BRNO UNIVERSITY OF TECHNOLOGY

OptaBro

Free Space Optical Communication Research Group

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FACULTY OF ELECTRICAL ENGINEERING AND COMMUNICATION | department of radio electronics

optabro | www.radio.feec.vutbr.cz/optabro

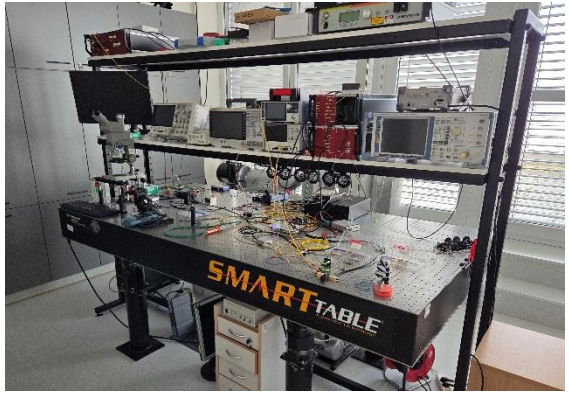
Optabro group

OptaBro is an optical communications research group at the Department of Radioelectronics at the Brno University of Technology.

Brno University of Technology, Faculty of Electrical Engineering and Communication campus

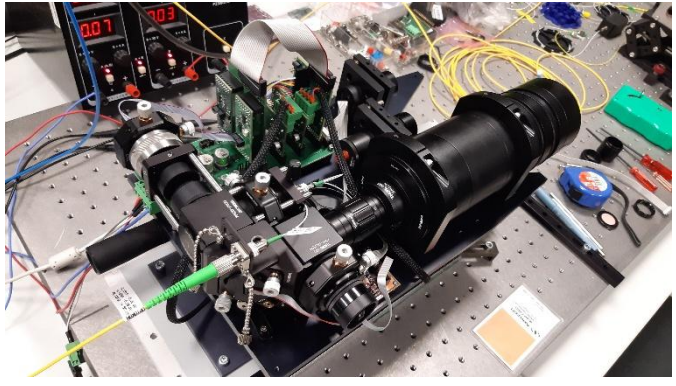
Research infrastructure

- **Free space** (850 m) and **fiber optical** (2 km) **link** (with compensation of induced phase noise) to Institute of Scientific Instruments of the Czech Academy of Science.
- **Tunable Wavelength Laser** EKSPLA NT 342-10-H-FC-ATTN - wavelength tuning from UV to IR (410 nm – 2600 nm), very useful for characterization of the photonic receivers, atmospheric transmission measurement, spectroscopic analysis.
- **Signal Quality Analyzer** Anritsu MP1800A - Bit Error Rate test from 0.1 Gbit/s to 32.1 Gbit/s.
- **Meteo station** on the faculty roof. (visibility (PWD Vaisala), temperature, pressure, humidity, precipitation). Stored every 15 s to Influx dB database and visualised by Grafana.



Applied research outputs

Optical Wireless System For The Propagation Of Optical Frequencies Through Free Space

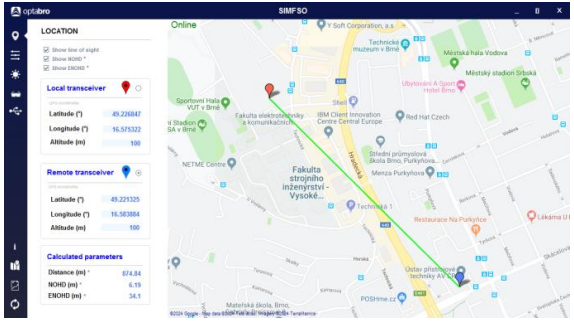


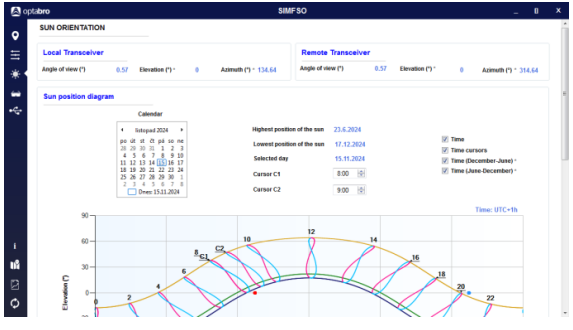
INSTITUTE OF SCIENTIFIC INSTRUMENTS
The Czech Academy of Sciences

