



The project team includes the entire technology development chain, starting from the core technology developers and extending to the component & system vendor towards the end user. In this rationale, the team consists of one space industry prime (ASTRIUM), three SMEs (DAS, CONSTELEX, MODULIGHT), one research center (IHP) and two universities (UPVLC, POLIBA). Using this composition, MERMIG will provide a clear path towards transforming the project scientific and technological objectives into an exploitable system with strong market potential.

## **DAS PHOTONICS SL**

DAS PHOTONICS is a spin-off company from the Valencia Nanophotonics Technology Centre

(NTC, Polytechnic University of Valencia), focused on the development of innovative value-adding products based on our proprietary photonics technology. Our activity is mainly driven in two directions: (1) Design of photonic chips based on proprietary Silicon Photonics technology, (2) System integration using our own integrated circuits as well as commercially-available devices in the field of microwave photonics. Since its creation in 2005, DAS Photonics has been paying close attention and are supporting investigation and development of nano-photonic technology in wide areas of interest. Now DAS has focused special attention to the field of photonic integration in order to achieve a breakthrough that allows the implementation of next-generation observation and sensing technologies. The company exploits the advantages of photonics technology to offer solutions with improved bandwidth, mass and power consumption, compared with electronic implementations.

### **ASTRIUM S.A.S.**

ASTRIUM is a 100 % subsidiary of EADS Company. It is a global space industry leader with world-class expertise and extensive experience as a prime contractor across all sectors of space business. With 15000 employees over five European countries, ASTRIUM, managed by François Auques is integrating three companies: Space transportation, Satellites and Services. Belonging to the Satellite Company, ASTRIUM SAS will be the legal entity working on the MERMIG project. Within ASTRIUM satellite organisation, Sensor and Actuator division (called APR) will be involved in this project as a final user of the developed application. The MERMIG project represents for ASTRIUM a very important step beyond in the gyroscope sensor design. It will give a boost on the miniaturisation of the sensor and will efficiently participate to final product cost reduction. The sensor and actuator department belong to the Product business unit in EADS ASTRIUM, and since 30 years has been involved in development and the production of space inertial sensors. The design and test of inertial sensors is part of our day-to-day work. Many CNES and ESA satellites are flying with inertial unit designed in our department. Our last gyroscope development, based on Fiber Optical Gyro has been selected for major projects such as Pleiades (CNES), CSO (DGA), Sentinel (ESA)

### **CONSTELEX TECHNOLOGY ENABLERS LLC**

Constelex Technology Enablers is part of Gooch & Housego (G&H), a global business specializing in photonic components and systems. With a mission to become a world-leading design-house and solution provider for photonic systems with applications in Aerospace and Defence, Constelex has built up a strong reputation for technical excellence since it was founded in 2009. As a result, Constelex has enjoyed considerable success in securing product development contracts by the European Space Agency (ESA) to develop complex photonic systems for predominantly space and satellite communications. Constelex is part of the Systems Technology Group (STG) of G&H, a separate business unit with a remit to design, develop and prototype systems-level products. The STG involves a multi-disciplinary team with expertise in mechanical, electronic and software design and modelling that enables integration of these technologies with G&H's expertise in photonics.

## **MODULIGHT OY**

Modulight is an ISO 9001, ISO 14001, and ISO 13485 certified laser manufacturing company focusing on design, development and manufacturing of laser diodes and laser systems. Modulight designs, manufactures and markets laser products for communication, industrial, medical, and security/defense applications. The Company has in-house production facilities and headquarters (3000sqm) are located in Tampere, Finland and a fully-owned subsidiary Modulight USA, Inc. based in San Jose CA. Currently, Modulight has 20 employees. Modulight's manufacturing capabilities include full-scale industrial optoelectronics chip fab, fiber coupling process for high-power laser diodes. The company also provides turnkey laser systems and design and implementation of sub-system level laser integration including cooling, drivers and mechanical design. Modulight is actively complementing its laser diode manufacturing capabilities with a sustained application development effort. The products are offered from bare and mounted laser chips to packaged and fiber coupled lasers and complete turnkey laser systems. Modulight invests continuously to R&D activities and has participated to several EU and ESA funded technology development projects over the past years. The Company has also qualified lasers to ESA SMOS mission that was launched in November 2009. Modulight is the only chip level laser manufacturer in Europe offering high-power lasers at eye-safe wavelengths and leading component provider globally. Modulight's eye-safe pulsed lasers are built into more than 30 000 handheld military grade laser range finders.

