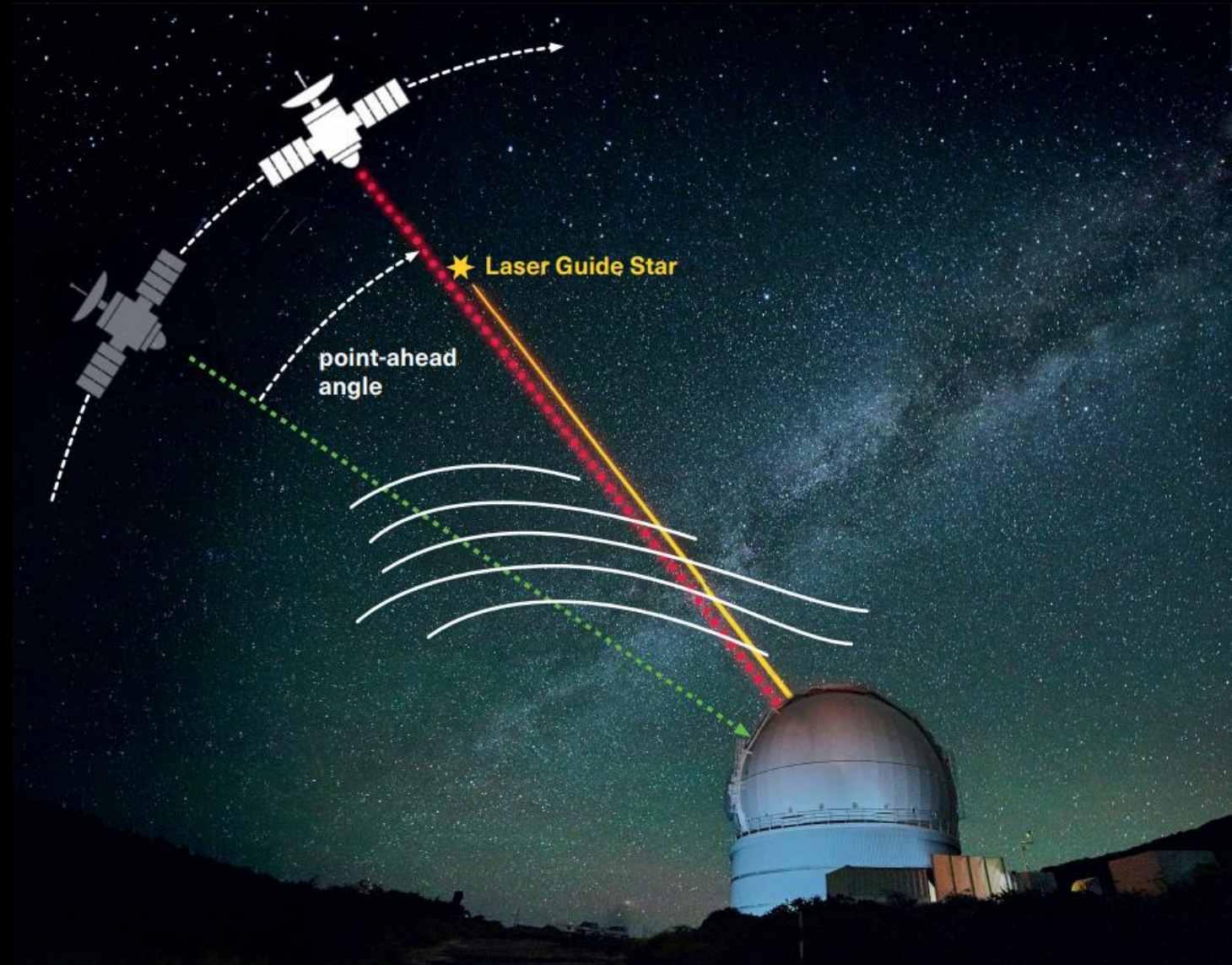
SDA / CCSDS compliant

aligned with space data link standards



Seamless OGS integration

ready to deploy in your ground station infrastructure



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