SpaceFibre Very High Speed Link Technology Demonstrator Activity

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Overview

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Introduction

- SpaceFibre is aimed to complement SpaceWire for very high speed applications
    a. Data rates ranging from 1-10Gb/s
    b. Bridge distances up to 100m at maximum data rate
    c. Use of fibre optic link technology which provides galvanic isolation
    d. Copper version with AC coupling for shorter distances
    e. Allow for mixed SpaceWire – SpaceFibre networks
    f. Transmit a scalable number of virtual SpaceWire links over one SpaceFibre
    g. Compliant to the packet level and wormhole routing mechanisms defined in the SpaceWire standard
    h. Support different levels of to quality of service

Introduction

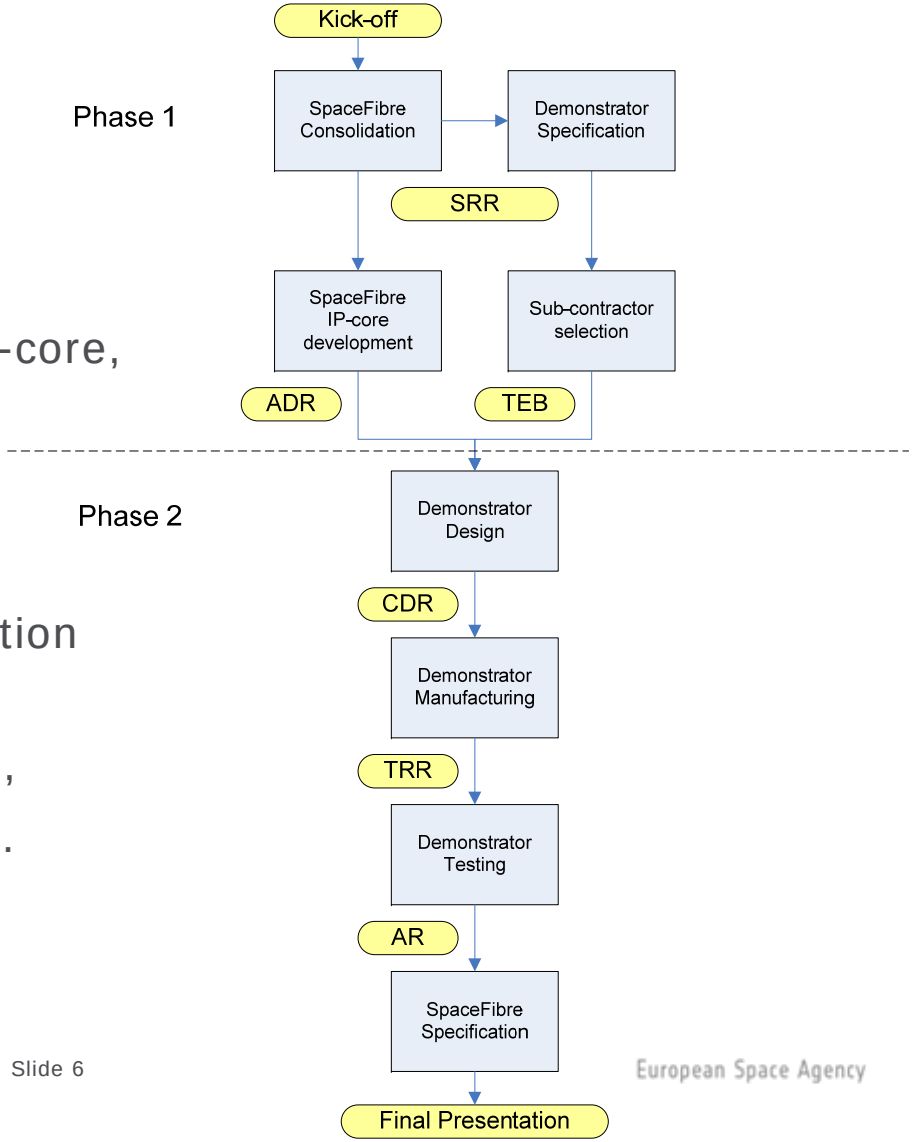
1. The SpaceFibre Demonstrator Activity has been started on 1 February
2. It is based on two previous activities
    a. “Optical Links for the Space Wire Intra Satellite Network Standard” activity which developed:
        – Bi-directional fibre optic transmitter and receiver,
        – Radiation tolerant fibres and a cable assembly including optical connectors.
    b. “SpaceFibre extension to SpaceWire” activity which developed
        – A first version of the SpaceFibre CODEC
        – SpaceFibre breadboard based on commercial FPGA technology integrating the codec with the fibre optical link.
        – SpaceFibre outline specification

