SpaceFibre IP Core, Alpha Test Programme, and Planned SpaceFibre Contracts

Steve Parkes[1], Martin Suess[2]

[1]Space Technology Centre, University of Dundee, UK

[2]ESA, ESTEC

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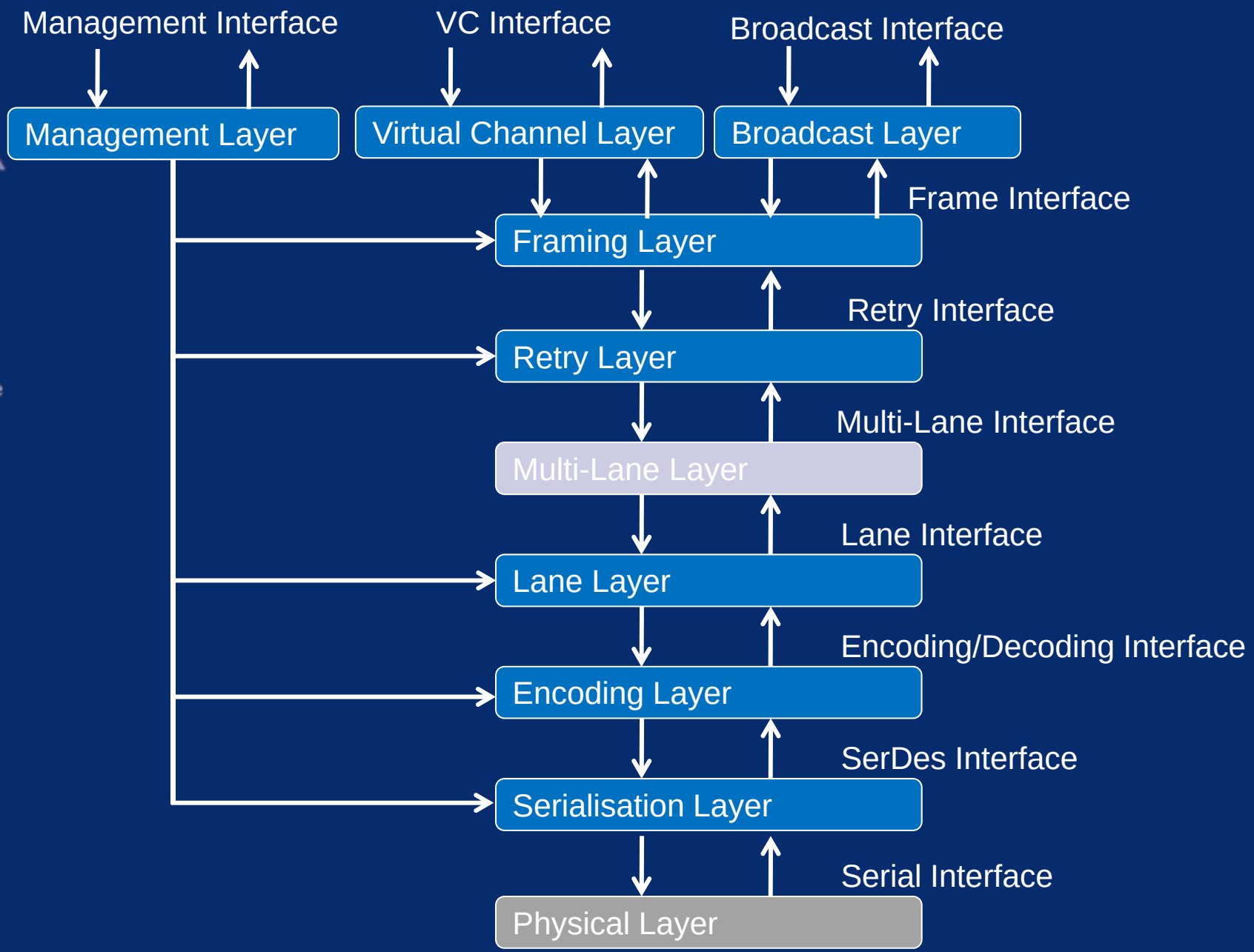
- SpaceFibre Alpha Programme
- SpaceFibre Development Contracts