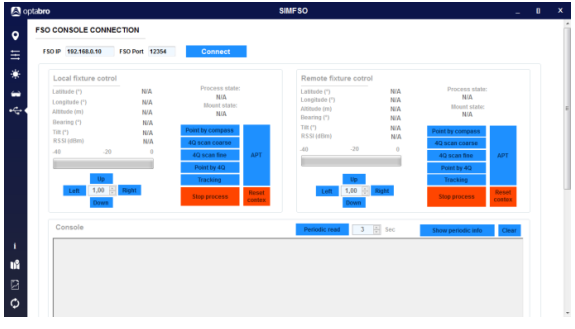
BARCÍK, P.; KOLKA, Z.; WILFERT, O.; BIOLKOVÁ, V.; HRABINA, J.; PRAVDOVÁ, L.; ČÍP, O.; KŮR, J.: FSO-DIS; Optical wireless system for the propagation of optical frequencies through free space. Brno University of Technology, Department of Radioelectronics, Technická 3082/12 616 00 Brno (functional sample), Project: TN1000008/18 Light sources and elements for quantum technologies and communications I, https://www.vut.cz/en/rad/results/detail/181581

Applied research outputs

SIMFSO (Simulation of Free-space Optics)







The **program** is designed to simulate the basic properties of the general optical wireless connection. In connection with the FSO terminal, it allows to control and monitor the activity of the local and remote heads.

ESA project involvement

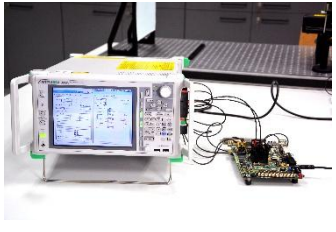
Exploring Laser Satellite communication at 2100 nm wavelength region - ELSA21

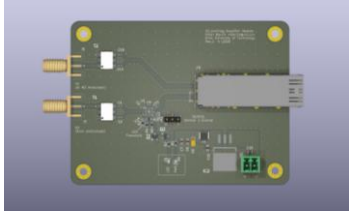
Contract Number: 4000150547/25/NL/GM/fm

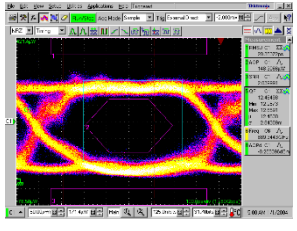
Prime contractor: CRYTUR, spol. s r.o. (Czech Republic)

Project overview:

- Development of 2.1 μm laser for optical free-space communication (FSO) – exploring possibilities
- Long-distance ground-to-space communication (and back) [long term goal]
- The project sets a task to develop the laser source technology and to send high-speed modulated data
- Experimentally quantify the advantages of 2.1 μm laser







ESA project involvement

Coherent Transceiver for Free Space Optical Communication and Time and Frequency Transfer

Prime contractor: German Aerospace Center (DLR) (Germany)

Project overview:

- Development of 100 Gbps coherent transceivers for satellite-to-ground optical communications through the atmosphere.
- Optimization of digital signal processing and time-diversity algorithms to enhance link reliability.
- Implementation of time and frequency transfer functions within the communication chain.
- Increasing channel capacity by an order of magnitude, scaling current 10 Gbps standards to 100 Gbps.

DLR Institute of Communications and Navigation

TESAT

Adtran

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