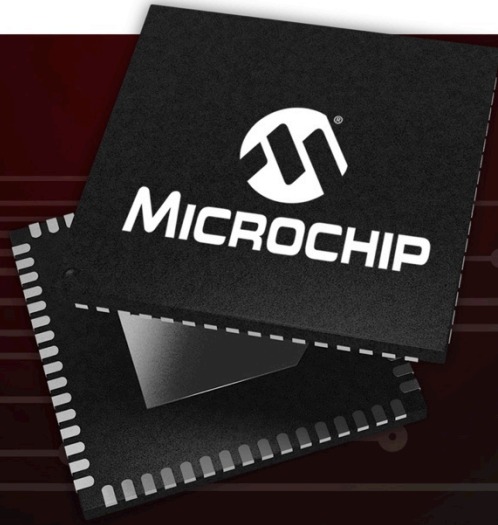
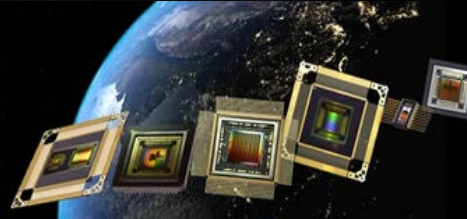




# MICROCHIP




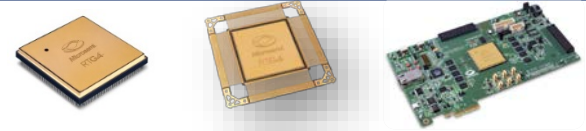




A Leading Provider of Smart, Connected and Secure Embedded Control Solutions



***Space Products Overview  
ADCSS, ESTEC  
November 2019***

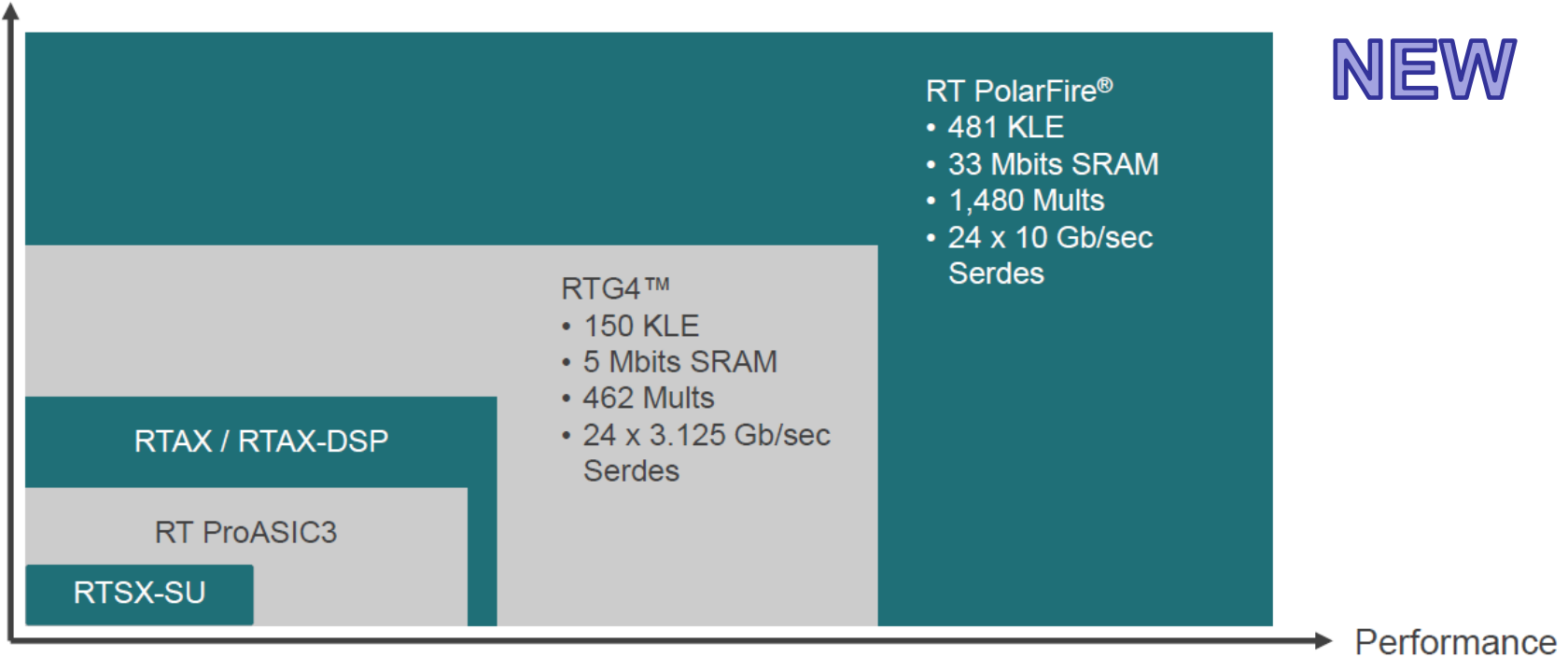


# Delivering A Comprehensive Space Portfolio

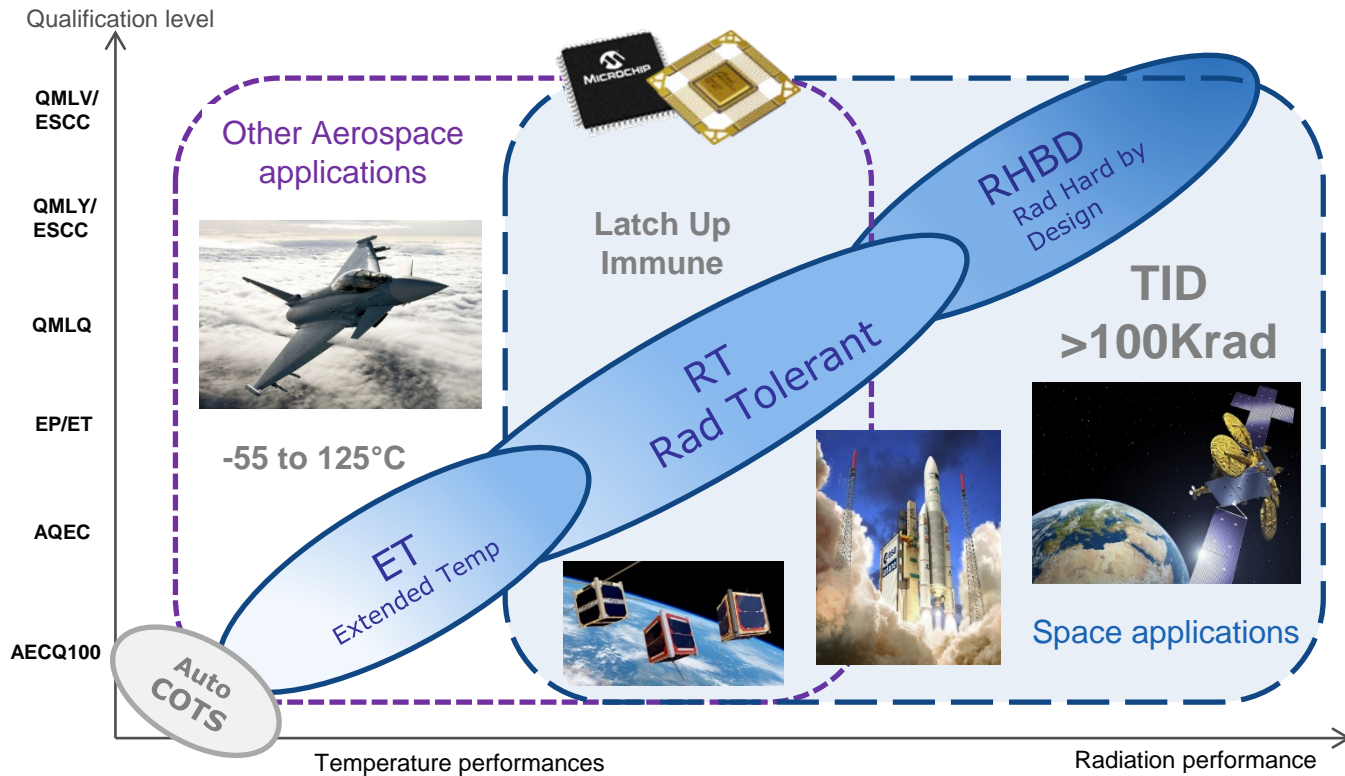
<p><b>Rad-Tolerant &amp; RHBD MCU/MPU, Com &amp; Mem</b></p>	<p>COTS to Rad Tolerant, Rad Hard by