SpaceFibre IP Core



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SpaceFibre IP Core

- VHDL IP Core
  - Compliant to current version of standard
  - Interfaces
    - Virtual channel interface
    - Broadcast channel interface
    - Management interface
  - Virtual channels
    - Generics for number of VCs
    - 1k byte buffers (TBC)
  - Broadcast
    - Link level broadcast mechanism

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SpaceFibre IP Core

- VHDL IP Core
  - QoS
    - Integrated priority and bandwidth reservation
    - Scheduling with 64 time-slots (TBC)
  - Retry
    - Rapid retry
  - Single lane
    - Multi-lane support will be provided 2Q2013
  - Xilinx GBT interface
  - TLK2711 interface coming soon

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SpaceFibre Alpha Programme

- Support to three ESA projects
- SpaceFibre IP Core Licence
  - Specified ESA project
  - Specified site
- Support for the use of the IP core
  - Specified ESA project
  - Specified site
- One StarFire unit
  - SpaceFibre diagnostic interface and analyser
  - Includes upgrades for two years
    - To support revisions of SpaceFibre standard

StarFire

- SpaceFibre Diagnostic Interface and Analyser
- Interface Functions
  - Two SpaceFibre ports
  - Two SpaceWire ports
  - One USB port
  - Input and output triggers
  - Logic analyser outputs
- Internal logic analyser
  - Configured over USB interface

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StarFire

- SpaceFibre
  - 2.5 Gbits/s signalling rate
  - 8 VCs on each SpaceFibre interface
  - 2 VCs connected to internal SpW router
  - 6 VC connected to high speed pattern generators/checkers
- Diagnostics
  - Full analysis capabilities
    - Monitoring signals from UUT
  - Lane initialisation
  - Frame transfer
  - Packets over up to 8 VCs
  - Broadcast operation

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StarFire

- Analysis
  - In-line analysis
  - Between two UUTs
  - Once connection established can capture and analyse
    - Control words
    - Data frames
    - Broadcast frames
    - Idle frames
    - Packet transfer over up to 8 VCs

StarFire

- *Word* viewer

Comalnit	LLCW	INIT3	0	INIT3	INIT2	Comalnit	LLCW	INIT2	INIT2
Comalnit	LLCW	INIT3	0	INIT3	INIT2	Comalnit	LLCW	INIT2	INIT2
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Comalnit	LLCW	INIT3	0	INIT3	FCT +2 (2)	FCT	2	2	8A
Comalnit	LLCW	INIT3	0	INIT3	FCT +3 (3)	FCT	3	3	76
Comalnit	LLCW	INIT3	0	INIT3	FCT +4 (4)	FCT	4	4	C1

