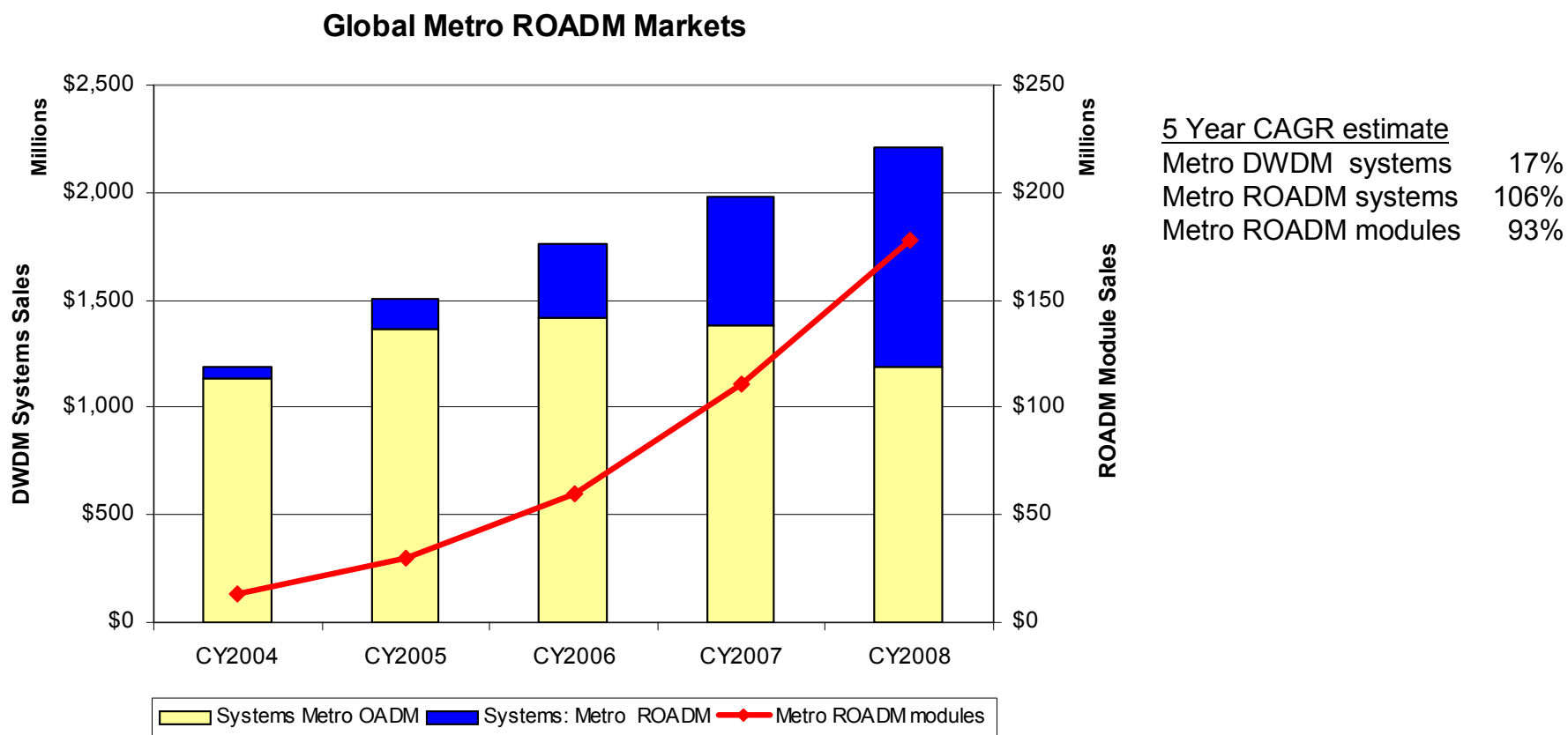


Hybrid integrated high performance PLC/MEMS Wavelength Selective Switch for Agile Optical Networks