## **IHP GMBH - INNOVATIONS FOR HIGH PERFORMANCE MICROELECTRONICS/LEIBNIZINSTITUT FUER INNOVATIVE MIKROELEKTRONIK**

Leibniz Institute for Innovative Microelectronics (IHP) is a public research institute located in Frankfurt (Oder) in Germany. IHP has a team of 240 R&D professionals with core competence in micro-electronics process technology, circuit design, and systems. As a public research institute and member of the Gottfried Wilhelm Leibniz Society, the core funding comes from the German Federal Government and the State Government of Brandenburg. The institute aims at establishing the region of East-Brandenburg as a high-tech region and to create jobs through innovation. Therefore IHP uses its R&D to enhance the competitiveness of German and European businesses and works closely with the Federal and State Governments to attract international companies to the region. IHP owns a 1000 square meters, class-1 clean room and pilot line with production-grade tool-set for 0.25 and 0.13  $\mu\text{m}$  technologies and offers its CMOS and SiGe BiCMOS technologies for Multi Project Wafer service and low-volume prototyping to external customers. IHP is focussed on developing innovative solutions for wired and wireless communications and microelectronics. Its expertise ranges from system design, digital, analog and RF IC design to the development of 130nm to 250 nm SiGe BiCMOS and RFCMOS technologies and Si photonics. IHP has long years of experience in wireless systems research especially in RF circuit design, baseband/MAC processor design, and semiconductor processing technology. IHP has been involved in MUX/DEMUX design for 100Gbps long-range optical applications, 10Gbps and 40Gbps analog front ends for optical links (VCSEL/Modulator

driver, TIA), analog-to digital converters up to 15Gsample/s and Digital-to-Analog converters up to 30GSample/s. IHP is or has been a partner in EU projects: PULSERS I and II, GALAXY, MIMAX, OMEGA, BOOM, HELIOS and others. It is acting as a coordinator in the GALAXY project.

### **UNIVERSITAT POLITECNICA DE VALENCIA - Nanophotonics Technology Centre**

The Universidad Politécnica de Valencia (UPVLC, [www.upv.es](http://www.upv.es)), founded in 1973, is a public institution devoted to higher education, and to research and development (R&D) activities. The main scientific and technological domains are information and communication technologies, electric, electronic, mechanical and chemical engineering, civil engineering, architecture, food and agricultural technologies, business sciences and fine arts. The UPVLC runs its R&D policy towards two aims: On one side, as a young university, the UPVLC strengthens its basic knowledge base by moving its research groups towards the major European research priorities, especially within the European R&D Programmes. On the other hand, it has a special vocation to perform R&D of interest to the local industrial environment, fostering technological and R&D partnership with companies in the region. The Nanophotonics Technology Centre (NTC, [www.ntc.upv.es](http://www.ntc.upv.es)) possesses design capabilities as well as fabrication and characterisation facilities for integrated photonics. Concerning design capabilities, the NTC owns several licenses of simulation tools such as RSoft packages for FDTD and FEM calculations. NTC's engineers also have extensive experience handling these tools, as it can be shown in several publications. Concerning fabrication and characterisation, NTC facilities include a 500m<sup>2</sup> cleanroom for 6" Si wafer processing. They also have a fully-equipped packaging laboratory with the most advanced technologies for pigtailling, wire bonding and packaging. For optical characterization, they have advanced 5-axis stations for coupling light into photonic integrated circuits. A wide set of laser sources and detectors are available covering the wavelength range between 1260 and 1635 nm.

### **POLITECNICO DI BARI**

Politecnico di Bari (Poliba), Italy, founded in 1990, is a public institution devoted to higher education, research and development (R&D) activities. The main scientific and technological domains are information and communications technologies, electrical, electronic, mechanical, environmental engineering, civil engineering, and architecture. Last year, Poliba academic community included about 12,000 pre-graduate students, 200 doctoral students, 300 teaching staff members, and 300 administrative and support staff members. Politecnico di Bari is considered one of the best technical University in Italy, including research groups in many National and International research projects. One of its largest department is Dipartimento di Elettrotecnica ed Elettronica (DEE), mainly devoted to education and research in electrical and electronic engineering. One of DEE main research groups is Photonics Research Group, formed and led by Prof. Vittorio M.N. Passaro. The group is internationally known in modeling and design of photonic devices and systems for telecommunications, signal processing and

sensing in advanced optical technologies (URL: <http://dee.poliba.it/photonicsgroup>), especially silicon and other group IV materials, as well as in modelling of non linear effects in silicon-based photonic devices. The research team has more than 20 years of experience in the field.