ATMEL inputs for the definition of next generation space microprocessors

Nicolas RENAUD

ATMEL Nantes

+ 33 2 40 18 17 19

nicolas.renaud@nto.atmel.com

Overview

- Sparc standalone processor
- Hard IP on rad-hard ASIC family

Evolution of the Sparc family

- LEON3-FT
  - New pipeline
  - Caches size increase
  - MMU
  - Multi-processing
  - SEU protection improved
  - Performance
    - ~ 200 MHz on CMOS 0.13 µm
    - > 200 MIPs / W
- GRFPU
  - 4 times bigger than Meiko (100 Kgates versus 25 Kgates)
  - ~ 200 MFLOPs on CMOS 0.13 µm
  - Comparison on CMOS 0.18 µm : x 4 better performance than Meiko

Interfaces / embedded memories / reprog

- Interfaces
  - PCI
  - Spacewire
  - CAN
  - 1553, Flexray, USB…?
- Synergy with other ATMEL rad-hard products
  - Embedded Memories
    - EEPROM
    - SRAM
  - Reconfigurable block

New standalone processor?

- Decision up to the agency
  - User requirements
  - Niche market
- Will require a technological improvement
  - CMOS 130 nm or CMOS 90 nm
- Radiation Hardening
  - Technological and design aspects

Hard IP opportunities

- Soft IPs very useful for “simple” functions
  - Communication protocols, EDAC…
  - Can be customized
  - Reuse
  - Differentiation
  - But, often, doesn’t match the user needs

- Hard blocks more suited for complex functions
  - Processor, signal processing
  - IP validated once and for all, specified and guaranteed
  - Performances and radiation capability guaranteed
  - Design simplified for customers, which can focus on their applications
  - Shorter and controlled design cycle time
  - Reduced risk of redesign

Examples of potential hard IPs

- LEON2-FT
  - On ATC18RHA
- LEON3-FT (and if needed GRFPU)
  - On CMOS 130 or 90 nm rad hard ASIC
- Internal ATMEL opportunities
  - AVR 32 bits

The end

Thank you for your attention !