

STAR-Dundee: Whom you can rely on to develop SpaceWire Systems

Dr. Guoxia Yu (于国霞)

Gregor Cranston

Dr. Steve Parkes

STAR-Dundee

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**Space
Technology
Centre**
University of Dundee





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SpaceWire

- Connects data-handling units on a spacecraft:
 - Instruments, Processors, Mass memory, Downlink, etc
- Standard interface
 - Simplifies integration and test
 - Re-use instruments, etc
 - Reduces development time and costs
- Widely adopted across the Space Industry
 - Europe, USA, Japan, Russia, and China
- Standard written by University of Dundee
 - ECSS-E-ST-50-12C (31 July 2008)



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SpaceWire Key Features

- Not a Data Bus (总线); A data handling network
- Simple, Easy to use, Low gate count
- Bi-directional, Full-duplex
- High speed (2-400 Mbits/s)
- Flexible architecture
- Fault tolerance
- Time-codes



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SpaceWire Packets



- Destination

- Represents either

- path to destination node e.g. 1,3,7,2
 - identity of destination node e.g. 67

- Cargo

- Data or message to be transferred from source to destination

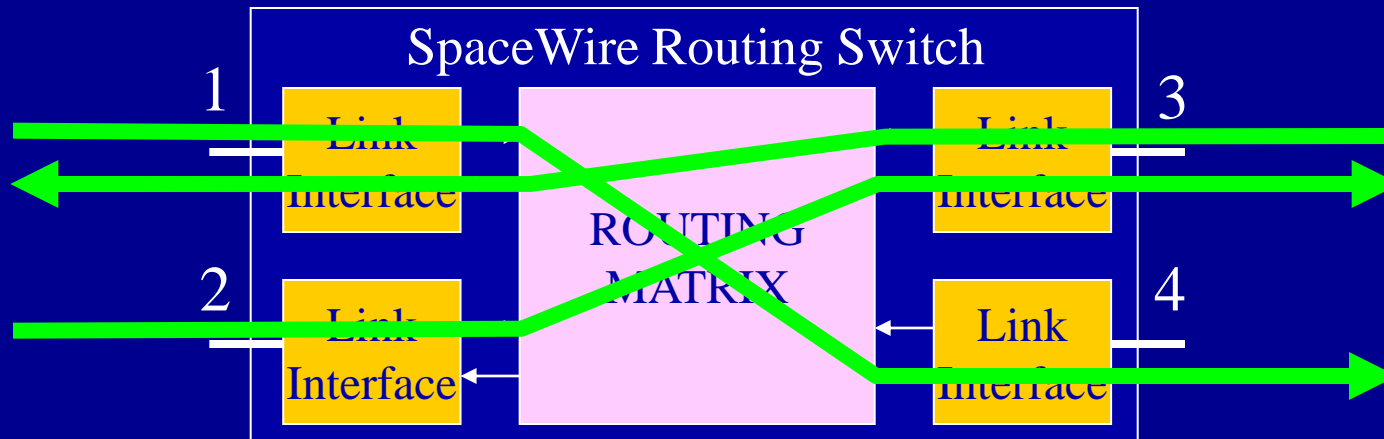
- End of Packet Marker

- Indicates end of packet



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SpaceWire Routing Switches



- Packet arriving at any link input
- Can be switched to any link output

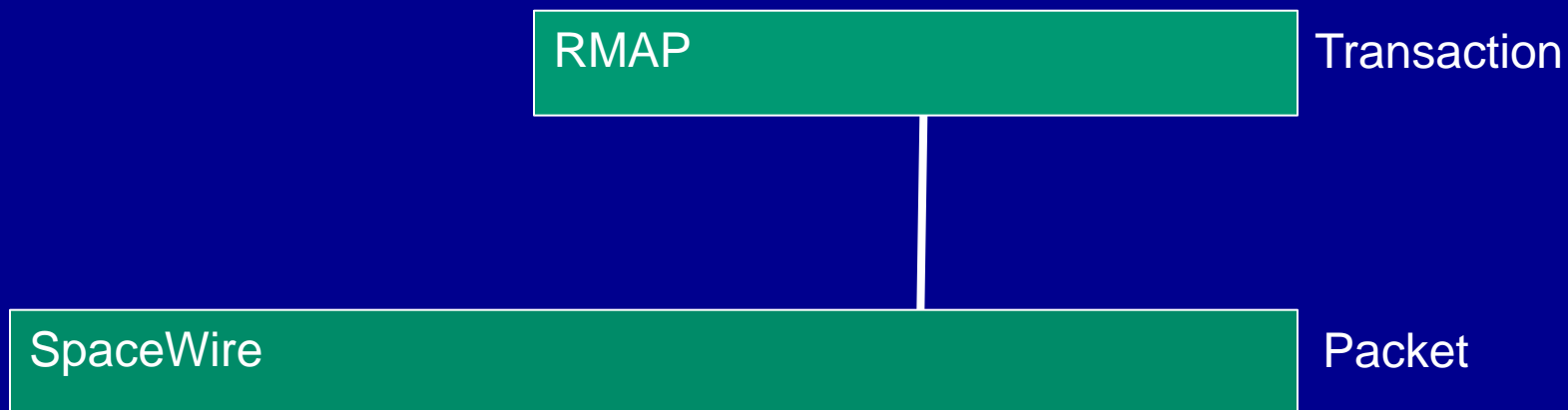


- Remote Memory Access Protocol
 - ECSS-E-ST-50-52C (5 Feb 2010)
- Provide a means of
 - Writing to
 - Reading from
 - Registers or memory on a SpaceWire node
 - Over a SpaceWire network
 - Registers are considered to be memory mapped
- Simple and effective
- Flexible
 - Encompassing diverse applications
 - Used on Bepi Colombo, MMS, ExoMars, ...



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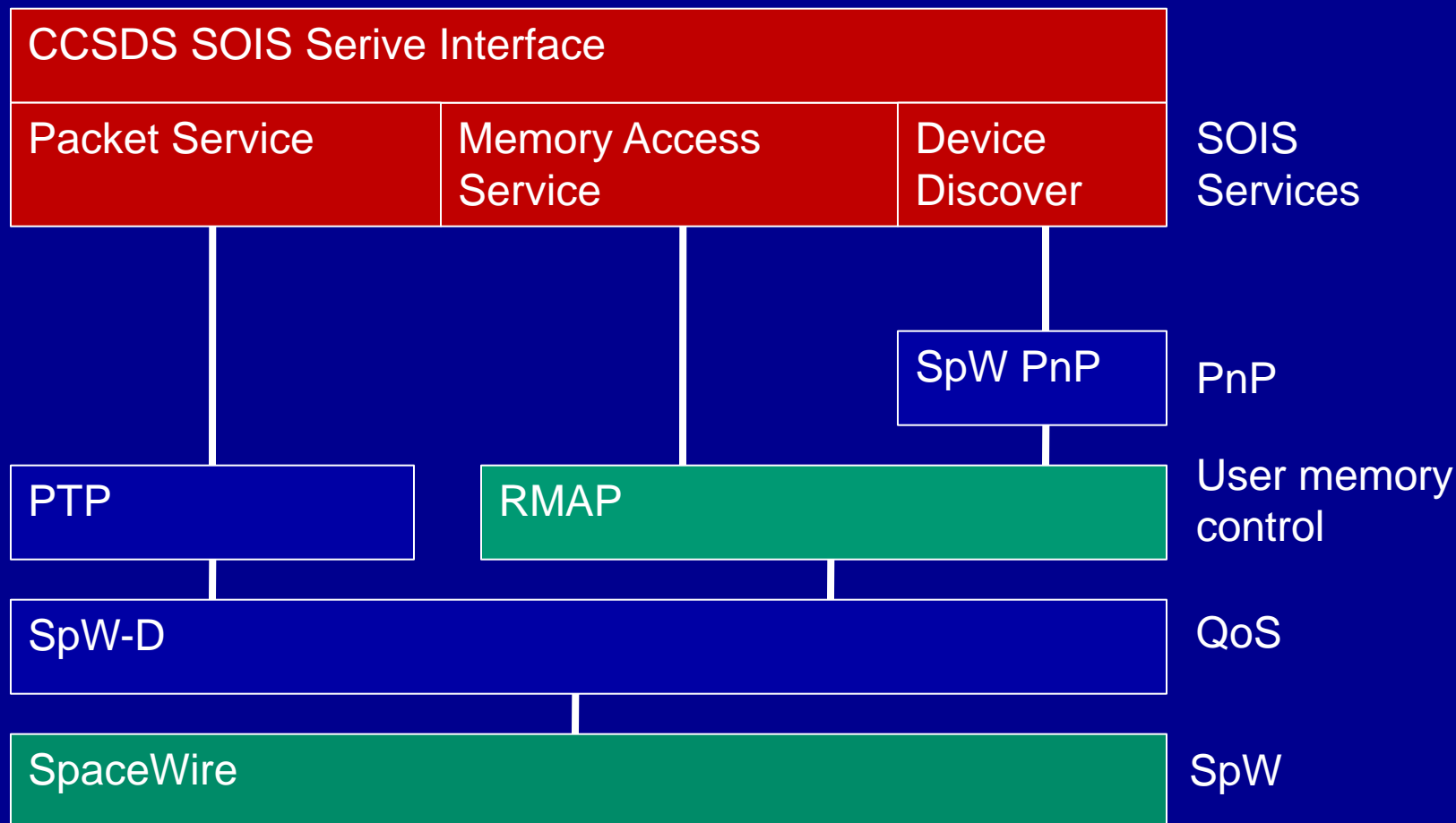
SpaceWire Software Stack

