

SpaceWire Remote Terminal Controller

Presented by

Jørgen Ilstad

On board Payload Data Processing Section,
ESTEC

Co Authors

Wahida Gasti, ESA ESTEC

Sandi Habinc, Gaisler Research

Peter Sinander, SAAB Space

Overview

- Introduction
- ESA Strategy On-board ASSP
- SpW RTC Description
- SpW RTC and On-board Computing Architecture
- Payload Applications
- Platform Applications
- Conclusion

Introduction

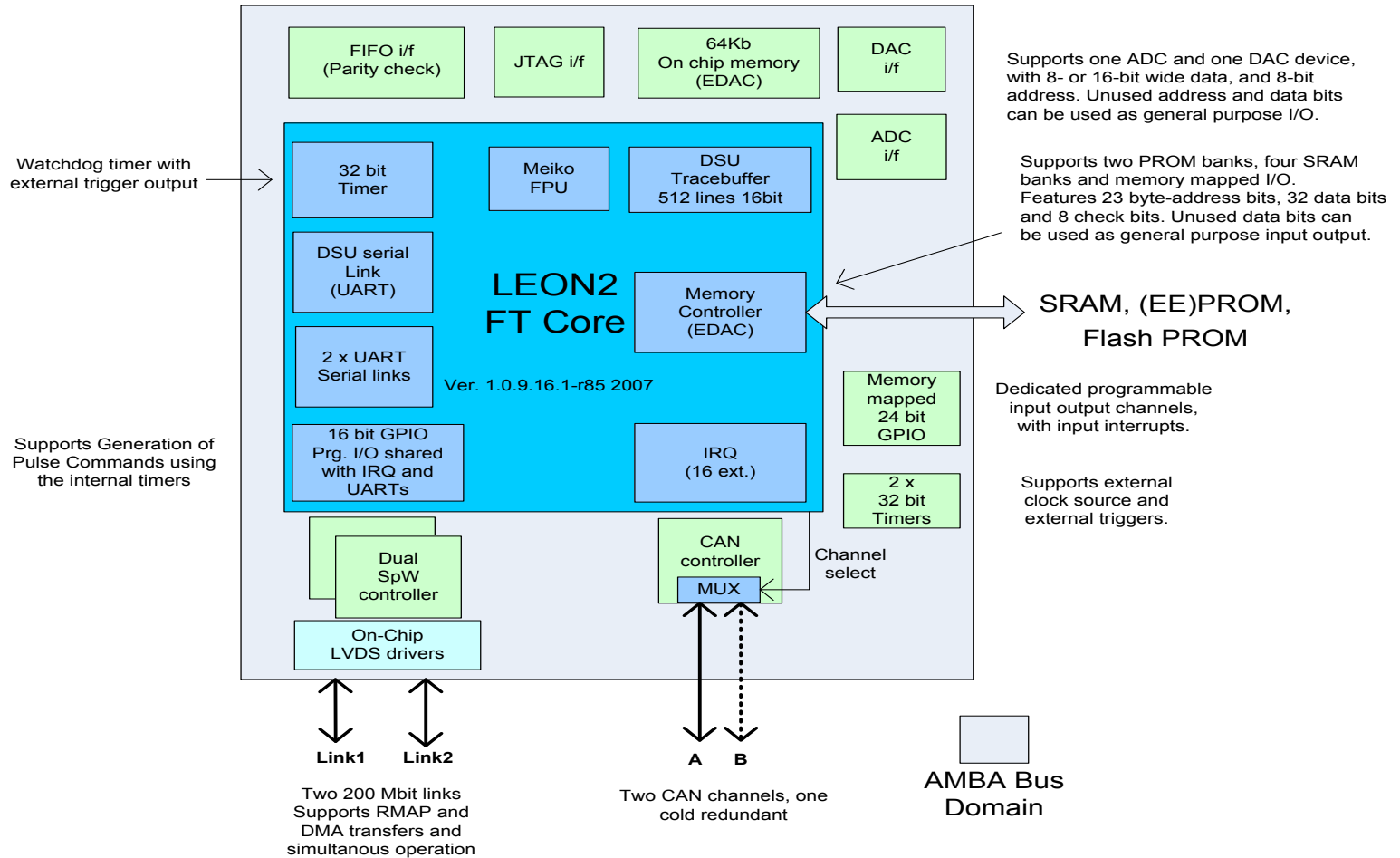
- Satellite payloads are becoming increasingly more complex
 - **Increased requirements** of on-board processing capabilities
 - **Onboard intelligence** or even some form of **autonomy** for advanced satellites
- **ESA anticipated** this trend by developing a concept to facilitate implementation of such requirements
 - **Payload data systems** based on integration of building blocks allowing **equipment and module re-use.**