Activity Objectives

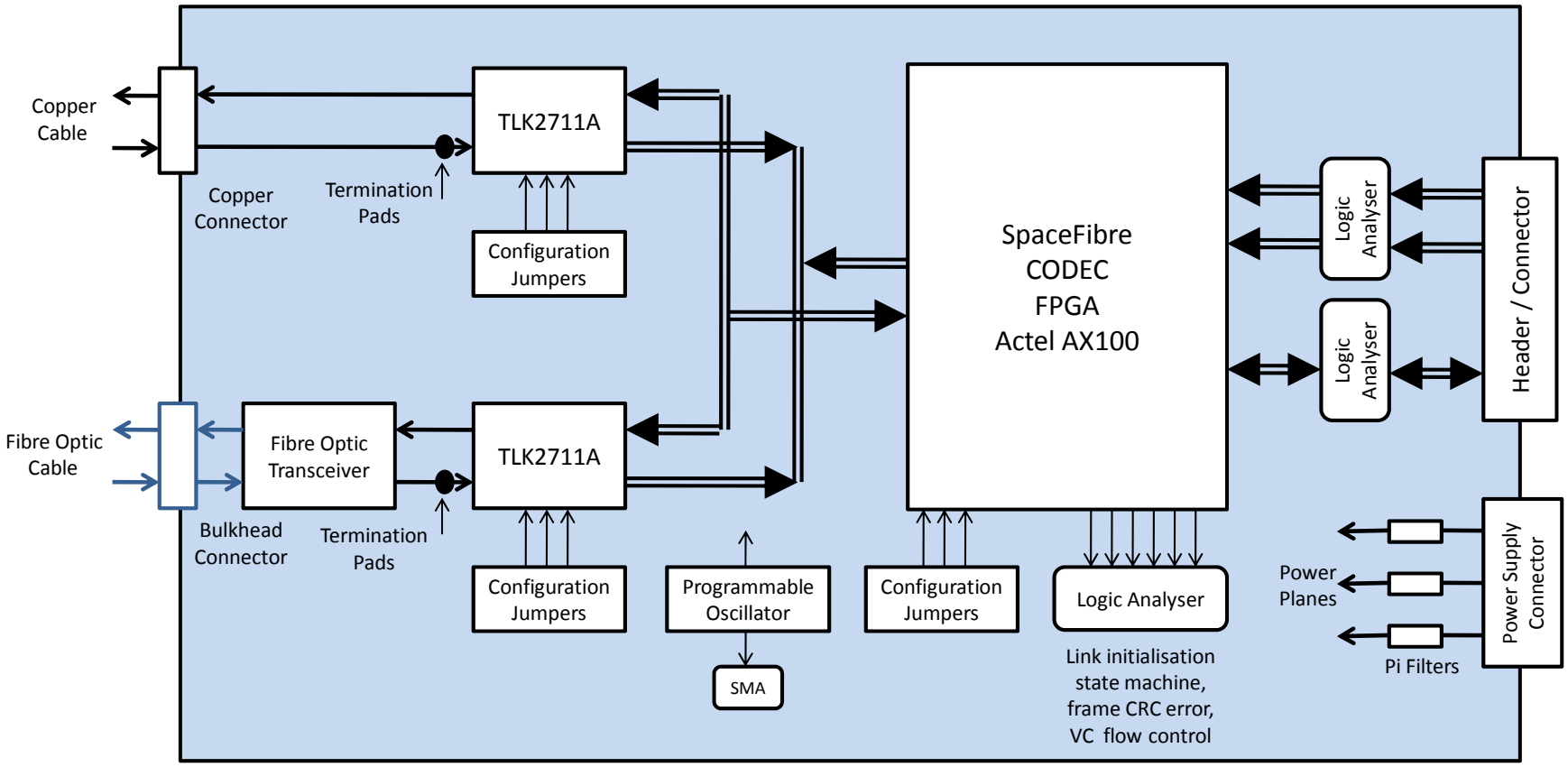
1. Development of a SpaceFibre Demonstrator based on components available in radiation tolerant technology.
2. Evaluation of the SpaceFibre performance.
3. Demonstrate that SpaceFibre could be implemented in the short term in space missions with existing space qualified components.
4. Detailing and consolidation of the SpaceFibre specification.
5. Preparation of a SpaceFibre IP-core.
6. This IP-core shall be made available and licensed through the ESA IP-core service for reuse in other activities and projects.
7. The document shall be provided and presented to the SpaceWire Working Group to allow discussion and independent prototype implementation.
8. The resulting final version shall be used as the technical baseline document for a following standardisation under ECSS

