

Space-grade Opto-electronic Interfaces for Photonic Digital and Analogue Very-high-throughput Satellite payloads

Fact Sheet

Project Information

SIPhoDiAS

Grant agreement ID: 870522

Status

Ongoing project

Start date

1 January 2020

End date

31 December 2022

Funded under

H2020-EU.2.1.6.1.

H2020-EU.2.1.6.2.

Overall budget

€ 2 999 042,50

EU contribution

€ 2 999 042,50

Coordinated by

LEO SPACE PHOTONICS R&D
MONOPROSOPIIKE

 Greece

Project description

Photonic technology for very high-performance satellite payloads

Following their widespread installation within terrestrial data centres, photonics are gearing up for their penetration into modern communication satellites (COMSATs). The new COMSAT class is dubbed 'VHTS – Very High Throughput Satellite' and the increased capacity and low SWaP (Size, Weight and Power) targets that it has to deliver drives the migration towards photonics. This migration requires a new class of photonic building blocks – these are the opto-electronic (O/E) interfaces, i.e. transceivers, modulators and photodetectors. The current O/E component generation

is still lacking in terms of speed, power consumption and size and an upgrade of performance accommodated by reliability has to be demonstrated. The EU-funded SIPhoDiAS project targets the development of this new component generation by leveraging reliable manufacturing, assembly and packaging technologies that exist within Europe.

Objective

The satellite market experiences a paradigm shift with the rise of VHTS that is challenging the capabilities of existing SatCom systems. Under increasing capacity/flexibility and stringent SWaP requirements primes are embracing a technology migration relying on photonics. TAS is the first prime to introduce optical interconnects in a commercial digital processor and this is expected to open the opportunity for photonics penetration in every part of the satellite payload (P/L). However the current critical photonic building blocks fail to deliver the big promise for high-performance and low SWaP photonics-enabled VHTS. These are the opto-electronic (O/E) interfaces - transceivers, modulators and photodetectors - that are deployed in the highest volumes and connect equipment at the edge and within the payload. They suffer from limitations in speed, bandwidth, reliability and most importantly size and power consumption which are still off-target, while most of them are available from US. SIPhoDiAS aims to advance these components to address O/E performance, size and power and at the same time enhance their reliability and demonstrate flight-ready parts at TRL 7, enabling for the first time photonic P/L systems that hit the right SWaP targets. SIPhoDiAS will deliver the following impressive advancements: up to 224 Gb/s radiation hard transceivers 4.5x faster and 8.5x more energy efficient than state-of-the-art (SOTA), 50 GHz modulators 2 times smaller having 7 times more bandwidth per unit area than SOTA, 40 GHz photo-detectors 50% lighter, with 4.5 times more bandwidth per unit area and 66% better responsivity. Modules will be system integrated and tested in representative sub-systems to show optical interconnect demonstrators running 350% faster with 80% less power and 50% less mass and photonic-RF frequency converters extended up to Q/V band (40-50 GHz) at 50% less mass. SIPhoDiAS technology will be made in Europe and will contribute to the European SatCom roadmaps.

Programme(s)

Topic(s)

Call for proposal

Funding Scheme

RIA - Research and Innovation action

Coordinator



LEO SPACE PHOTONICS R&D MONOPROSOPIIKE

Address

**Patriarch Grigorios And
Neapoleoleos
15341 Agia Paraskevi
 Greece**

[Contact the organisation](#) 

Activity type

**Private for-profit entities
(excluding Higher or
Secondary Education
Establishments)**

EU contribution

€ 443 125

Participants (6)



IHP GMBH - INNOVATIONS FOR HIGH PERFORMANCE MICROELECTRONICS/LEIBNIZ-INSTITUT FUER INNOVATIVE MIKROELEKTRONIK

 Germany

EU contribution

€ 489 925

Address

**Im Technologiepark 25
15236 Frankfurt Oder**

[Contact the organisation](#) 

Activity type

Other



THALES ALENIA SPACE FRANCE SAS

 France

EU contribution

€ 381 552,50

Address

**Avenue Jean Francois
Champollion 26
31100 Toulouse**

[Website](#) 

Activity type

**Private for-profit entities
(excluding Higher or
Secondary Education
Establishments)**

[Contact the organisation](#) 



ALBIS OPTOELECTRONICS AG

Switzerland

EU contribution

€ 379 687,50

Address

**Moosstrasse 2A
8803 Ruschlikon**

Activity type

**Private for-profit entities
(excluding Higher or
Secondary Education
Establishments)**

[Contact the organisation](#)



ALTER TECHNOLOGY TUV NORD SA

Spain

EU contribution

€ 424 937,50

Address

**Calle Tomas Alba Edison 4
Isla De La Cartuja
41092 Sevilla**

Activity type

**Private for-profit entities
(excluding Higher or
Secondary Education
Establishments)**

[Contact the organisation](#)



AXENIC LIMITED

United Kingdom

EU contribution

€ 404 502,50

Address

**Thomas Wright Way Netpark
Incubator
TS21 3FD Sedgefield Durham
Cleveland**

Activity type

**Private for-profit entities
(excluding Higher or
Secondary Education
Establishments)**

[Contact the organisation](#)



ALTER TECHNOLOGY TUV NORD UK LIMITED

United Kingdom

EU contribution

€ 475 312,50

Address

Activity type

Bain Square 5
EH54 7DQ Livingston

Private for-profit entities
(excluding Higher or
Secondary Education
Establishments)

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