



MISSION:

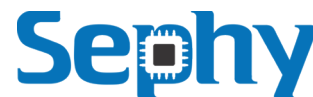
- * SEPHY aims to increase the European competitiveness by developing an ITAR-free and radiation hardened 10/100-Base-T Ethernet transceiver (PHY), which can be used worldwide.
- * This project will foster innovation by developing a new space market device, which will grant non-dependence as it is designed and manufactured with European flows and processes.

MOTIVATION:

- * The growing complexity of space systems is creating the need for high-speed networking technologies to interconnect the different elements of a spacecraft.
- * SEPHY targets the development of a space-graded Ethernet transceiver device to allow the protocol's full adoption in space applications while maintaining interoperability with the existing technical standards.
- * Further contributions and new developments based on both Time-Triggered Ethernet and AFDX protocols are expected.
- * This should reduce even more the dependence on export-controlled technologies from outside Europe.
- * The development of SEPHY will make Europe a pioneer on a critical space component, since currently there are no such space-graded Ethernet transceivers available on the global market.

OBJECTIVES:

- * Development of a radiation hardened 10/100-Base-T Ethernet physical layer transceiver for the space market in line with the trend towards Ethernet based communications.
- * SEPHY will become a standard solution in future international space applications for launchers, satellites and spacecraft.
- * The project results are fully in line with Ethernet and space-validated Time-Triggered Ethernet for deterministic real-time communication and enhanced Quality of Service based on the Ethernet standard.
- * Study the feasibility of a 1000Base-T Ethernet physical layer transceiver for space as the natural evolution of the 10/100-Base-T.



TECHNICAL APPROACH

SEPHY focuses on the development of a mixed-signal Processing ASIC, as one of the technologies identified as a priority on the list of Urgent Actions on Critical Space Technologies. The detailed actions to be considered and how they are addressed in SEPHY can be summarized are fivefold:

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ITAR-FREE ETHERNET PHY
TRANSCEIVER:

- * The SEPHY Ethernet transceiver is a mixed-signal device developed in Europe and free from restrictions imposed by the International Traffic in Arms Regulations (ITAR).
- * The physical layer transceiver deals with the transmission and reception of data over the physical medium ensuring reliable communication (see Figure).
- * Since the PHY interacts directly with the physical signals on the cable it has to contain an analogue front end capable of transmitting and receiving analogue signals.
- * As the PHY connects to the digital MAC layer, it needs to perform complex digital signal processing and data controlling.
- * The physical implementation occurs by means of a mixed-signal ASIC. This is a complex semiconductor device that embeds in the same substrate analogue and digital functions.
- * The device will be 100% compatible with 10/100Base-T Ethernet standard.

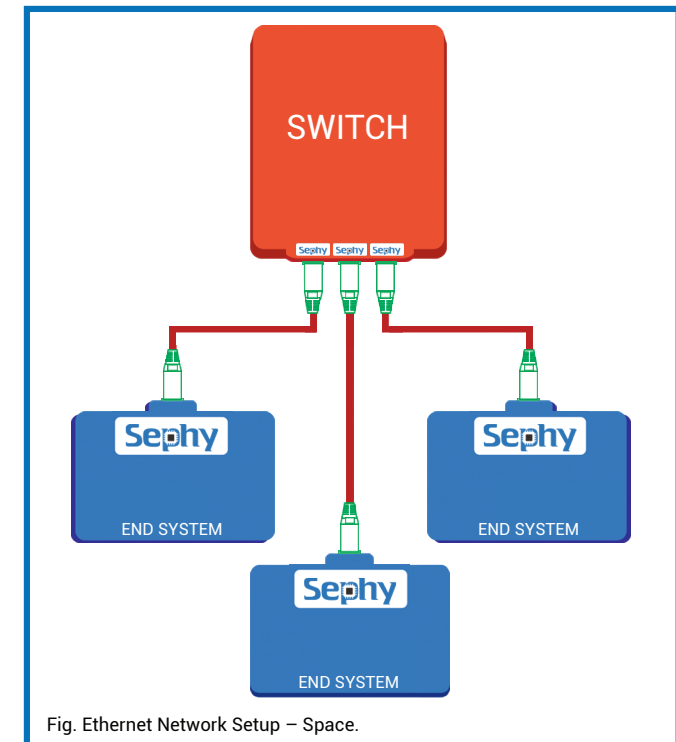


Fig. Ethernet Network Setup – Space.