design, QML/ESCC 8-bit &amp; 32-bit AVR, ARM, SPARCV8 MCU and MPU, SpaceWire Router, Memories</p>	
<p><b>Radiation-Tolerant FPGAs</b></p>	<p>High Performance, High Density, Low Power TID up to 300 Krad, SEL Immune RTG4 FPGAs up to 300 MHz and 150K LE RTProASIC3, RTAX and RTSX-SU QML Qualified</p>	
<p><b>Rad-Hard Mixed Signal Integrated Circuits</b></p>	<p>Telemetry and Motor Control Space System Managers Extensive Custom IC Capability Power supply protection</p>	
<p><b>Space Qualified Oscillators</b></p>	<p>Ovenized Quartz Oscillators Hybrid Voltage Controlled and Temperature Compensated Crystal Oscillators Cesium Clocks</p>	
<p><b>Rad-Hard Power Solutions</b></p>	<p>Rad-hard JANS Diodes, Bi-Polar Small Signal Transistors Rad-hard Isolated DC-DC Converter Modules Custom Power Supplies 2 W to &gt; 5 KW Point of Load Hybrid Solutions Electromechanical Relays</p>	
<p><b>Space Screening for RF Products</b></p>	<p>Surface Acoustic Wave (SAW ) Filters Packaged and Chip Si Diodes Si Bipolar Transistors&amp; GaAs pHEMT MMICs</p>	