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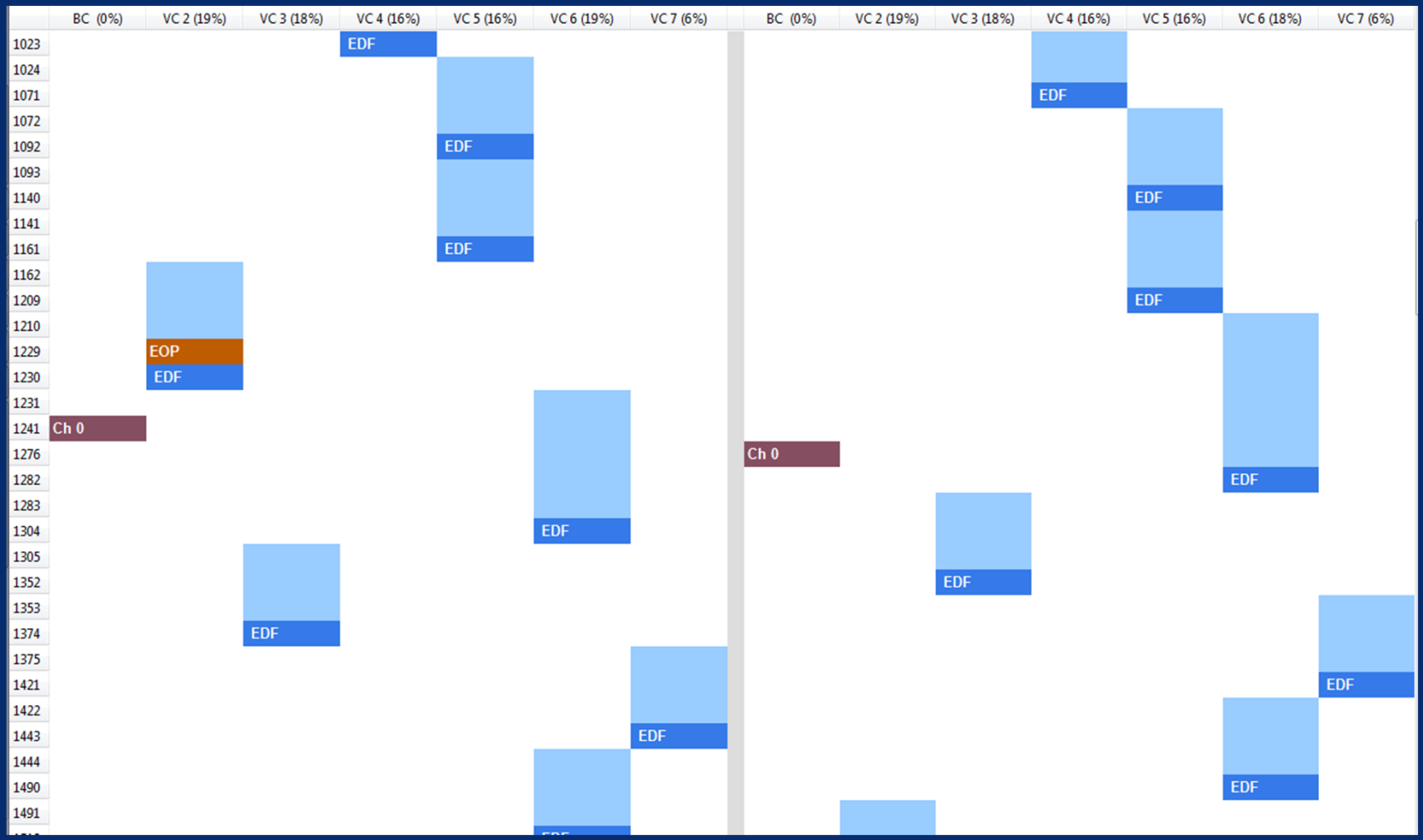
StarFire