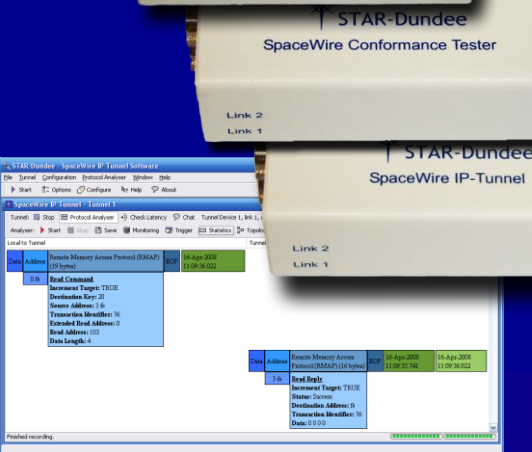




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SpaceWire Software Stack



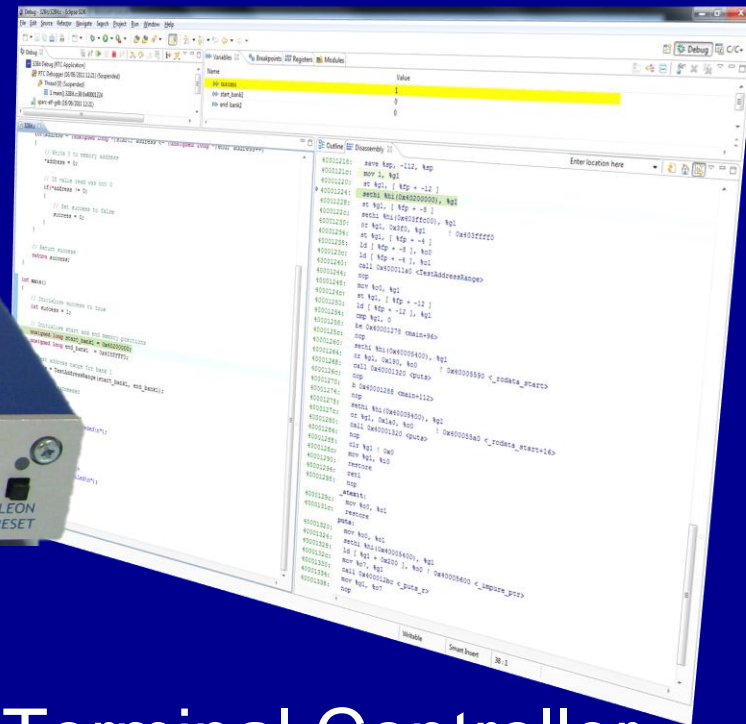


- Evaluation
- Development
- Test
- EGSE
- IP Cores





STAR-Dundee SpaceWire RTC Development Kit



- SpaceWire Remote Terminal Controller
- Atmel AT7913E
 - LEON2-FT processor - AT697
 - 2 x SpaceWire Link
 - 2 x CAN interface



