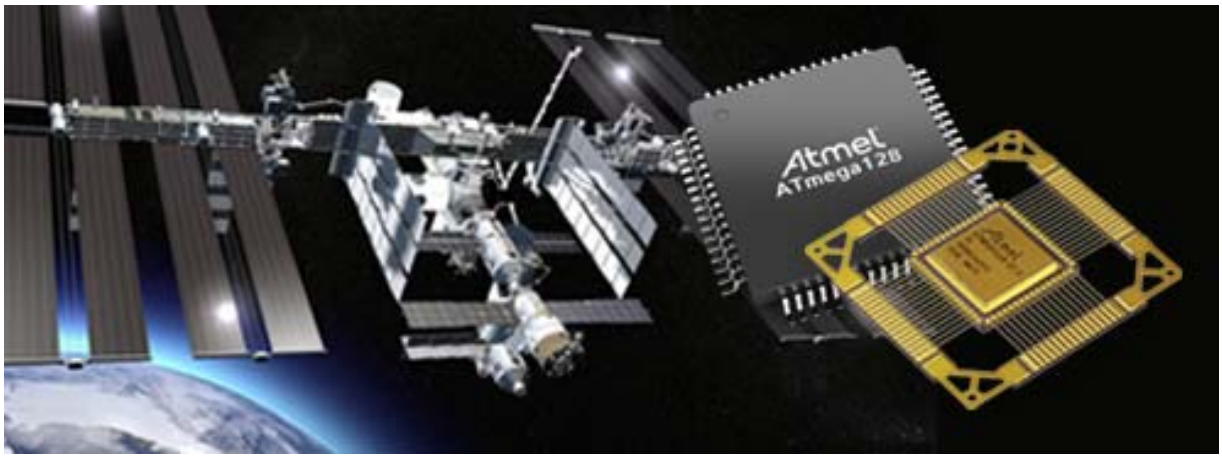


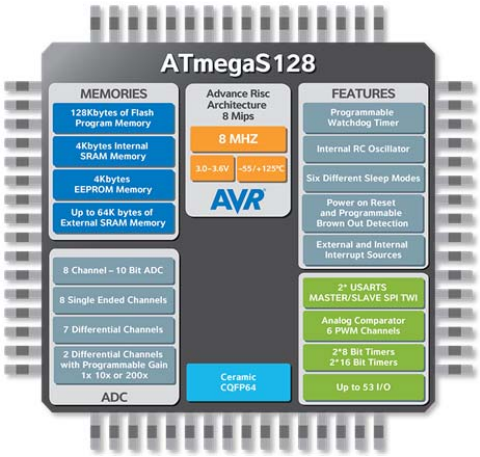
From the last 20 years, **Atmel** is established as main space microprocessor supplier out of US. With worldwide sales of over 5000 flight models based on SPARC architecture, Atmel's processor experience and knowledge has an unrivalled flight heritage.

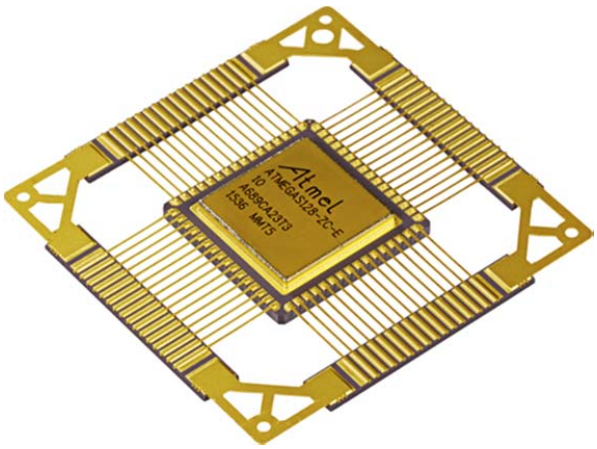
In order to answer to market trend and demand to benefits from proven other domains devices, reducing costs but also to provide the right level of performances and quality required for Space, **Atmel proposes Rad Tolerant microcontrollers**.

By using select devices from Atmel's industrial or automotive portfolio, **Atmel Aerospace** reuses the full metal mask set and manages epitaxial improvements to be latch up immune under radiation. This methodology doesn't change the device functionality and the new Rad Tolerant device is fully compatible with the full ecosystem available for commercial product: development tools, evaluation boards …

Associated to radiations performances improvement, **Atmel** applies to **Rad Tolerant** devices the same space quality flow than all usual space parts: full wafer lot traceability, space screening and a space qualification flow as done for QMLQ & QMLV grade components. This qualification is done for ceramic hermetic package version with all required steps: visual inspection, PIND test, Burn-in and Group A to D tests.

For high volumes and low cost driven program, a plastic version can be also proposed with product spec, full temperature range tests and traceability.





The first **Atmel Rad Tolerant product** available is the **ATmegaS128**, derivative from ATmega128 commercial device: AVR 8 bits, 10MIPS, 3.3V, ADC, UART, PWM, TWI & SPI at 3.3V in QFP64 package.

ATmegaS128 is today selected in many kind of missions, some FMs already delivered and is planned for flight in 2017 after product introduction on the market end 2015.

ATmegaS128 achieved radiations performances results are:

- No Latch-up at 62.5 MeV/mg/cm2 @ 125°C (3.6V Vcc max)
- Full SEU characterization done @125°C for all functional blocks from 2 to 62.5MeV.cm²/mg. Saturation reached at 30 MeV.cm²/mg. Estimated SER : 1 event every 1000 days (LEO*)
- TID = 30 Krad

AMR and AVR new Rad Tolerant microcontrollers coming in 2017:

- AVR **ATmegaS64M1**: 10 MIPS with CAN & Motor control, QFP32
- ARM **Cortex M3, SAM3XE RT** : 100 MIPS,CAN, Ethernet & dual bank flash, QFP144
- ARM **Cortex M7, SAMV71 RT** : 600 MIPS, CAN, Ethernet, FPU & MPU, QFP144

Atmel has been acquired by **Microchip** since April 2016 and is Aerospace activity is now named **Microchip Aerospace & Defense**. It will bring to Aerospace much more rad tolerant devices opportunities around microcontroller: PHYs, NVM, RS485, HV devices and so on.