

SpaceWire networking Protocol

Working Group Meeting 5

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

Ph. Armbruster (ESTEC)

C&C busses and Point to Point Links

- < 1 Mbps
 - low speed links and C&C busses
 - ESA ML/DS (TTC B01, ECSS-E50-14)
 - ESA OBDH, C&C, RBI
 - Mil 1553B, C&C, (ECSS-E50-13 protocol ext.)
 - CAN, (ECSS-E50-09)
 - *Sensor bus*
 - *Optical & RF wireless sensor bus*
- 1-10 Mbps
 - digital links
 - “RS422”
 - *Optical & RF Wireless Lan*
- 2-200 Mbps
 - high speed point to point links
 - SpaceWire, ECSS-E50-12A, RMAP
 - *RF Wireless Lan*
- 200-4000 Mbps
 - very high speed point to point links
 - *SpaceFibre*
- 4-10 Gbps
 - ultra high speed point to point links

low speed links

Application

- Simple sensors with digital interface
- Miniaturized sensors
- Smart Sensors

Requirements

- Bi-directional link
- Data rates < 1 Mbps (10 Mbps)
- Low budgets (mass, volume, power and cost)
- Low number of wires (harness reduction to the extreme)

Proposed options

- Sensor bus based on existing standard
- “PowerLinks”

Low speed links : “Powerlinks”

Point to point links combining digital transmission and power lines on-board satellites, envisaged at two levels:

- At primary power distribution : typically between Power Control Units and other platform/payload units
- **At secondary level** : typically between data collection units like On-board Computers or Remote Terminal Units and sensors/transducers

Constraints

- Fault isolation, no failure propagation
- Power – “ready to use by sensors”, no local power regulation
- Compatible with C&C buses and/or SpW

very high speed point to point links

Application

- Very high speed interface for advanced instruments (e.g. high spatial/spectral EO instruments)

Requirements

- Could be limited to mono-directional links
- Encoding scheme compatible with very high data rates (> Gbps)
- Data rates > 1 Gbps (growth potential to 10 Gbps)
- Compatible with AC coupling (e.g. for optical fiber transmission)
- Low number of wires (harness reduction)
- Compatible with ground standard
- Compatible with SpW at packet level

Proposed options

- SpaceFibre
- ?

Other needs ?