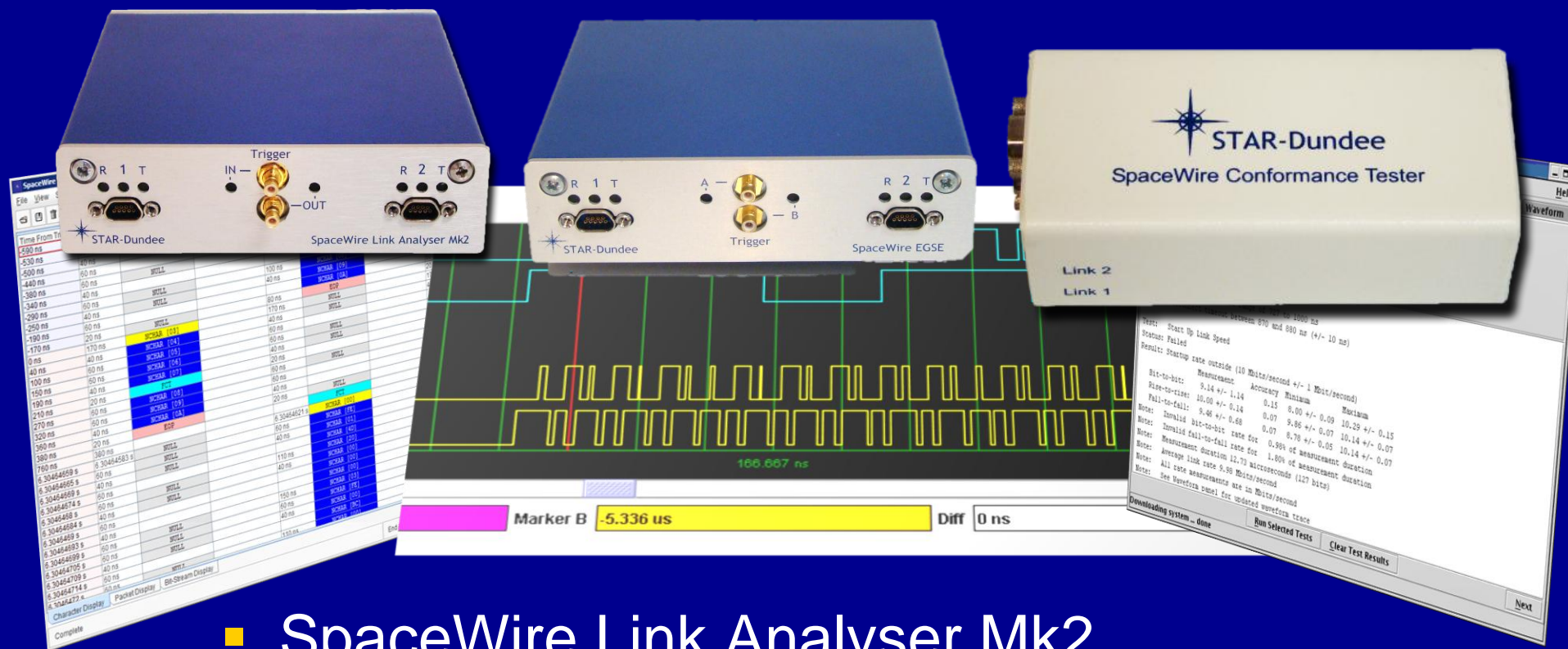
STAR-Dundee SpaceWire Interface/Router



- USB-Brick
- PCI/compact-PCI/PMC,/PCI-express Mk2
- Router-USB Mk-2
- SpW-10X (AT7910E) Development Kit



