



## **Activity title: ARM Based Microcontroller Development (TDE)**

### Abstract

Spacecraft and satellites are expanding in complexity to provide commercial and military operators with robust new communication and data capabilities. The goal is to achieve better reliability, and faster speeds, while reducing cost, size, and weight.

In this environment, lowering system development costs while enabling greater capabilities and space system integration are ever more critical. The introduction of ARM processing cores for space applications opens new perspectives by relying on the existing proven ecosystems from the consumer and industrial markets. It offers developers the simplicity of a single-core processor with the performance of an advanced architecture without having to implement heavy mitigation techniques, as is required for non-space components.

To leverage the benefits of the ARM® processor architecture and address the needs and challenges of new aerospace control and processing applications, in terms of integration levels, development and verification times, cost and performance, the ESA activity “ARM Based MCU” was initiated. It was co-funded by the ESA EO and TDE programs, and implemented by a consortium led by Microchip, with contributions from OHB, RUAG, SITAEL, Alter Technology and N7 Space. The objective and outcome of this project was the development of the Microchip SAMRH707F18, a space grade, radiation-hardened, mixed-signal microcontroller (MCU) based on the ARM® Cortex®-M7 processor architecture. It integrates a powerful ARM® Cortex®-M7 processor core, various on-chip memory blocks and external memory controllers with EDAC, a wide range of peripherals suitable for space applications, such as SpaceWire, MIL-STD-1553, and CAN-FD, along with analog functions such as on-chip ADC/DAC and PWM.

Offering more than 100DMIPS at 50MHz in small-footprint ceramic packages, the SAMRH707F18 is designed for high-level radiation performance, extreme temperatures, and high reliability in aerospace applications.

The device has already been released to the European and worldwide aerospace market with very positive reception and customer response and can already be considered as another success story of the TDE/EOP programs.