- *Frame* viewer



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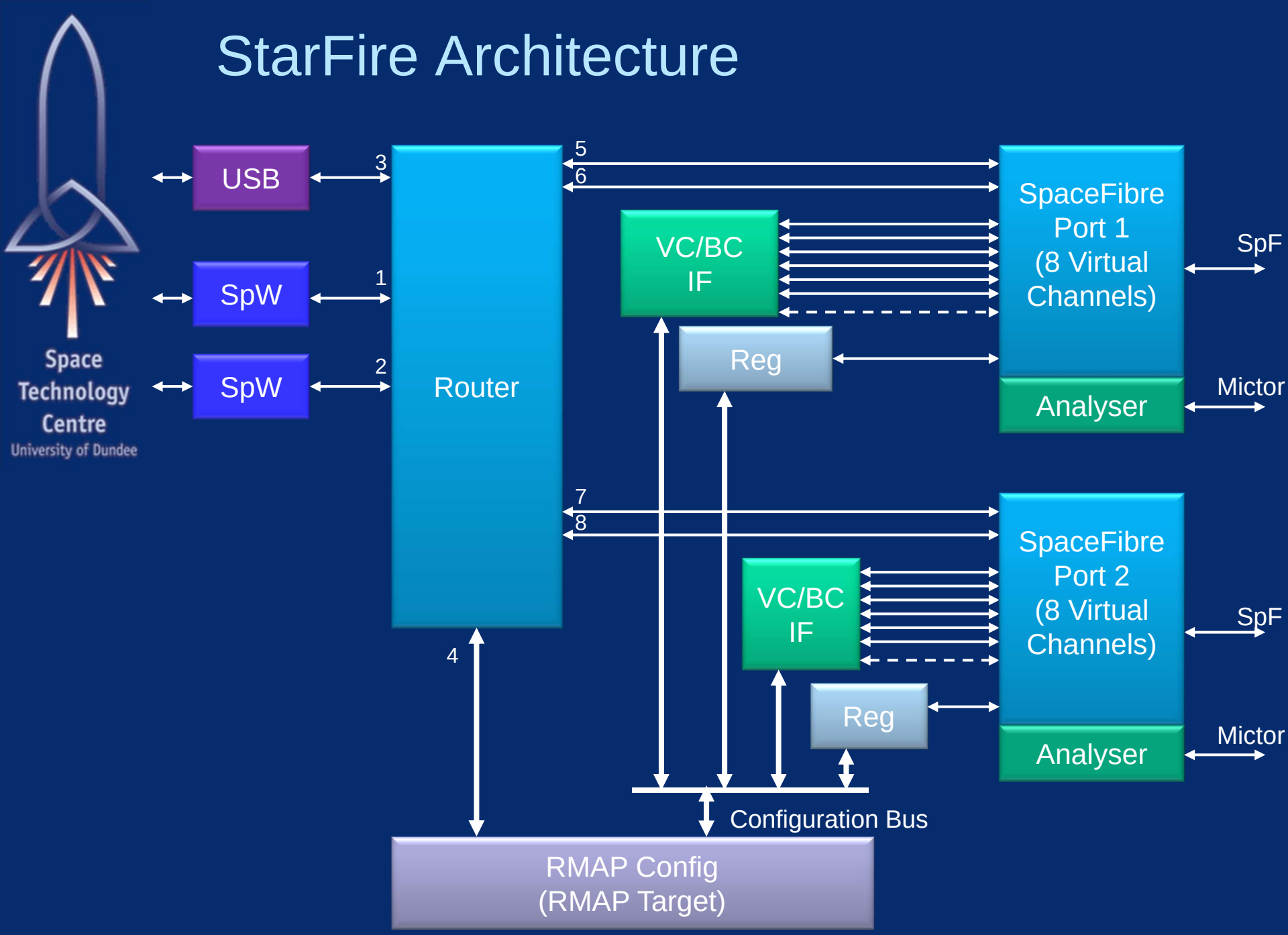
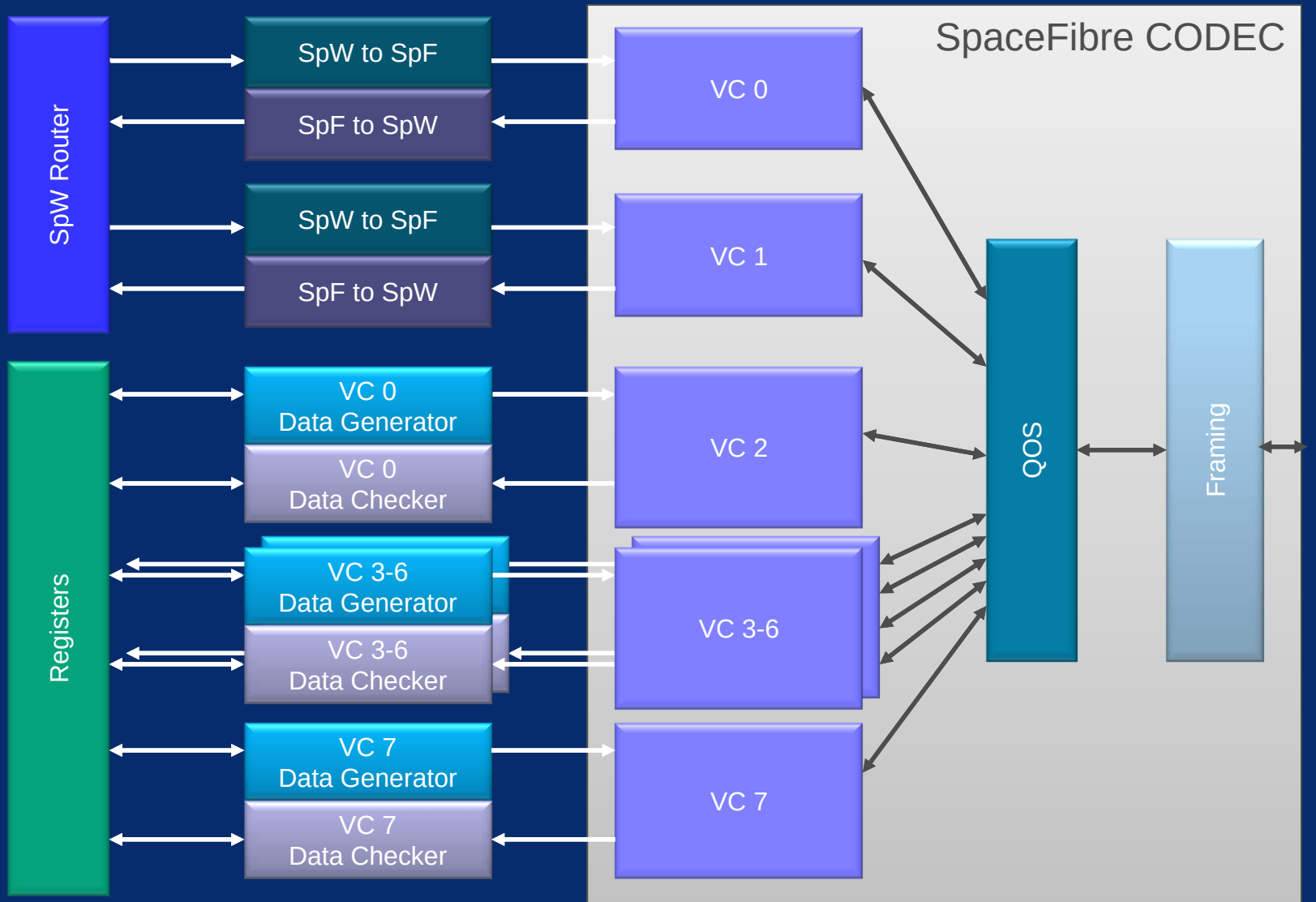
StarFire Architecture



