

OPTICAL WAVELENGTH MULTIPLEXING TECHNOLOGIES for INFORMATION-RICH, NETWORKED PLATFORMS

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CHARACTERISTICS of a PHOTONIC MANIFOLD in a COMBINED INTER- / INTRA-PLATFORM NETWORK

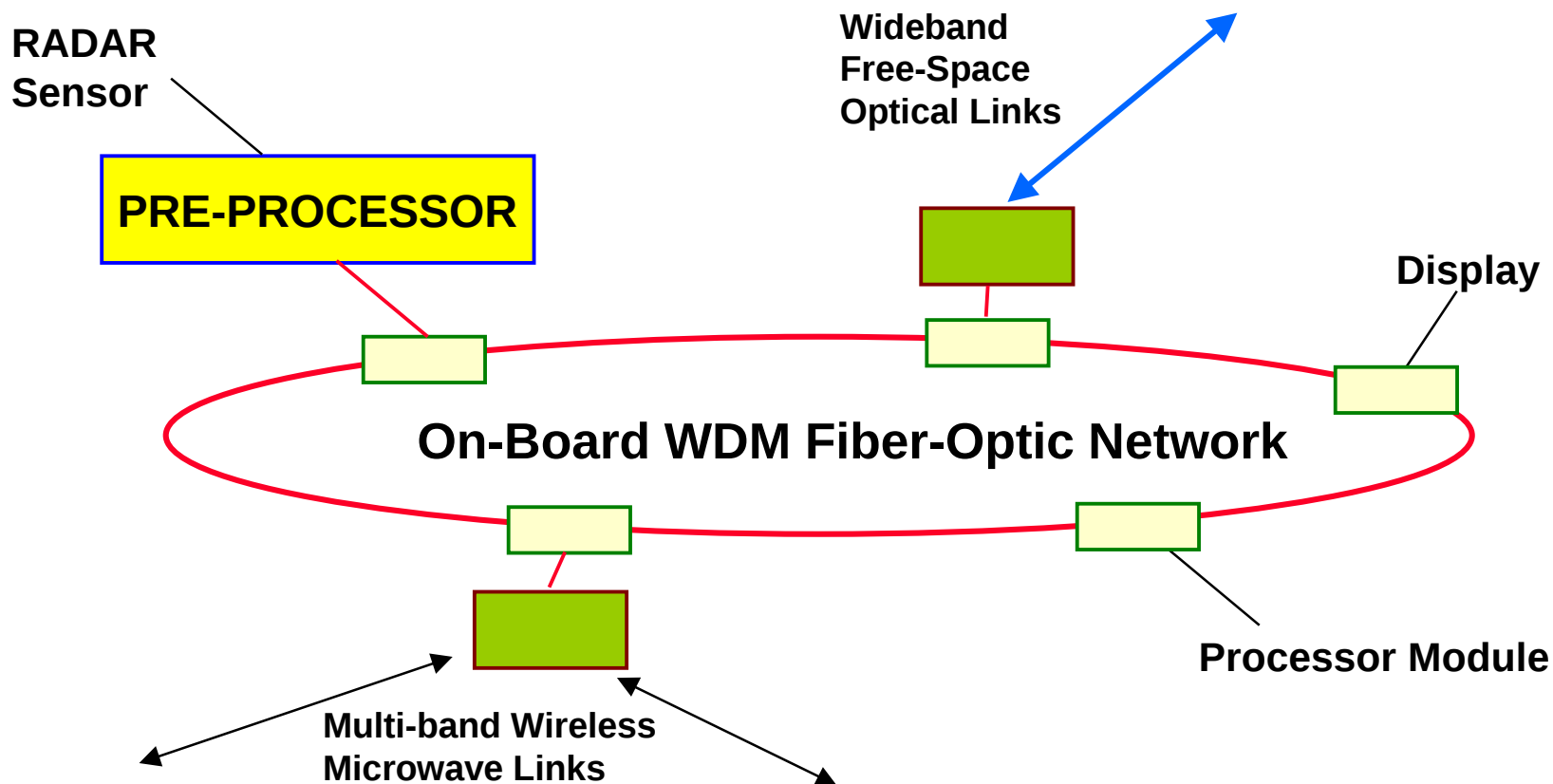
INTER-PLATFORM COMMUNICATION:

