

# SpaceWire networking Protocol

## Working Group Meeting 5

### Introduction and Agenda

Ph. Armbruster TEC-ED

## Introduction and objectives and SpW WG

- Mandate of the WG is manifold:
  - To share information related to the implementation of on-board networks based on the SpaceWire standard
  - To review and discuss services supported by networks on-board spacecraft
  - To define or register (via PID allocations) a set of Networking Protocols (e.g RMAP) for SpaceWire links, nodes and routers (SpW-SnP).
  - Cooperation is framed if required by Inter-Agencies agreements – (c.f. BepiColombo, JWST), in the spirit of the CCSDS charter.
  - Information is exchanged openly in a collaborative spirit in full respect of intellectual property rights (responsibility of each participant).
- Working Group composition – Open to Industry - Agency members shall act as focal points for national industrial and intra-agencies activities.

## Introduction and objectives

**First** SpaceWire Working Group Meeting, 15<sup>th</sup> and 16<sup>th</sup> (AM) of September 2004

**Second** SpaceWire Working Group Meeting, 10<sup>th</sup> PM, 11<sup>th</sup> , 12<sup>th</sup> (AM) of November 2004 ⇒ RMAP Draft B

**Third** SpaceWire Working Group Meeting, 15<sup>th</sup> , 16<sup>th</sup> , 17<sup>th</sup> (AM) of February 2005 ⇒ RMAP Draft C

**Fourth** SpaceWire Working Group Meeting, 19<sup>th</sup> (PM), 20<sup>th</sup> and 21<sup>st</sup> (AM) of July 2005 ⇒ RMAP Draft D

**Fifth** SpaceWire Working Group Meeting, 15<sup>th</sup> (PM), 16<sup>th</sup> and 17<sup>th</sup> of November 2005 ⇒ RMAP Draft D consolidation

**Scope of the 5<sup>th</sup> meeting:** SpaceWire networking protocols issues; SnP-Remote Memory Access Protocol (comments on RMAP Draft D), RMAP Conformance and Error Handling, links to CCSDS TCONS, SpW implementation issues, other protocols, Architectures, Applications and Perspectives

## 15PM Technical session on RMAP (Draft D) & Site tour

13:00 Introduction – Agenda WG Mtg, Y. Kasaba (ISAS) & Ph. Armbruster (ESA/ESTEC)

13:15 RMAP Status and evolution, S. Parkes (UoD)

- Evolutions RMAP Draft C → Draft D
- Demonstration RMAP as the SpW Router Configuration protocol

15:30 SpW Handbook - Do we need a handbook ? How should it be prepared ? , Ph. Armbruster (ESA/ESTEC)

16:00 Site Tour

- Operation Room (Hayabusa/Astro-EII/Geotail/Akebono)
- Test Facility (Astro-F/Solar-B/Sounding Rocket)

## 16AM Plenary Session, Mission req. and system view

10:00 "SpaceWire in future Spacecrafts", O. Notebaert, Astrium (F)

Scope:

- State of the art for SpaceWire usage on recent Spacecrafts (in e.g. Mars/Venus Express, RocSat/Theos, TerraSAR-X...)
- The need for HS datalinks from Platform / Payload data processing and SW standpoint, and applicability versus missions characteristics
- Added value provided by using high speed datalinks networks on-board spacecrafts (OBLAN) as an enabling technology (e.g. for SW distribution, for resource optimization)
- Overview of foreseen usage on future missions; a generic view with some practical examples such as Bepi Colombo, Gaia, Aurora missions or others.

11:00 Task synchronization over SpaceWire networks using RMAP, M. Nomachi  
University of Osaka

11:30 Other needs, Very high speed, Low speed links, PowerLinks, Ph. Armbruster  
ESA/ESTEC

## 16PM Plenary Session, Imp. Issues, equipment and tools

- 13:00 SpW in Data systems Equipment, S. Asserhall, Saab Ericsson (S)
- 13:30 SpW based On-board Computers, P. Rastetter, Astrium (D)
- 14:00 SpaceWire Codec status and validation, S. Parkes UoD (UK)
- 14:30 Validation of SpW links with the Conformance Tester, G. Kempf, Austrian Aerospace (A)
- 15:00 Proposed Changes to SpaceWire Physical Layer, S. Allen, NASA/GSFC
- 15:30 SpaceWire and CCSDS SOIS, S. Parkes, UoD (UK)
- 16:00 "New capabilities in 4Links' Gbit Ethernet based family of modular test and simulation equipment for SpaceWire", K. Matsui, Prominent Network (JPN), (presented on behalf of 4Links, UK)
- 16:30 "A software development methodology for distributed real-time systems that shares the simplicity and applicability of SpaceWire", K. Matsui, Prominent Network (JPN)

## **17AM            10:00-12:00 Inter-Agency meeting**

- SpW RMAP
- SpW Handbook
- SpW Connector(s), Alternate connector to 9-pin MDM ?
- Cooperation in common projects (Bepi Colombo, JWST)
- Conferences, publications
- SpW based devices, IP cores
- Next meeting (date, scope)
- AOB

# 17PM **Advanced Data Systems on Modern Spacecraft** **~ SpaceWire and beyond ~ Chair: T. Takahashi**

13:00 SpaceWire Initiative Present Status and Perspectives and ESA Activities :  
Ph. Armbruster (ESA/ESTEC)

13:30 SpaceWire Standard: SpW links, routers & networks, Tutorial S. Parkes, UoD (UK)

14:45 "SpaceWire in future Spacecrafts", O. Notebaert, Astrium (F)

15:15 Activities in NASA & USA, G. Rakow & S. Allen, NASA/GSFC

16:00 Break

16:15 Activities in JAXA & Japan,

- Roadmap for space applications T.Takahashi (ISAS/JAXA)
- Technologies for commercial systems M. Kobayashi (U. Tokyo)

17:00 Demonstrations and commercial products:

- Conformance Tester, Link Analyser, SpW Router demonstration UoD/Star Dundee

17:25 Concluding Remarks, T. Takahashi (ISAS/JAXA)