Thomas Ducellier

IEEE-LEOS / OPRA / OPC seminar
Tuesday April 25th, 2006

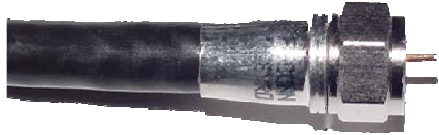
Metro ROADM System & Module Markets



Infonetics, "ROADM Equipment and Components Market Outlook", Jan 31, 2005

Strong ROADM growth opportunity

ROADM Market Drivers



Broadband Battle MSOs vs. Telcos

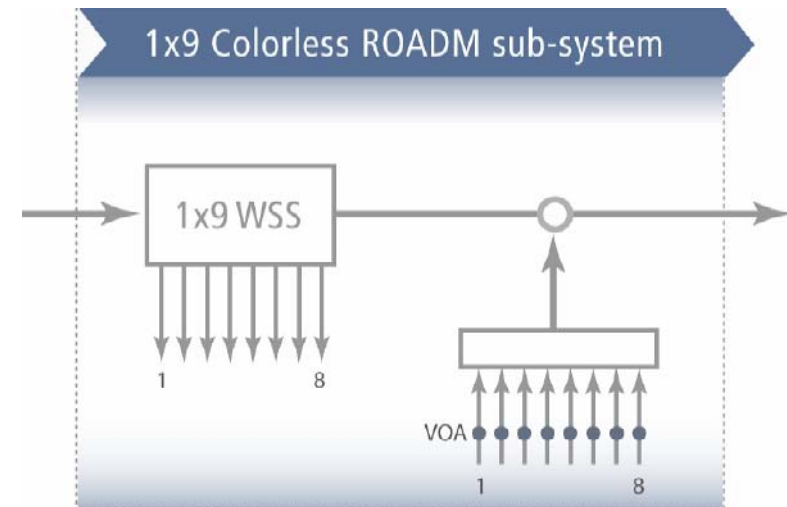
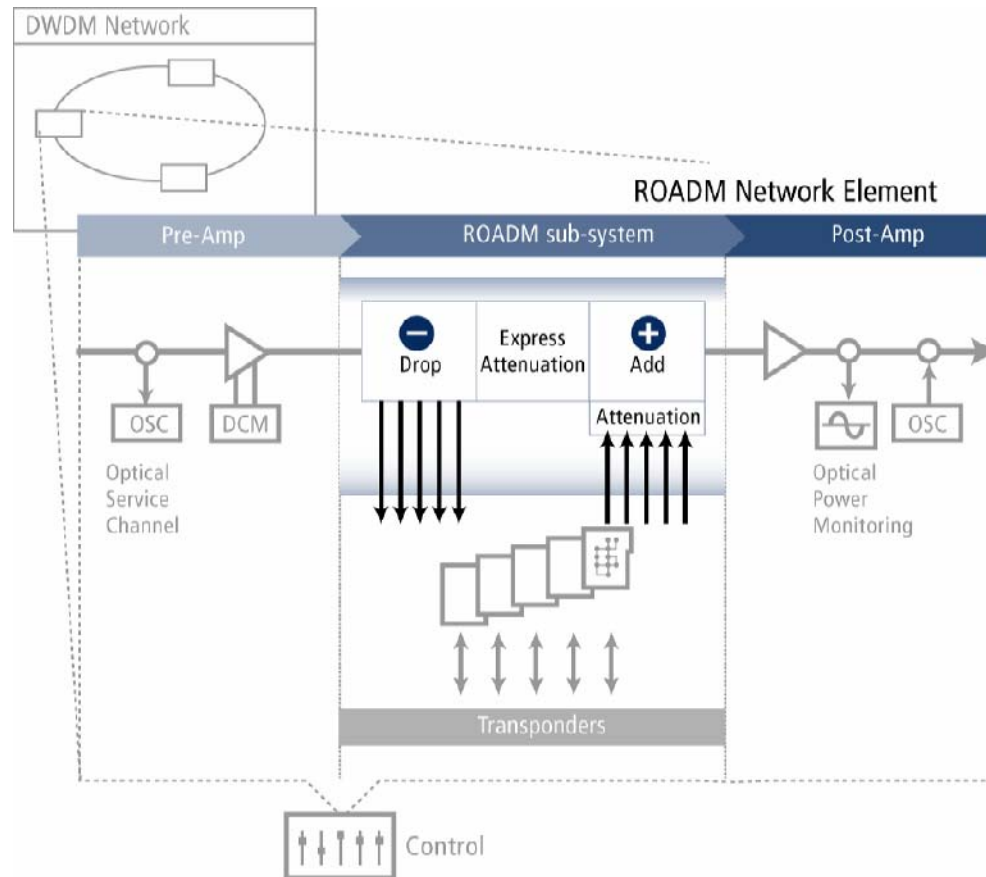