ESA strategy on payload developments

- Development of Application Specific Standard Products (**ASSP**)
 - Devices capable of answering most onboard computing needs for the coming decade.
- Adopt upcoming **ASIC** developments to use similar device architectures based on **pre-validated ESA IP cores** for the purpose of **reducing development time and recurring costs**.
- **Ensure SpW nodes** developed by ESA (i.e. component, module, unit...etc) to be **easily integrated** in **ESA On-Board Distributed Computing and Control System**.

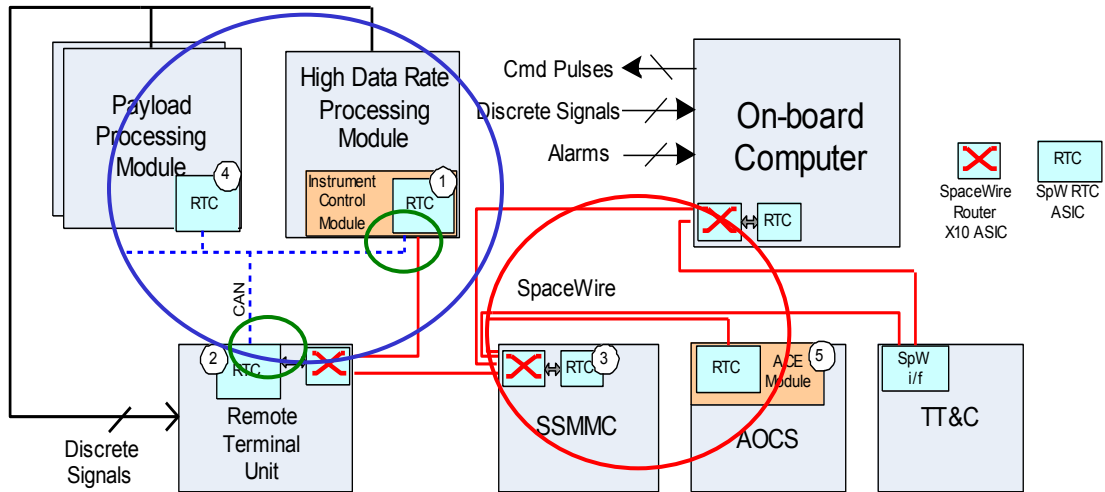
SpW RTC Description

Supports Dual FIFO configuration
(DMA support)



SpW RTC as part of the On-board computing architecture

Payload Applications



Versatile device offering:

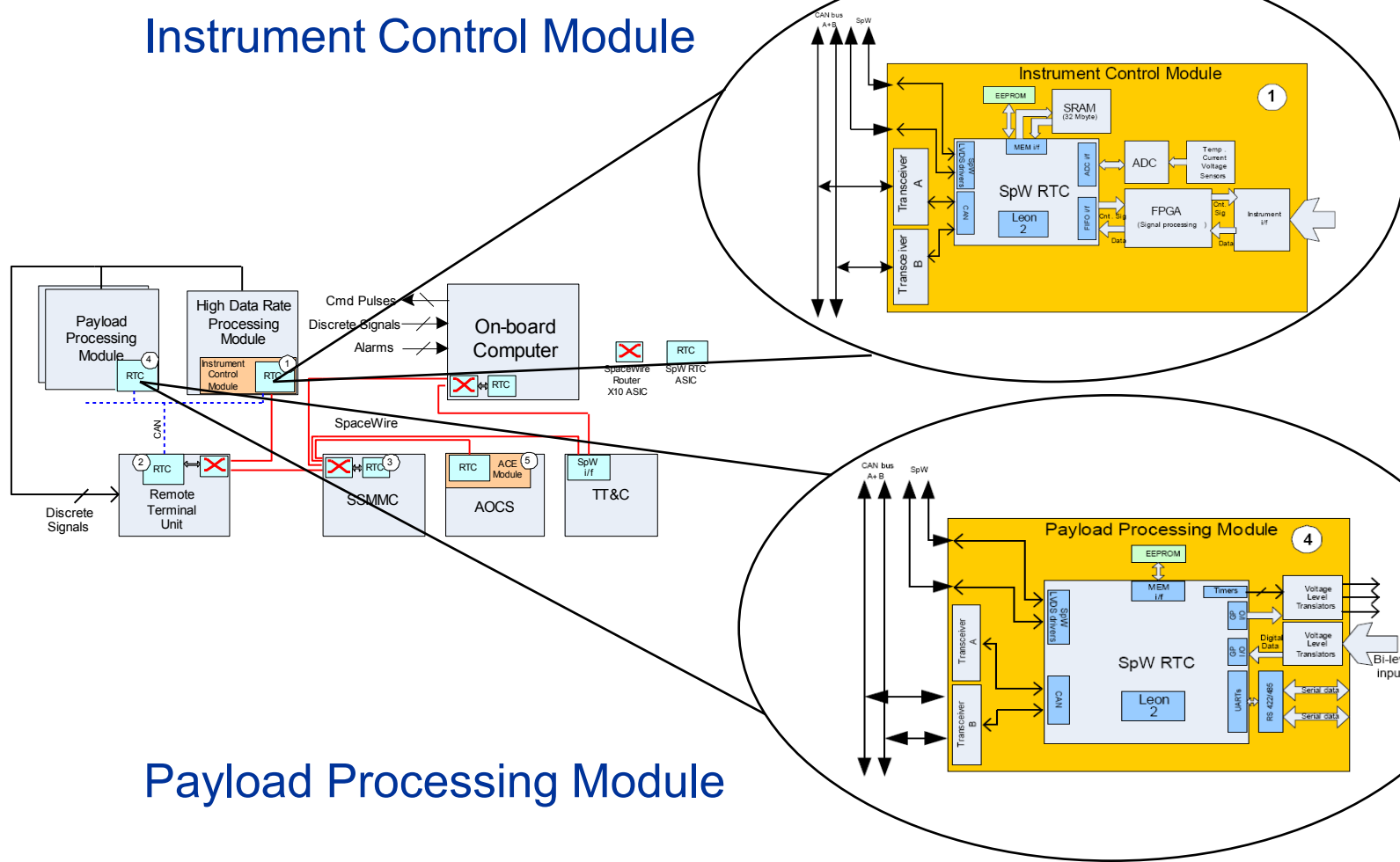
- Computational power
- SpaceWire interfaces
- CAN interface
- ADC/DAC interfaces
- Memory with EDAC
- FIFO with parity check
- General Purpose I/O
- UARTs
- 32 bit timers