STAR-Dundee SpaceWire Analysis Tools

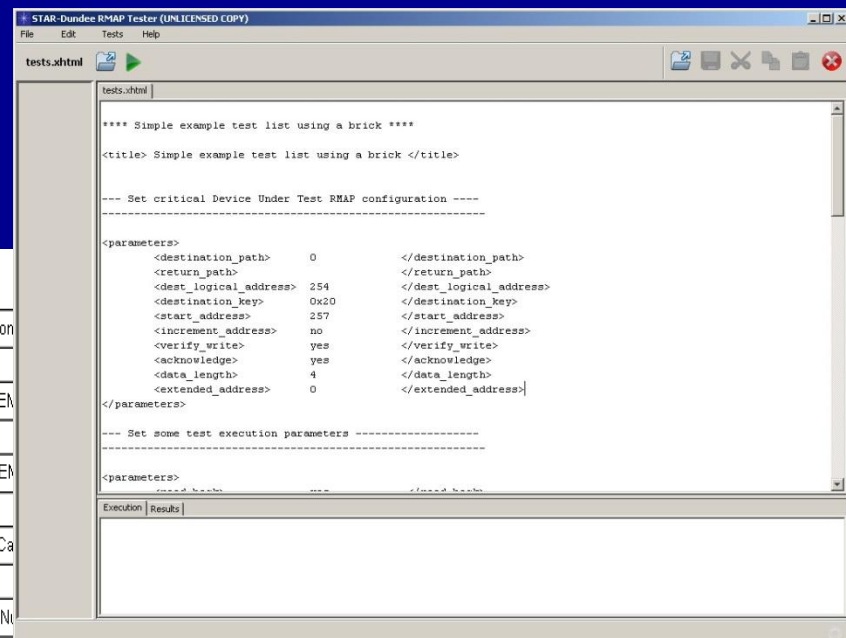
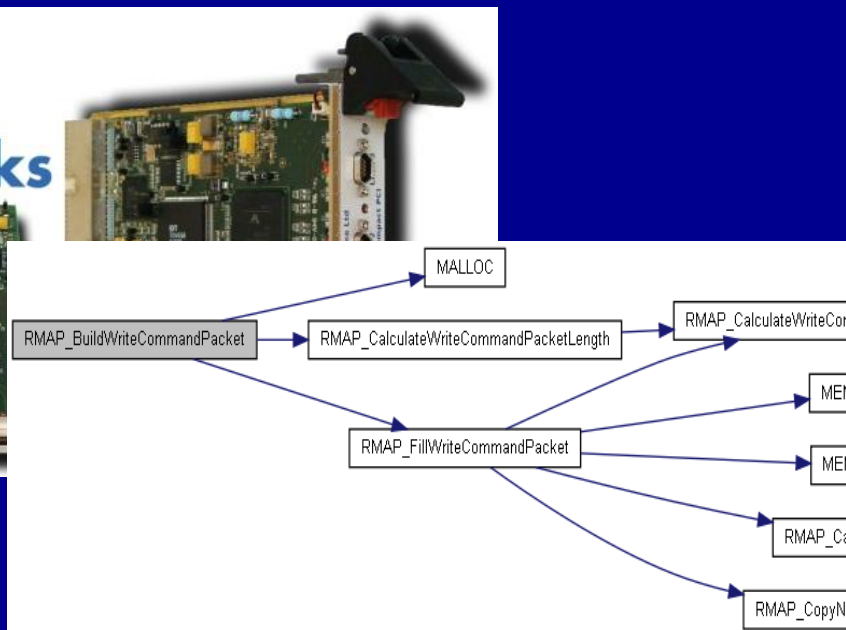


- SpaceWire Link Analyser Mk2
- SpaceWire Conformance Tester
- SpaceWire EGSE



STAR-Dundee SpaceWire Software

QNX
VxWorks



- VxWorks & QNX Driver
- RMAP Tester
- RMAP Packet Library (Object/Source Code)



