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OPTICAL SWITCHES OF PHOTONICS PAYLOAD

Abstract

Optical fibre provides data transfer with low transmission loss, harnesses flexibility and is immune to Electro-Magnetic Interference with other onboard systems. Those characteristics make optical fibre an ideal choice for signal / data transmission inside satellite payloads.

The upcoming next generation of space telecom satellite repeaters are required to provide high data throughput while making communications links reconfigurable during all mission phases. This will be made possible by a combination of conventional Radio Frequency equipment with the emerging photonic solutions. Among the various subsystems, the optical switching and routing equipment is responsible for directing incoming optical signals containing Radio Frequency data to suitable output ports. Optical switching, allowing also redundancy functionalities and optical interconnecting, is one of the main enabling photonic technologies.

MOEMs optical switching has been the focus of terrestrial research and development during the last decades but, as far as we know, it provides inconclusive results in respect of in-space conditions. Sodern is presently investigating a more appropriate optical switching candidate regarding the space mission environment and spatializing the DirectLight® Optical Switching Technology from HUBER+SUHNER Polatis (UK), a major player in fibre optics connectivity equipment for ground applications. The work ahead, as part of the Horizon 2020 European Research and Innovation program, has concentrated on making the core devices more robust technically and therefore we designed a dedicated opto-mechanical structure. This new architecture has recently emerged as feasible. Based on the outcome of these efforts, development of an engineering model focused on electronics robustification will follow and the next challenge will be to flight qualify this model.

We report on our progress in developing this optical switching function and provide an overview of the performance.