- Carriers are gearing up for fight over consumer triple play dollars
 - New services: IPTV, Video on Demand, HDTV, VoIP, Internet access
 - Services driving higher core network bandwidth
 - Transition to a converged IP over wavelength core network
 - Fiber-to-the-X finally becoming an economic reality
- Why ROADMs Matter
 - Rapid remote network reconfiguration
 - Operation savings from ROADM flexibility
 - Higher network utilization: eliminate stranded capacity
 - Eliminate costly transponders for ring interconnects
- Why Now
 - ROADM technology mature enough
 - Metro specific products at metro cost points



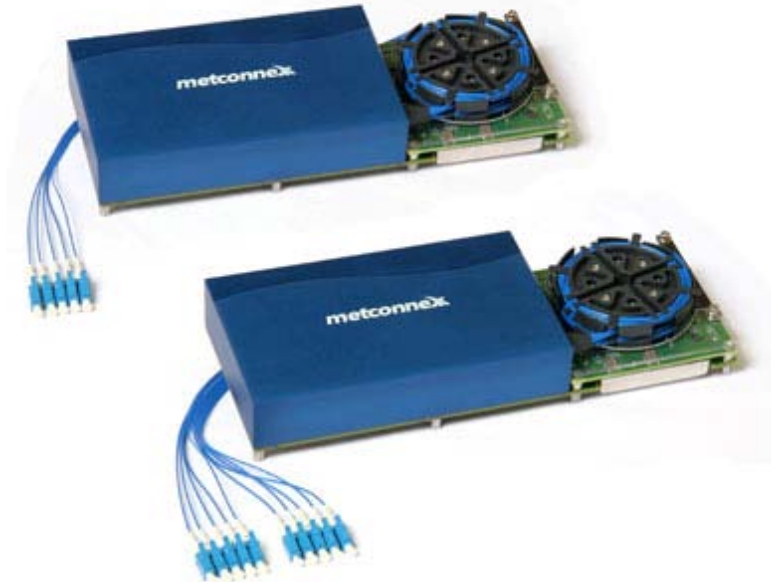
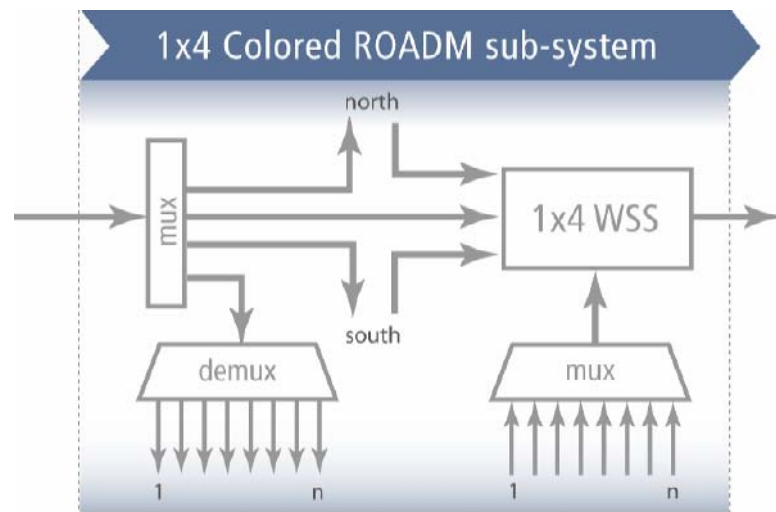
Degree-2 ROADM