StarFire Virtual Channel Interfaces



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Alpha Projects

- 2 x High Performance COTS Based Computer, Step 2 (Prototyping and Validation), Astrium (Fr), 4000105087
- 1 x Leon with Fast Fourier Transform Co-processor, SSBV (NL), 4000104321
- 1 x FPGA Based Generic Module and Dynamic Reconfigurator, TWT (D), 22424 09 NL LvH

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Extended Alpha Programme

- SpaceFibre Alpha Programme extended to other users
- Provided with
  - SpaceFibre IP core licence
  - Support for use of IP core
  - One StarFire unit
- Licence
  - Per project
  - Per site
- Special price for ESA projects
  - For projects starting before end March 2013
- For further details contact
  - enquiries@star-dundee.com

SpaceFibre Demonstration Contracts

SpaceFibre Demonstration Contracts

- Prime contractor:
  - University of Dundee
- Three sub-contracts to be let:
  - Demonstrator Board
  - SpaceFibre Cables
  - SpaceFibre OpNet Modelling

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SpaceFibre Demonstrator Board

- WP1 Architectural Design and Test Plan
- WP2 Design
- WP3 Manufacture
- WP4 Test
- WP5 EMC Testing

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SpaceFibre Demonstrator Board

- Outline specification
  - SpaceFibre demonstrator board (4 off)
  - Engineering model following flight rules
  - Using commercial grade components
    - With flight equivalents
  - FPGA to hold SpaceFibre CODEC
  - TLK2711 for SerDes
  - Copper and fibre optic versions
  - Connectors and cable assemblies to be free issued
  - Fibre optic transceivers, connectors and cables to be free issued
  - In-built test functionality to support testing
  - Appropriate housing for EMC testing

