



**About:** Project ROBIN (Multi-gigabit, Energy-efficient, Ruggedized Lightwave eNginEs for advanced on-board digital processors) is a 3-year collaborative project that is partly funded by the European Union, 7th Framework Programme. It runs from 1st November 2013 to 31 October 2016.

**Driver:** New multi-beam Tera-scale capacity satellites will require a disruptive approach to address digital on-board processors that rely on electronics which consume space, power and cost and reach their capacity saturation. The disruptive solution must combine scalability, technical feasibility, power-efficiency and cost-effectiveness.

**Aim:** ROBIN aims to provide this solution realizing multi-gigabit optical interconnectivity with a unique combination of low-power and high-bandwidth multimode (MM) GaAs VCSEL/PDs, low power, radiation-hardened BiCMOS drivers and radiation-hardened multi-core fibers. ROBIN will integrate these technologies on a space-grade photonic integration capable to provide ruggedized transceiver modules with a record-high 150Gb/s throughput and record-low <10 mW/ Gb/s energy consumption.

**Objectives:** ROBIN will fabricate >15GHz 850nm VCSELs operating at -40 degC to +100 degC with low energy consumption and >20 GHz multi-mode photodiodes with multi-core fibre compatibility. ROBIN will couple these lasers and photodetectors to multi-core/multi-mode radiation-hard fibres enabling single-feedthrough robust and hermetic module packaging. Point to multi-point connectivity will be achieved through monolithic fan-outs, avoiding the use of expensive connectors. In addition, ROBIN will systematically work towards higher speeds and throughputs and fabricate >20 GHz VCSELs and >30 GHz PDs. Finally, within the project state-of-the-art 25 Gb/s multi-channel driver and TIA ICs will be developed, achieving a 5-fold decrease in power consumption compared to products currently on the market.