Network element architecture

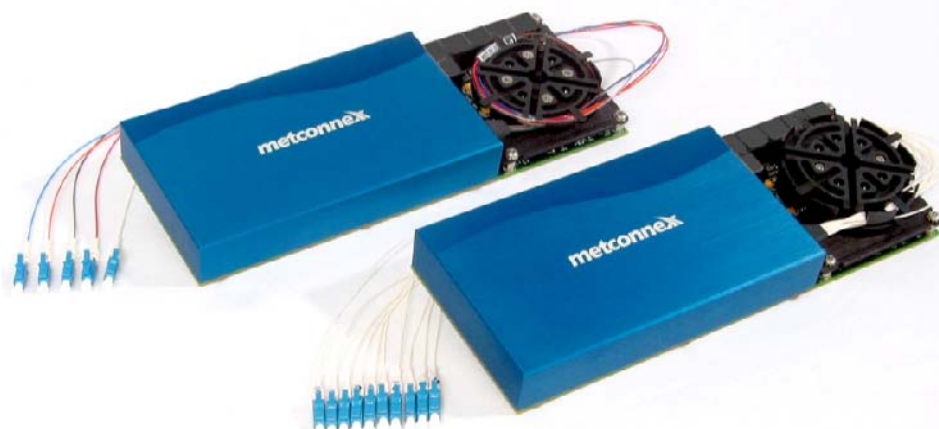
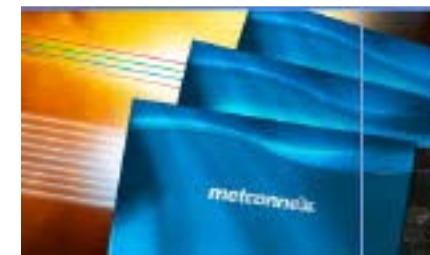


Degree-N ROADM

Wavelength Selective Switch



Wavelength Selective Switch



Key Features

100 GHz, 45 channel

Two products: 1x9 and 1x4

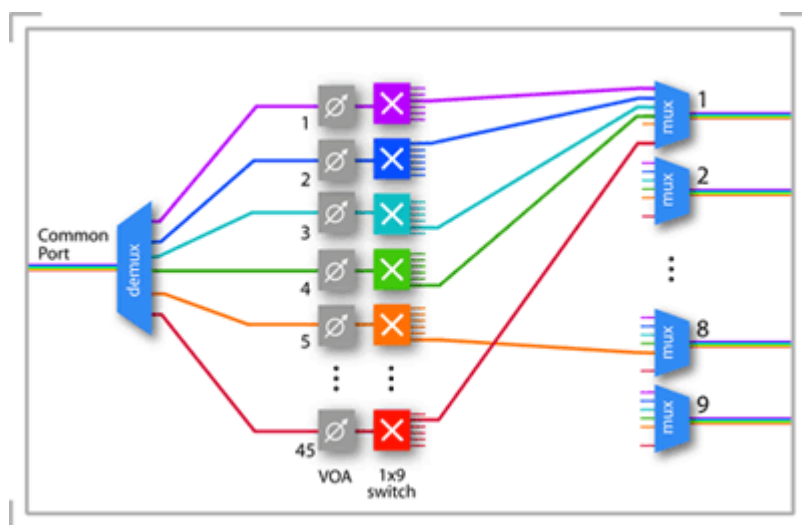
Integrated Functionality

- any to any hitless switching
- per port or per channel attenuation
- demultiplexing
- blocking
- multiplexing