# Radiation Hardened FPGAs

Logic Density



# COTS Scalable Solutions for Aerospace



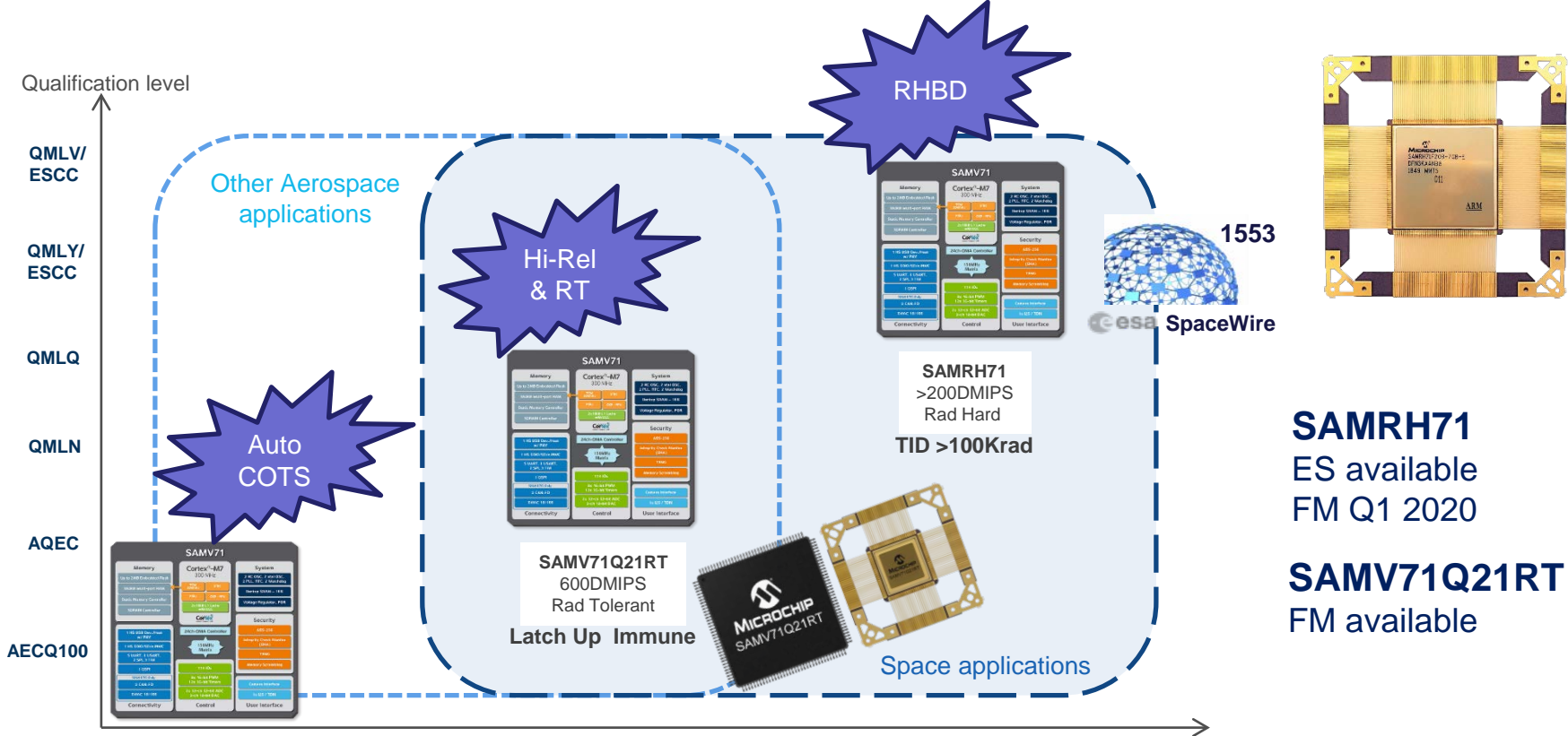
## ET/RT

- 8-bit AVR® MCU
- 32-bit ARM MCU/MPU
- Non-Volatile Memories
- Other companions TSS

## RHBD

- ARM MCU/MPU
- SPARC V8 MPU
- SRAM 1 to 16Mb
- GNSS & Spacewire
- Mixed-Signal ASIC

