SpaceFibre Architecture

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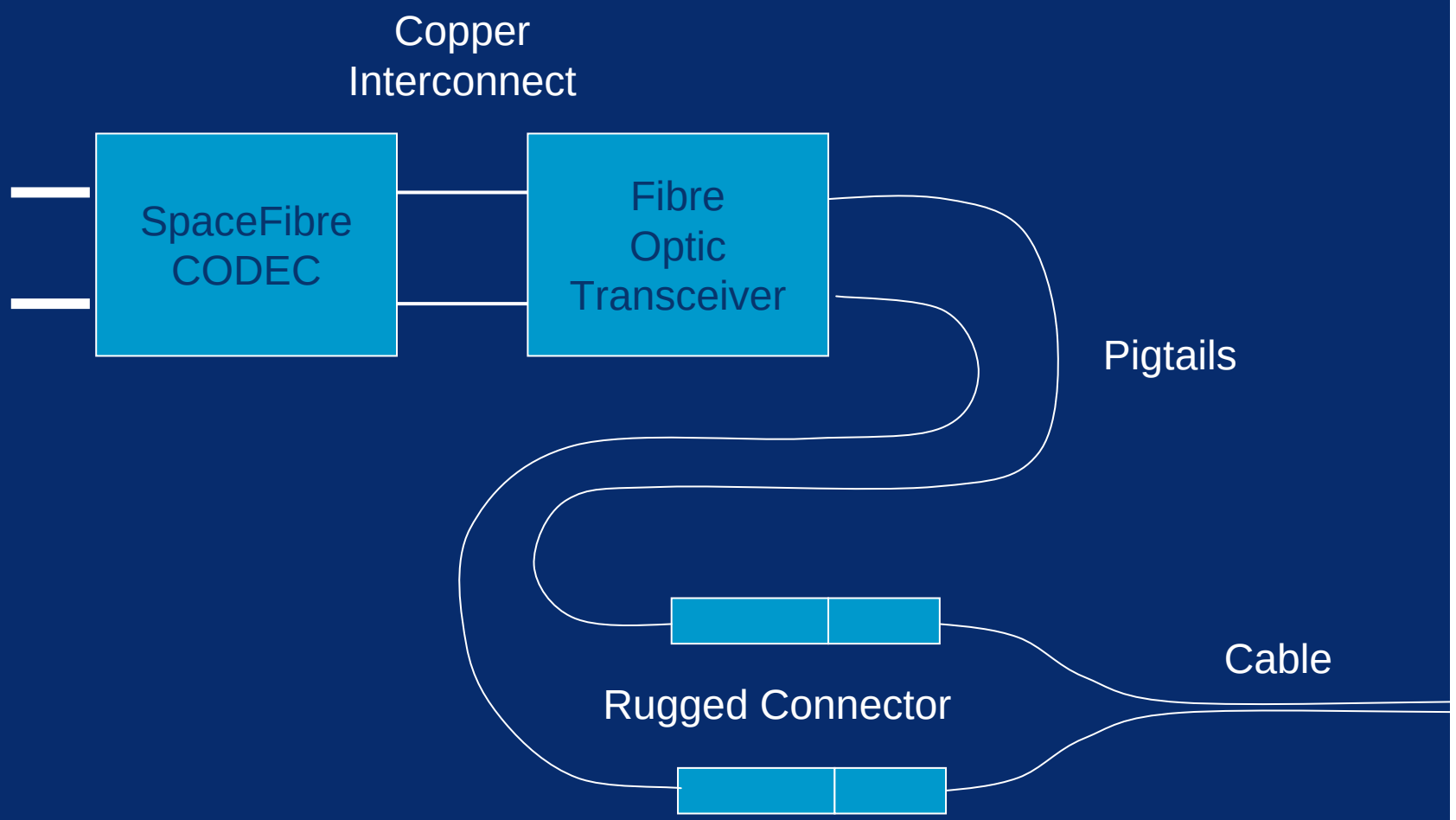
Overall Architecture



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Requirements

- High data rate
  - 2.5 G bits/s plus
  - Over fibre and copper
- Fibre optic communications
  - 100 m plus
- Copper
  - Short length (1m)
- Galvanically isolated
- Light weight cables
- Low power per Gbit/s
- Radiation tolerant
- Rugged
- Able to integrate with SpaceWire network

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R&D Team

- University of Dundee - CODEC
- Patria Finavitec Oy
- VTT - Transceiver
- INO - Fibre
- Fibre Pulse - Connectors
- Gore – Cable