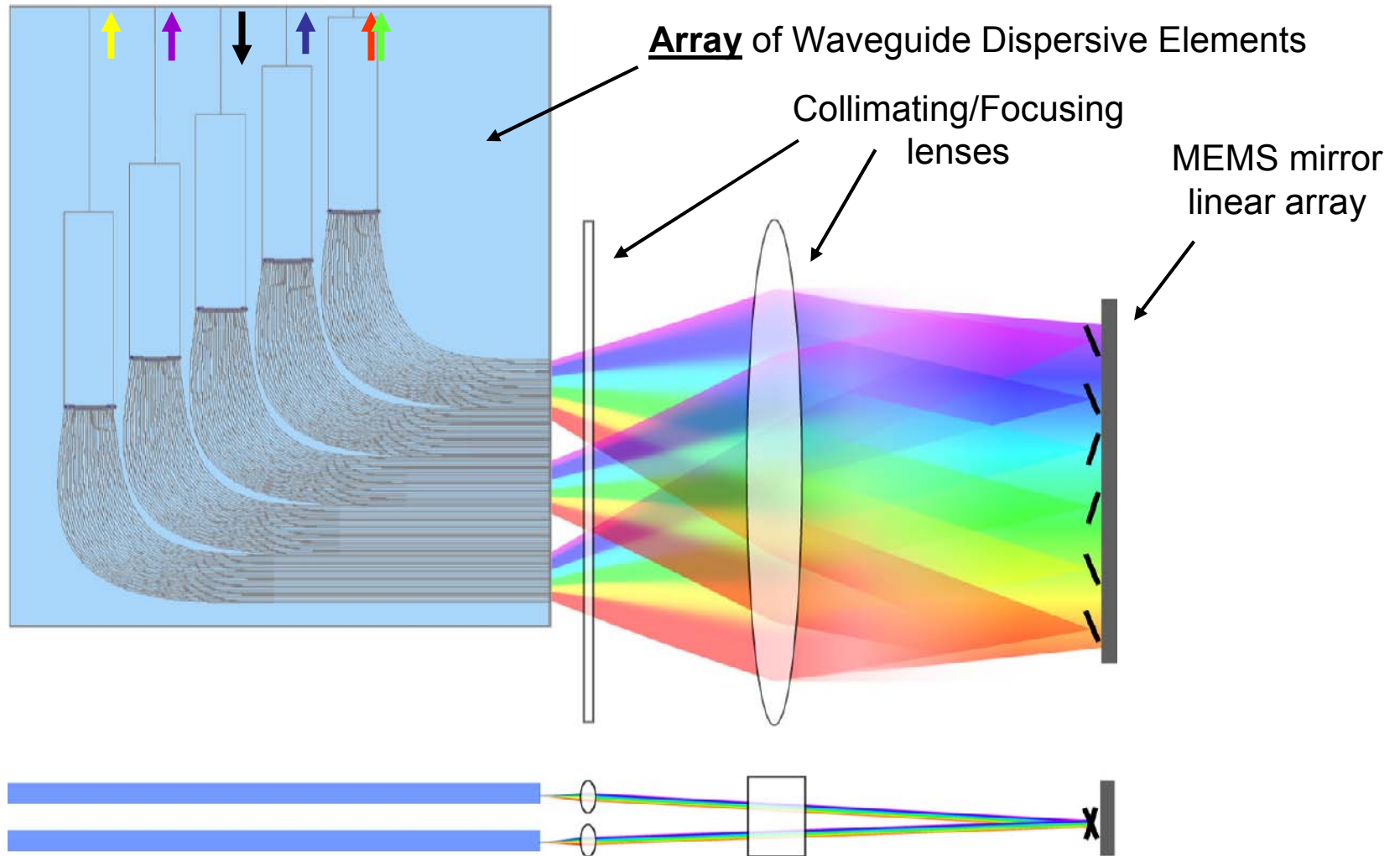
High Performance

- low insertion loss
- wide pass band with flat-top
- constant passband over attenuation range
- 40Gbps and 10Gbps

