



Optical Recirculating Loop Test Bed based on Nortel 10G WDM Transmission System
Laboratoire de technologies de réseaux
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Photonics at ÉTS

The objective of the photonic research program at ÉTS is to address some promising advanced component and signal processing technologies such as electronic dispersion compensators and microstructured-fiber devices and to analyze their impact on the performance, architecture and management (at the physical layer level) of future optical transmission systems and networks. Part of the program looks at novel **optical network architectures** based on advanced modulation and electronic pre-compensation techniques and explores the metrology, control and planning issues in optical networks based on these technologies. **Passive optical networks (PON)** are also among the research areas of interest. The research program in this area includes the development of a PON test bed to support exploratory research on methods for monitoring and troubleshooting point-to-multipoint (P2MP) passive optical networks. Another part of the program relates the development of advanced photonics devices, from both a component and a control perspective. One research orientation is into the applications of the novel **microstructured fibers** to multiple function devices, targeting specific applications where microstructured fibers have a competitive edge compared to conventional fibers. Another research orientation relates to photonic devices as intelligent network elements, equipped with embarked electronics and advanced control, for wavelength-reconfigurable optical networks. Such network elements require standardized, real time remote control and self-recognition of other network elements to optimize their own parameters. The approach aims at filling these needs using Web services. The research also targets the experimental study of the dynamics of such reconfigurable optical networks, including transient behavior and network instabilities.

The **Laboratoire de technologies de réseaux** at ÉTS includes a multi-span OC-192 WDM transmission test bed composed of 8 WDM transceivers, coupled to an optical line system including optical amplifiers and dispersion compensating modules. The setup also includes a **ROADM** with adjustable switching times, OADM modules and can operate in **recirculating loop** mode, thus allowing the simulation of wavelength-reconfigurable optical transmission links from metro to long haul range. The photonics infrastructure also includes *Nortel Optical Metro* and *Long Haul* WDM platforms for metropolitan and long distance applications. This complete WDM physical layer test bed at 10 Gb/s, an important industrial donation from Nortel to ÉTS further complemented by a CFI grant, enables experimental evaluation and testing from the component to the network level in a real-world environment. In line with ÉTS' mission of being "An Engineering School for the Industry", this infrastructure is available for use by the industry through contracts.