- ESA study managers
  - Martin Suess
  - Iain MacKenzie

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Key Problems

- Fibre
  - Blackening due to radiation
  - Robustness
- Transceiver
  - Radiation tolerance components
  - 2.5 Gbits/s plus
  - Rugged
- Connectors
  - Rugged
  - Materials
- CODEC
  - 2.5 Gbits/s plus
  - Transferable to radiation tolerant technologies

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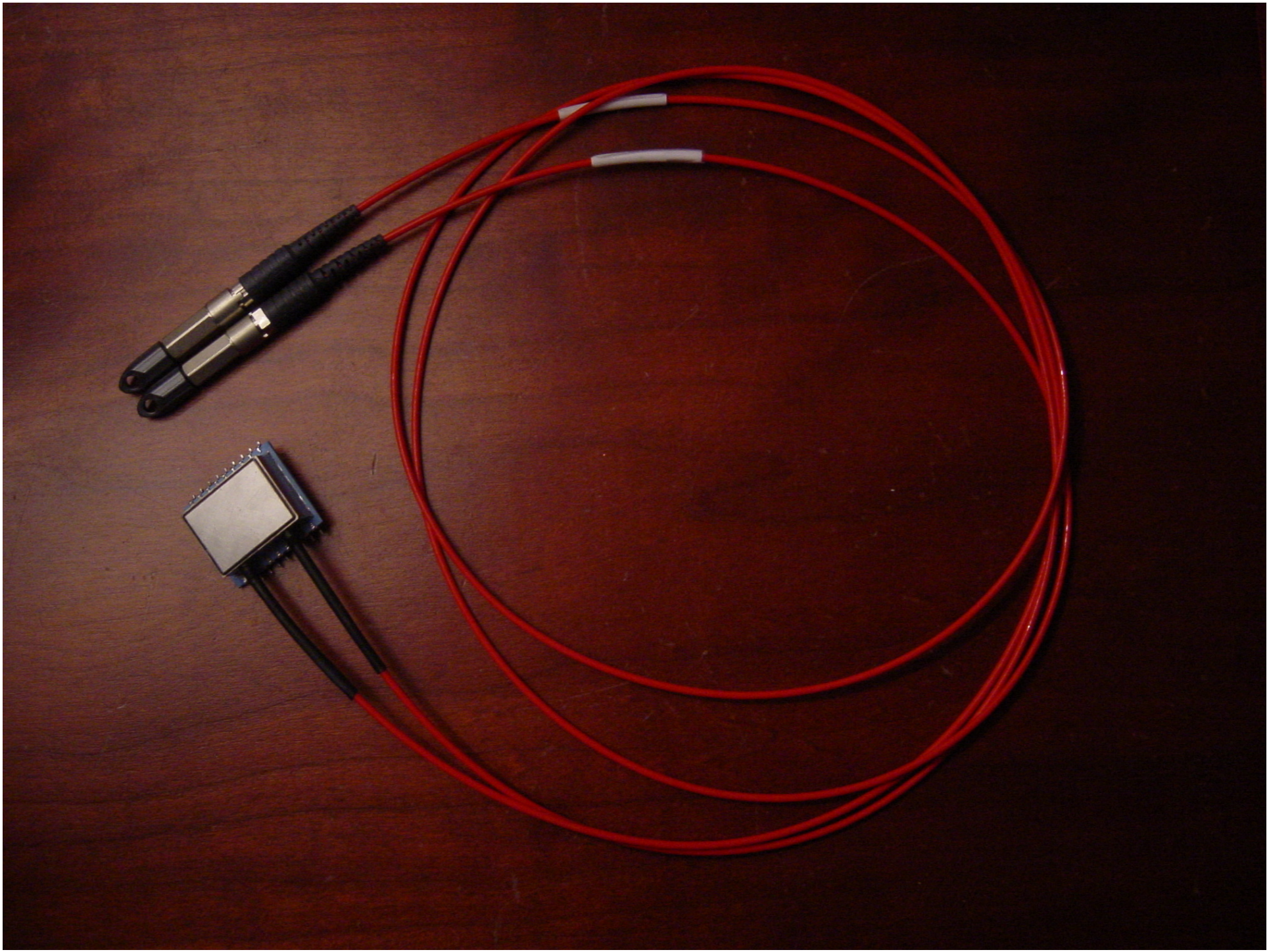
Current Status

- Radiation tolerant fibre
- Rugged cable
- Rugged connectors
- Radiation tolerant transceiver
- Prototype CODEC
  - Still in research phase



SpaceFibre Transceiver

- Implemented in Xilinx Virtex II
- Using Rocket IO

- Also implemented in VHDL
- Tested one implementation against the other

- Demonstration shows operation over
- Fibre
- Copper