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SpaceWire IP

Node

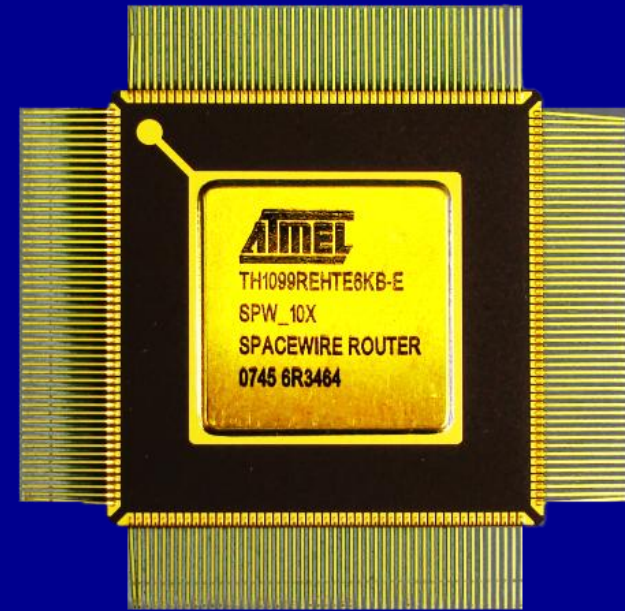
SpW RMAP IP

SpW Interface IP

Router

SpW Router IP

- ESA chips
 - Manufactured by Atmel
- Many flight FPGA designs
- In Europe, USA, China, and other countries



VHDL



STAR-Dundee 4th SpaceWire Conference

SpaceWire 2011
Fourth International Conference
8-10 November 2011
San Antonio, TX USA

The International SpaceWire Conference aims to bring together SpaceWire product designers, hardware engineers, software engineers, system developers and mission specialists interested in and working with SpaceWire to share the latest ideas and developments related to SpaceWire technology. The conference is targeted at the full SpaceWire community including both academics and industrialists.

Abstract Deadline 4 April 2011
Paper Acceptance Notification 11 July 2011
Full Paper Submission 22 August 2011

Technical Sessions:

- SpaceWire Missions and Applications
- SpaceWire Components
- SpaceWire Onboard Equipment and Software
- SpaceWire Test and Verification
- SpaceWire Networks and Protocols
- SpaceWire Standardisation

Conference Location:
This year's conference location is San Antonio, Texas. As the seventh largest city in the U.S., San Antonio blends history and tradition with cosmopolitan flair. Founded by Spanish missionaries in 1718, San Antonio enjoys a rich and diverse culture. The city beckons million of visitors each year to its festive River Walk, to the Alamo and other Spanish missions, to festivals held throughout the year, and to the mild climate of the region.

Chairpersons:
Steve Parkes, University of Dundee, Scotland
Glenn Rakow, NASA
Martin Suesse, ESA
Allison Bertrand, Southwest Research Institute*, USA
<http://2011.spacewire-conference.org>

Logos: AESS, Space Technology Centre University of Dundee, esa, NASA, JAXA, IEEE, and a map of Texas.

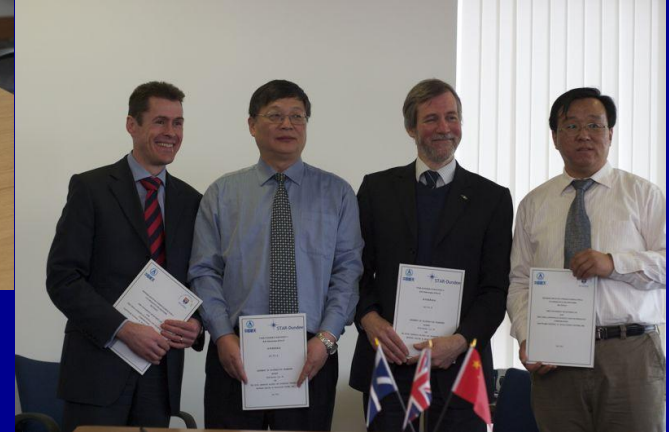
- San Antonio, Texas, USA
- November 8-10, 2011
- Sponsored by:
 - ESA
 - NASA
 - JAXA
 - RosCosmos
 - IEEE
- SpaceWire supplier exhibition
- Attendees
 - SpaceWire developers
 - SpaceWire users



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Collaboration with China

- CASC - Software Testing & Evaluation Centre
 - Dundee Visit in February
 - Cooperation Frameworks



- In October, a training course in Dundee



Planet and Asteroid Natural scene Generation Utility

- Applications: Vision-based Guidance Systems of
 - Planetary Lander
 - Planetary Rover
 - Asteroid Lander
 - In-orbit Spacecraft Rendezvous
- Custom viewer
 - High speed generation for camera images
 - Supports other sensors too: LIDAR, RADAR, 3D lookups
 - Remote access/control via TCP/IP