Study Logic

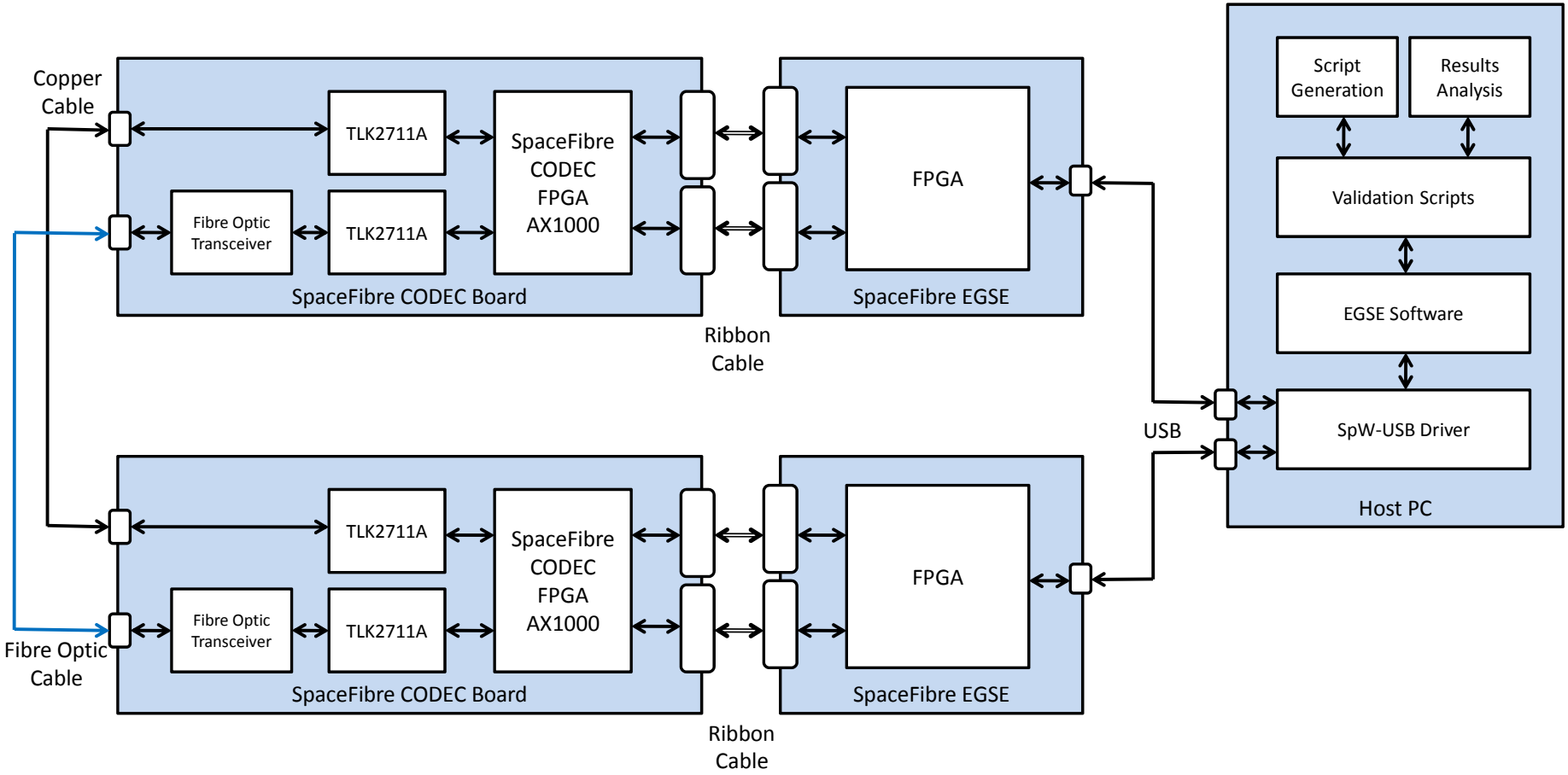
- The activity is split in two phases
- Phase 1 covers:
  a. Consolidation of the SpaceFibre specification,
  b. Development of the SpaceFibre IP-core,
  c. Demonstrator specification,
  d. Subcontractor selection.
- Phase 2 covers:
  a. Demonstrator design, implementation and testing,
  b. Revision of the SpaceFibre IP-core,
  c. Update of SpaceFibre specification.



SpaceFibre CODEC Board



SpaceFibre Demonstrator



Planning

1. The duration of the activity is 26 months including the sub-contractor tender period.

2. End of phase 1 will be 31 January 2012
   - SpaceFibre prototype implementation
   - SpaceFibre IP-core
   - SpaceFibre specification

3. End of phase 2 will be 31 March 2013
   - Tested SpaceFibre Demonstrator
   - Updated SpaceFibre IP-core
   - Updated SpaceWire Specification