CAN and SpW network bridge

Platform Applications

Payload Applications

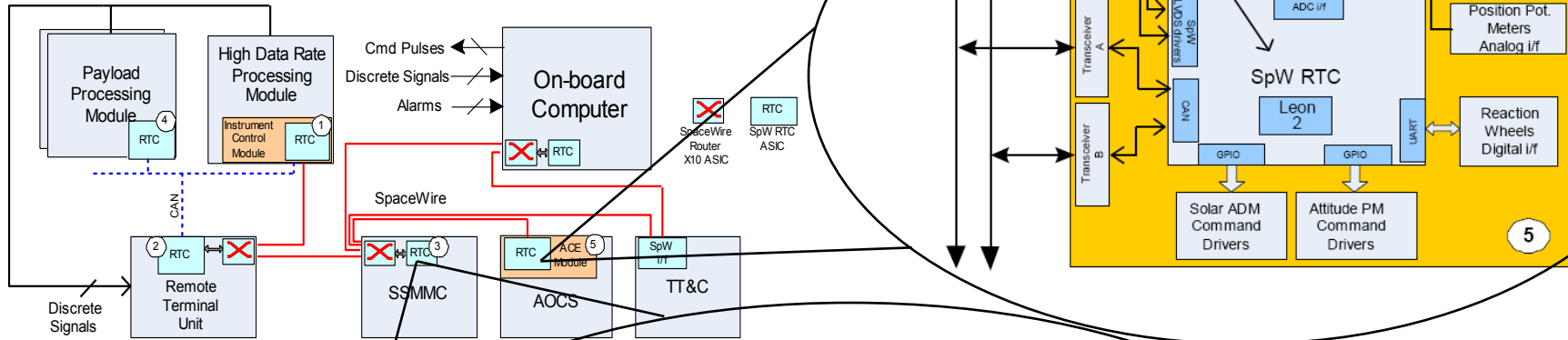
Instrument Control Module



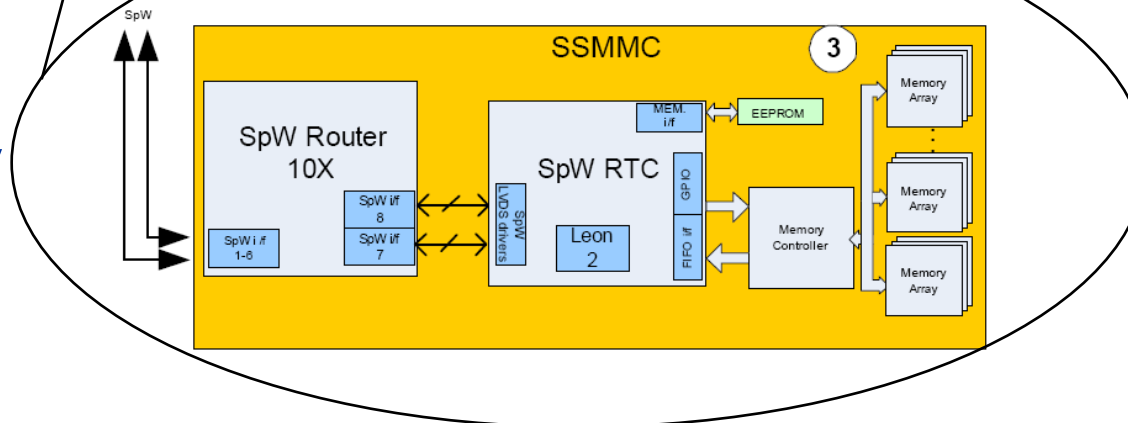
Payload Processing Module

Platform applications

Attitude Control Electronics Module



Solid State Mass Memory Controller



Conclusion

- The SpW-RTC
 - Is a result of **ESA strategy** towards **modular architectures** based on **SpaceWire**.
 - Answers to **ASSP** development strategy to **reduce development time and recurring costs**.
 - Architecture offers both **substantial processing capability** as well as **SpW, CAN i/f, memory and FIFO i/f, GPIO** etc. which makes it suitable for both **payload** and **platform** applications.
 - Will be **supported** by industry **s/w** and **h/w development tools** available early 2008.
- **Alpha customers** is currently **validating** the **FPGA implementation** of the **SpW RTC** to assess the device to be used as **common backend** of the **Bepi-Colombo instruments**.
- **ASIC** manufactured in **MCGA 349 package** in Atmel **ATC18RHA** technology
- **Flight Prototypes** available **early 2008**.

Thank you for your attention

Preliminary *datasheet* and *user manual* is obtainable from
spacewire.components@esa.int