- SEAMLESS CARRIER-FORM TRANSDUCTION
(OPTICAL FIBER, FREE-SPACE OPTICAL, WIRELESS MICROWAVE)
- DIRECT CONVERSION BETWEEN WIRELESS, OPTICAL-FIBER AND FREE-SPACE OPTICAL CARRIERS (WITHOUT CONVERTING BACK TO BASEBAND SIGNAL)
- COMBINED USE OF TIME MULTIPLEXING AND FREQUENCY MULTIPLEXING
- WAVELENGTH ROUTING (WAVELENGTH TRANSLATION ?) ALLOWS SEAMLESS CONVERSION BETWEEN OPTICAL FIBER NETWORK AND FREE-SPACE OPTICAL NETWORK

INTRA-PLATFORM SIGNAL DISTRIBUTION, SWITCHING AND ROUTING:

- OF BOTH ANALOG AND DIGITAL DATA
- FOR VARIETY OF MILITARY FUNCTIONALITIES
- INTERFACING TO VARIETY OF PROCESSORS, DISPLAYS, SENSORS, WAVEFORM SOURCES
Transparent to type of modulation / multiplexing format
- CONTROLLER-BASED RATHER THAN CONTENT-BASED ROUTING AND RECONFIGURATION
- OPTICAL-WAVELENGTH BASED *FRAMEWORK* FOR MULTIPLEXING, SWITCHING AND ROUTING
Makes efficient use cabling and connectors
- MIXTURE OF SECOND-LEVEL MULTIPLEXING FORMATS FOR NARROWER-BAND INFO (RF-SUBCARRIER MULTIPLEXING, TDMA AND CDMA)

COMPONENTS FOR MULTI-FORMAT, MULTI-PLATFORM DATA NETWORKS



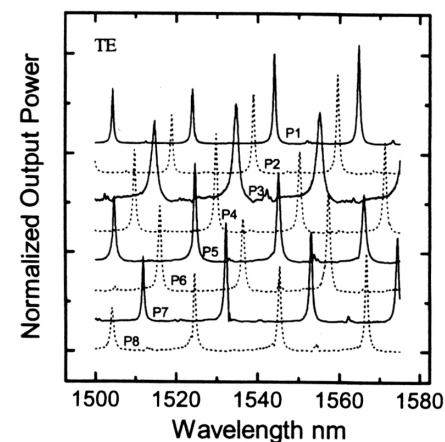
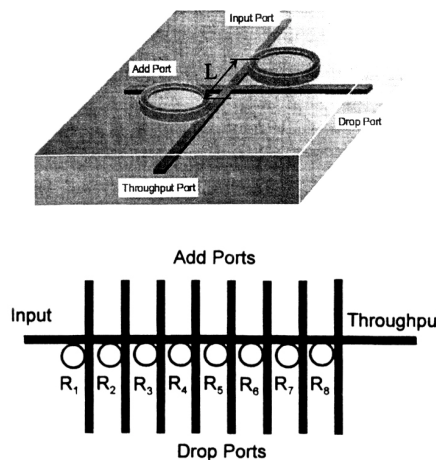
- WAVELENGTH SELECTIVE ADD / DROP MODULES (HIGH ISOLATION, NARROWER BW)
- RECONFIGURABLE WDM-BASED RF SIGNAL PROCESSORS (WIDEBAND, SHARP FILTERS)
- HIGH-FIDELITY TRANSDUCERS FOR FREE-SPACE OPTICAL LINKS
- CARRIER FORM, FREQUENCY BAND TRANSLATORS (TRANSPARENT TO DATA TYPE)

EXAMPLE: APPLYING WDM TECHNOLOGY TO NEEDS OF MILITARY PLATFORMS

ALL-OPTICAL ADD/DROP MULTIPLEXER

- **ADVANTAGE:**
Transparent to Signal Format
- **NEED:**
Tunable Passband and Bandwidth

Ref: S.T. Chu, B.E. Little, et al. (1999)



OPTICAL FIR FILTER

- **ADVANTAGE:**
Frequency Independent Bandwidth & Shape
- **NEED:**
Chip Scale Integration
Power Efficient Components
Low Noise Performance

Ref: N. You & R. Minasian (1999)