# SAMV71 for Space Unique Scalable Solution

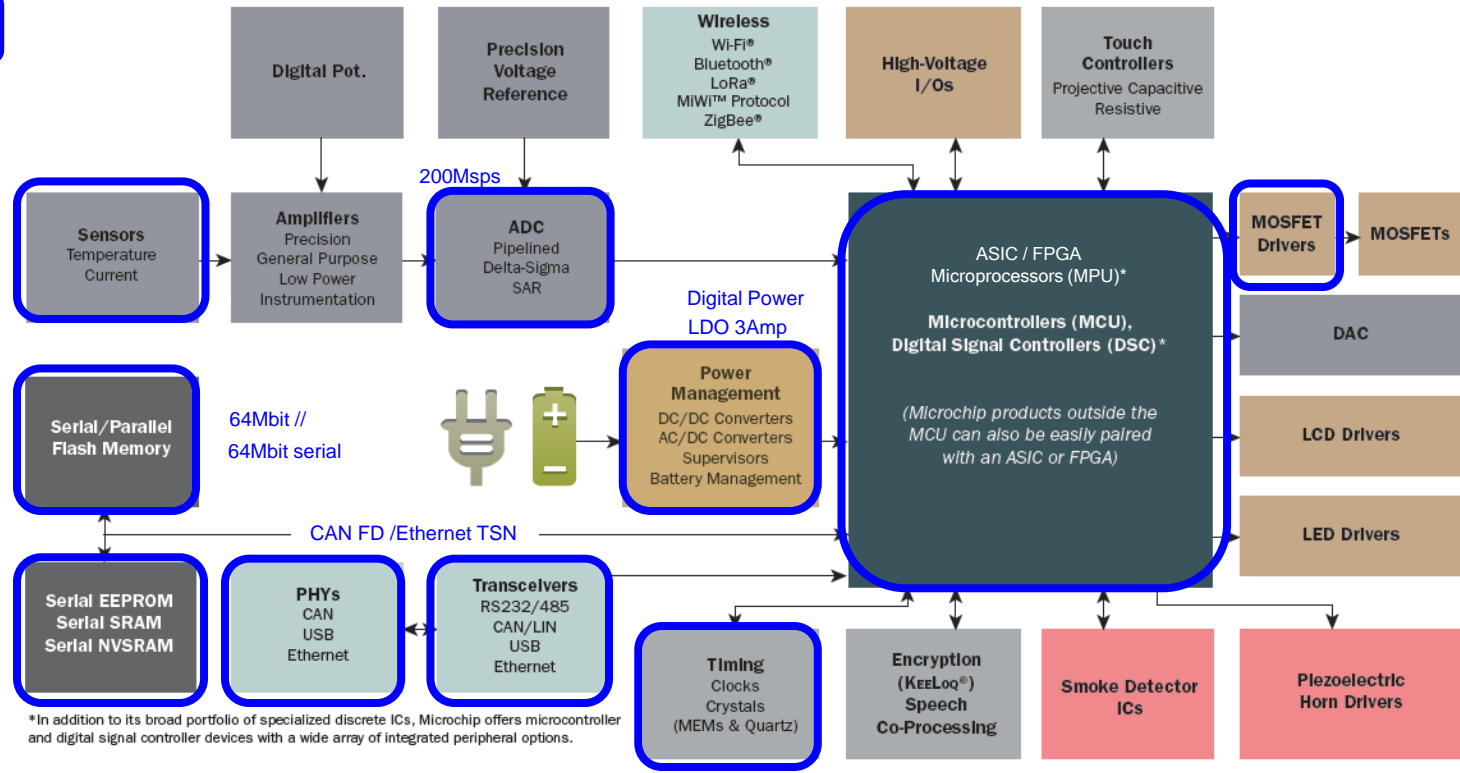


**SAMRH71**  
 ES available  
 FM Q1 2020

**SAMV71Q21RT**  
 FM available

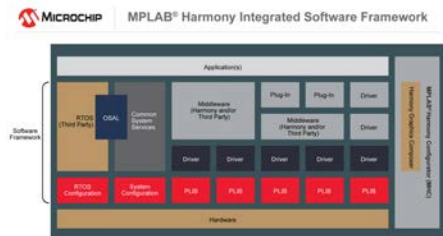
# Companion RT Products for Space

COTS RT



\*In addition to its broad portfolio of specialized discrete ICs, Microchip offers microcontroller and digital signal controller devices with a wide array of integrated peripheral options.

- **Enabling complete solutions with :**
  - Companions : transceivers, switches, interfaces, ...
  - Applications notes, system and hardware design examples
  - Software libraries as example and tools for targeted application



- **Ethernet safety – AVB/TSN**
- **CAN/CAN FD networks**
- **Motor control solutions**
- **Digital power migration**
- **FPGA Reprogramming & Powering**
- **Control with precision timing**
- **Space interfaces, SpaceWire**
- **ADCs & IO extension devices**