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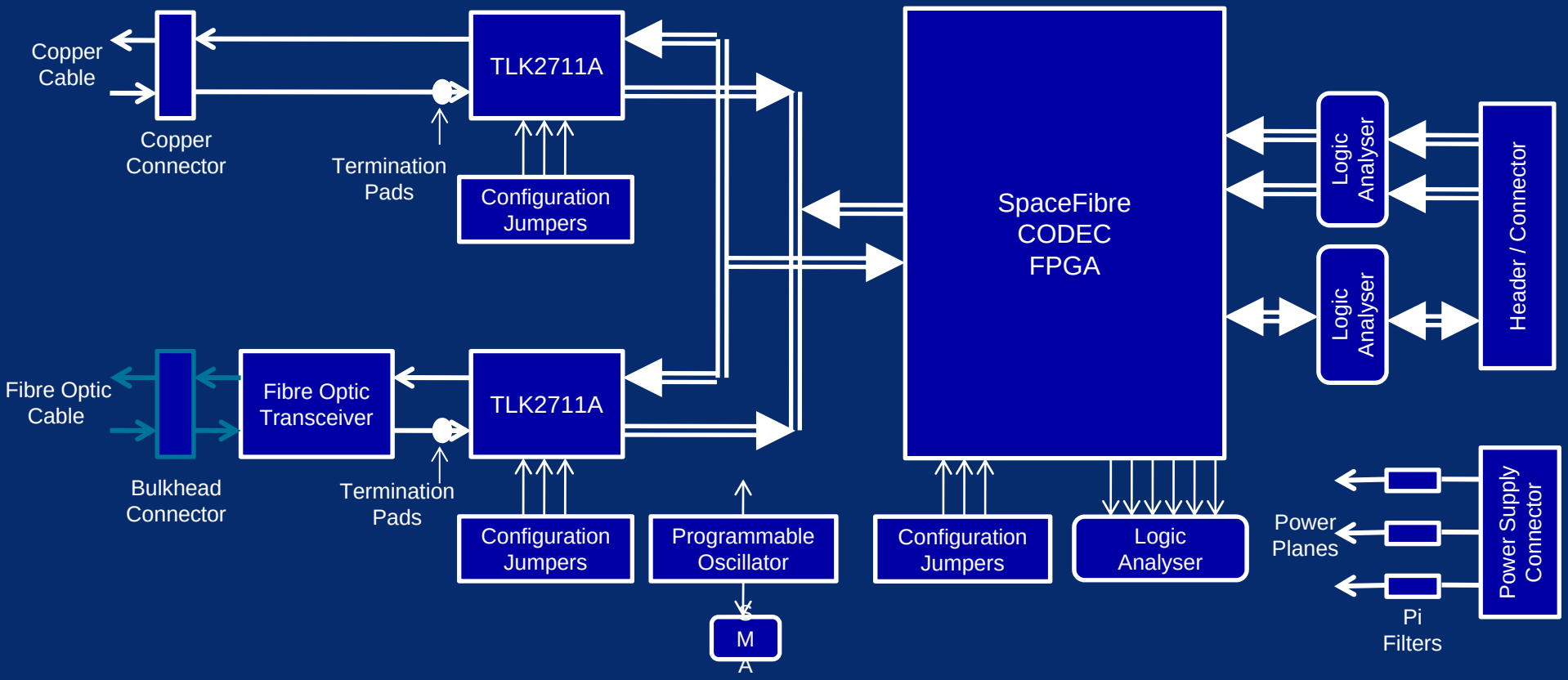
Example SpFi Demo Board Architecture



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SpaceFibre Demonstrator Board

- EMC Testing
  - EMC characterisation of a SpaceFibre system
  - Copper and Fibre Optic
  - Tests to include:
    - Radiated emissions
    - Radiated susceptibility
    - Conducted emissions
    - Conducted susceptibility
    - Electro-static discharge
  - Demonstration board and housing
    - To be designed taking EMC testing into account.

SpaceFibre Demonstrator Board

- Any comments, hints or suggestions
- Before the SoW is finalised?

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SpaceFibre Connectors and Cables

- Electrical connectors and cable assemblies to support SpaceFibre testing
- SpaceFibre electrical connector
  - PCB mounting (20 off)
- SpaceFibre electrical cable assembly
  - Two of each 0.5, 1, 2, 3, 4 and 5 m lengths
- SpaceFibre electrical cable
  - 10 m length

SpaceFibre OpNet Modelling

- Complete model of SpaceFibre CODEC
- Covering all layers
  - Virtual Channel, Broadcast Channel and Management interfaces
  - To Physical interface
- Multi-lane layer model to be included
- Network layer model to be included
- Aim to validate the protocols used in SpaceFibre
- Complementary to System C modelling
  - Being done by SUAI within SpW-RT project

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SpaceFibre Demonstration

- Extensive support being provided
- For potential users of SpaceFibre
- Allowing:
  - Experimentation
  - Assessment for specific applications
  - Feedback on the standard
- At low cost/risk
  - Including support
  - Including test equipment
- Path to flight
  - Via IP core licence
- SpaceFibre training courses

Any questions or comments?