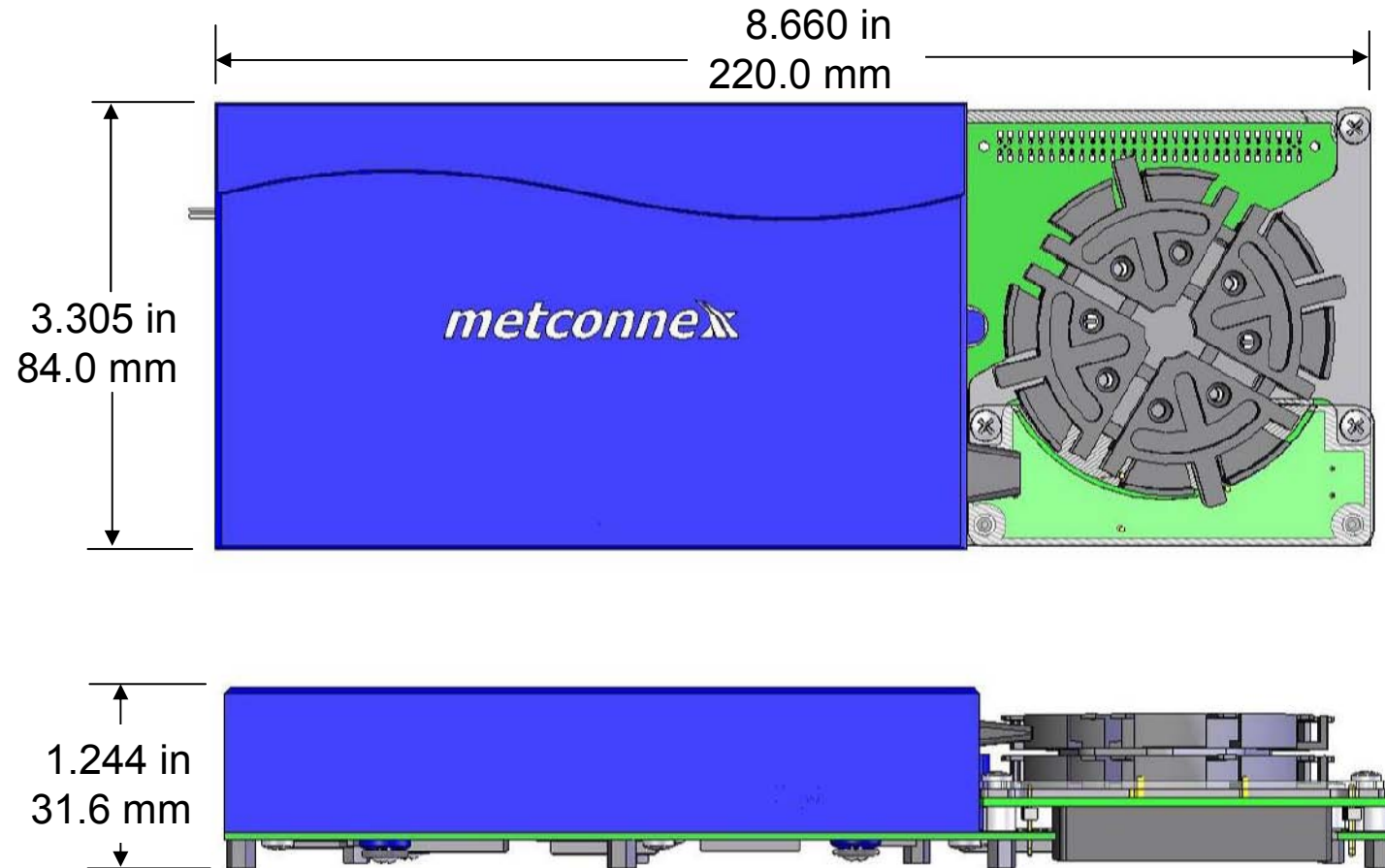
Compact Size



2D arrangement of ports for scalable 1x9 WSS



Small Footprint

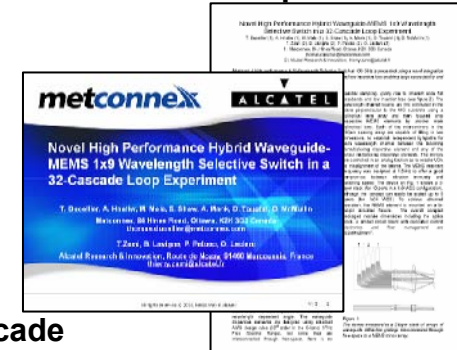


HI-PLC™ Performance:

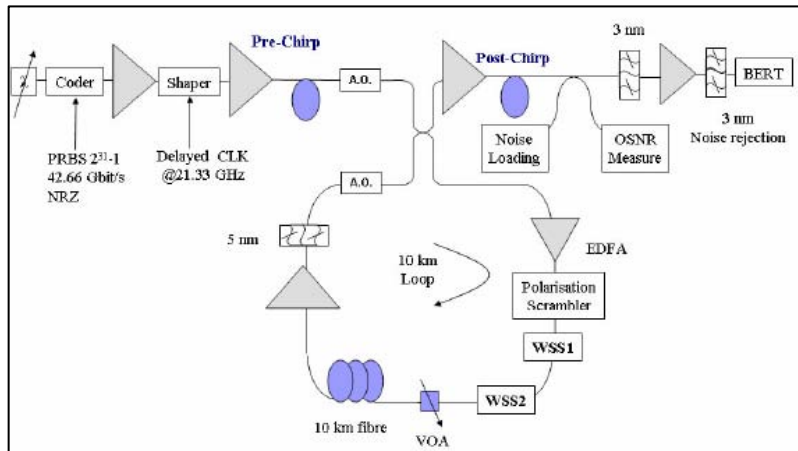
10G and 40G Capability, 30 Cascaded ROADMs