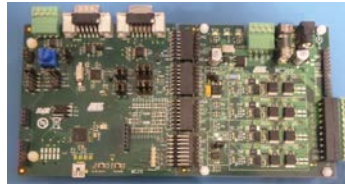


# Demonstrating TSS CAN, Spacewire & Ethernet Connectivity

**ATmegaS64M1**



**ATmegaS64M1**



**SAMV71Q21RT**



CAN Network



**SAMRH71F20**

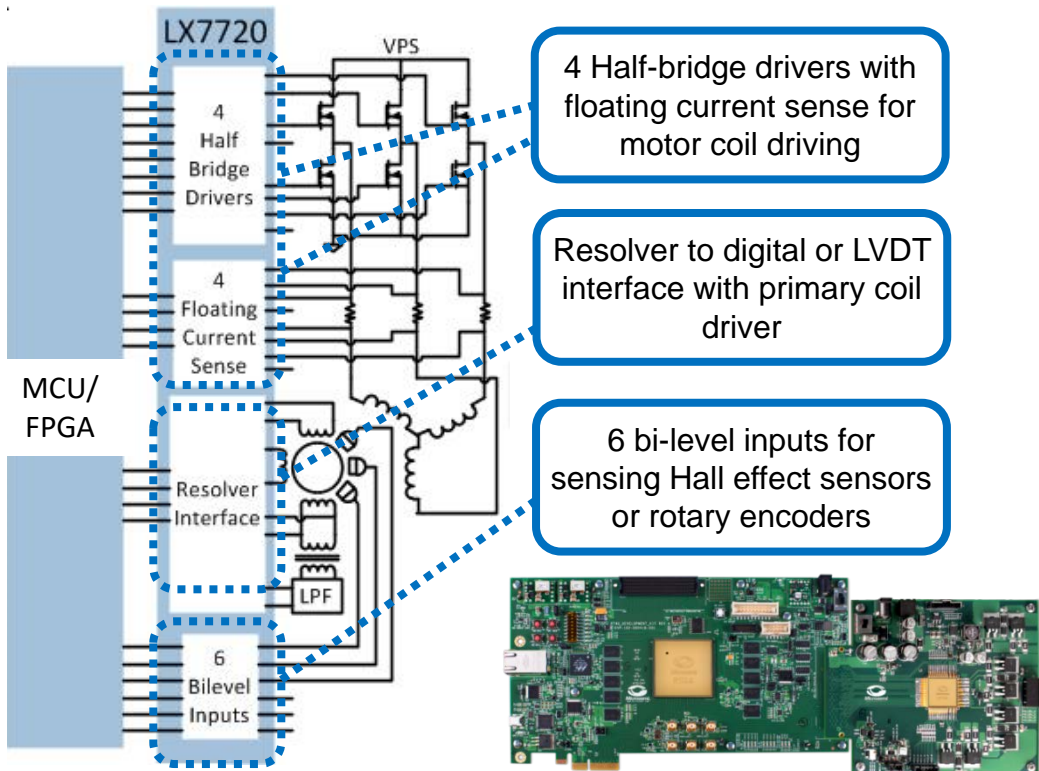
SpaceWire

Ethernet





## LX7720 RH solution



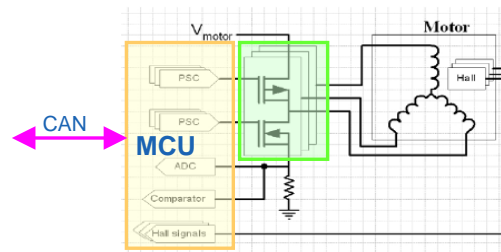
## Processing / Control Units

Products	Rad	Type	Available
RT MCU	RT	ATMEGAS64M1 / SAMV71RT	FM
RT FPGA	RH	RTAX / RT4G	FM
SAMRH71	RH	Arm SoC MPU	ES

## Companions

Products	Rad	Type	Available
LX7720	RH	Power Driver w Rotation & Position Sensing	FM

## ATmegaS64M1 RT solution





**MICROCHIP**

**Thank You**