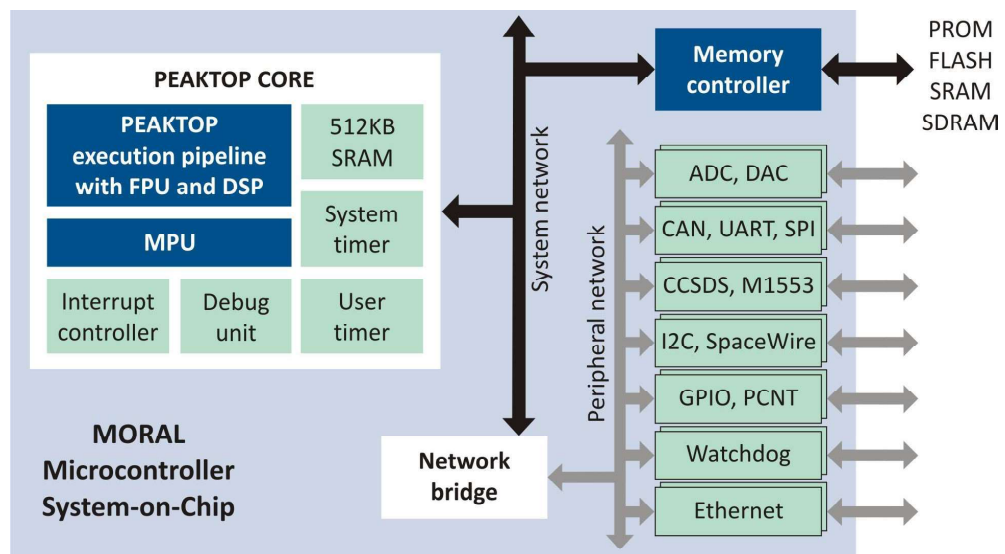


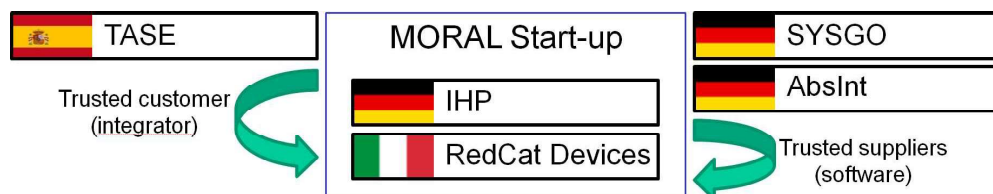


MORAL Project Team at IHP © IHP 2020

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| 1. | Project: MORAL |
| 2. | <p>The MORAL project goal is to develop a completely European, ITAR (International Traffic in Arms Regulations) free microcontroller for space applications. The processor core of the microcontroller is based on a novel IHP Peaktop architecture.</p> <p>Another goal is to establish a new European company held by the core consortium partners.</p> <p>The project started on 1st of January 2020 and has a duration of 40 months. It is funded by the European Commission with 3 Mio. Euro.</p> |
| 3. | Objective |
| | <ol style="list-style-type: none"> 1. Develop a completely European, International Traffic in Arms Regulations (ITAR) free, high performance, 32-bit microcontroller for space applications, focused on small satellites, flight control and payload computers. The processor core is based on a novel IHP Peaktop architecture, including novel, European instruction set which is orthogonal, regular and circular. The microcontroller System-on-Chip (SoC) is scalable, highly customizable and flexible, and can be easily tailored for a wide range of applications. Furthermore, it is designed and verified with modern techniques based on SystemVerilog. Besides the processor, the required ITAR-free middleware, Real-Time Separation Kernel (RTSK) and software toolchain will also be available. Achievement of Technology Readiness Level (TRL) 6 is planned. |



2. As a result of the microcontroller development, establish a new European company held by the two core partners involved in this project, which will target the European market, but also Russia, India, China and Latin America. This new company, as the last stage of the evolution of the project, will sell the microcontroller chip and its accompanying software, and give support to the market. It will be focused to produce a microcontroller that can bootstrap the European market for space applications. In particular, we will target the fast growing small satellite market.



4. IHP's Contribution

IHP is the project coordinator, provides initial microcontroller, and adapts it to the targeted platform.

The IHP as a research centre covers all aspects of the design, integration, fabrication and test of complex systems and SoCs.

Additionally, IHP is the new company co-founder.

5. Funding

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| | This project has received funding with 3 Mio. Euro from the European Union's Framework Programme Horizon 2020 for research, technological development and demonstration under grant agreement N° 870365. |
| 6. | Project Partners |
| | <ol style="list-style-type: none"> IHP GmbH - Innovations for High Performance Microelectronics, Germany Coordinator, provides initial microcontroller, adapts it to the targeted platform, system integration, fabrication and test, new company co-founder AbsInt Angewandte Informatik GmbH, Germany Development of highly-optimized and verified C compiler RedCat Devices Srl., Italy Develops rad-hard cell library, memory blocks and analogue components (ADC/DAC), new company co-founder SYSGO AG, Germany Development of real-time separation kernel Thales Alenia Space España S.A., Spain Application and system and specification, demonstration phase - possibly providing the application/demo system infrastructure, and as end-user, exploitation |
| 7. | External Links |
| | <ul style="list-style-type: none"> - www.ihp-microelectronics.com - www.absint.com - www.redcatdevices.eu - www.sysgo.com - www.thalesaleniaspace.com - europa.eu/index_en.htm |