- Maintaining a wide, flat passband across all attenuation is a key requirement to maximize cascadability
- Testing at 10G and 40G has confirmed Metconnex's strength in this area

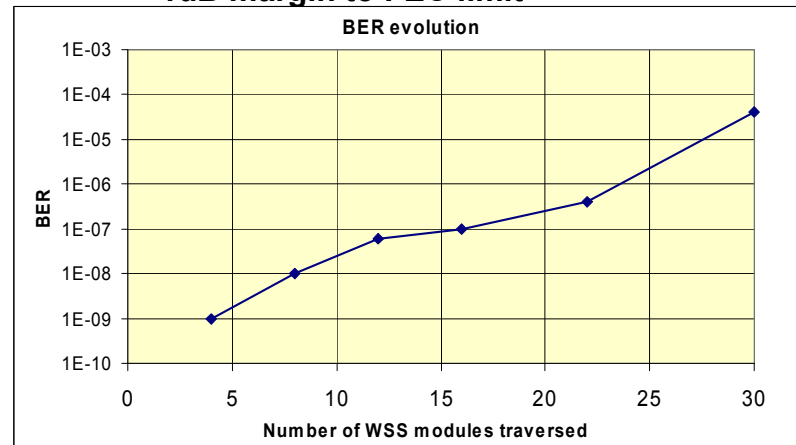
10 Gbps Test bed confirms 32 cascades
Metconnex/Alcatel Post Deadline Paper ECOC 2004



40 Gbps loop testbed

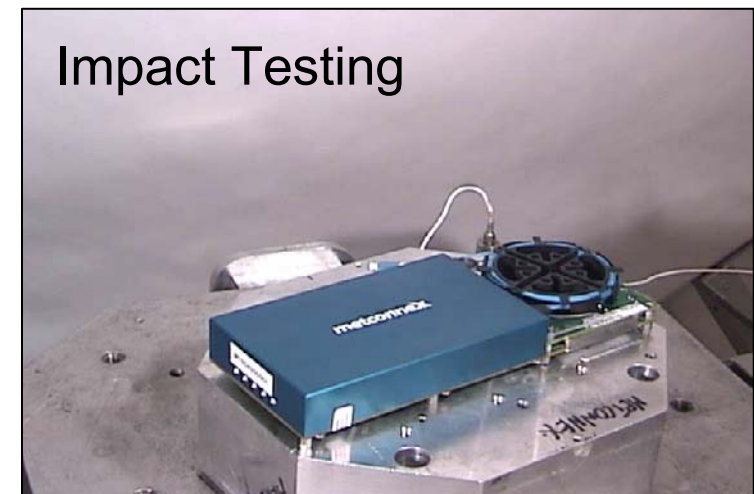
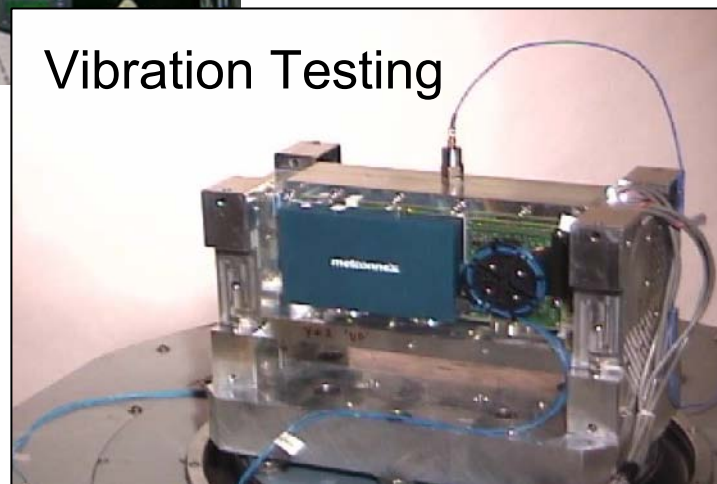
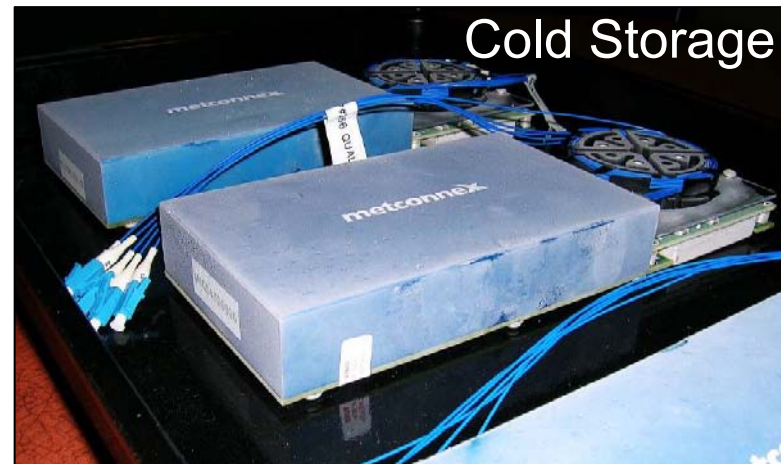


Early 40 Gbps of 30 ROADMs cascade



Maximum cascadability and future proofing

Robust Platform



Summary

- Hybrid PLC + MEMS technology provides
 - High optical performance, especially over attenuation
 - Manufacturability
 - Scalability and versatility
 - Robust platform

