INPUT NODES FOR NORMAL INCIDENCE-FREE SPACE COMMUNICATION FOR OPTICAL NETWORKS EMBEDDED IN COMPOSITES

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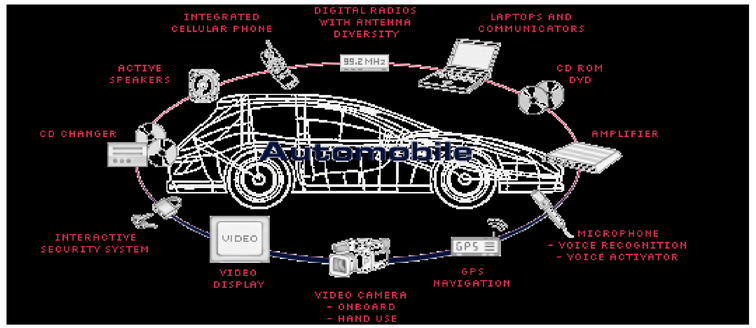
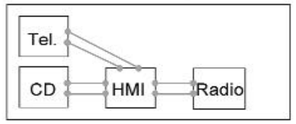
MODERN VEHICULAR COMMUNICATION



- The number of components in a car that require intra-vehicle communication has increased dramatically in the past 15 years
- Increased network traffic has led to a need for a more robust network that can accommodate large traffic flow with a small form factor

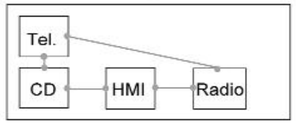
COPPER CABLING VS. PLASTIC FIBER CABLING

Conventional Cabling

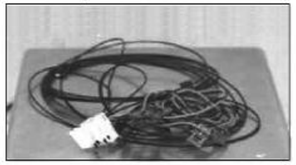


Number of cables	6
Total cable length	12 m
Conductors per cable	3
Total conductor length	36 m
Number of contacts	36
Total cable cost	$2.5x
Total weight	1700 g

MOST Technology

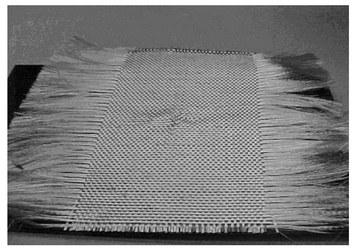


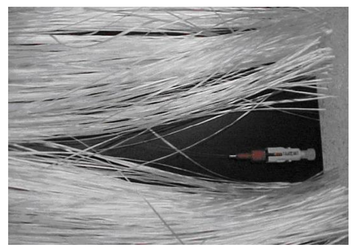
Number of cables	4
Total cable length	9 m
Conductors per cable	1
Total conductor length	9 m
Number of contacts	8
Total cable costs	$1x
Total weight	123 g



Source: OASIS Silicon Systems

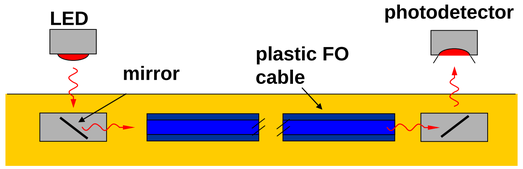
AUTOMATED INTEGRATION OF OPTICAL FIBER INTO COMPOSITE WEAVES





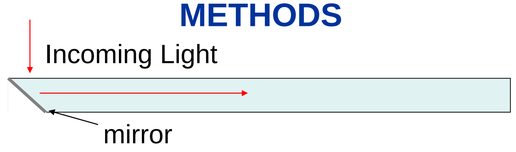
- Automated integration of optical fiber has been demonstrated and would provide a convenient way of running cabling throughout a vehicle
- The major hurdle is that the ingress/egress points of the optical fiber are points of weak reliability

OPTICAL PORTING



- If remote access to the network were available, then one could take advantage of automated integration of optical cabling in composites
- Infrared porting overcomes the problems of physical connectorization at the ingress/ egress points

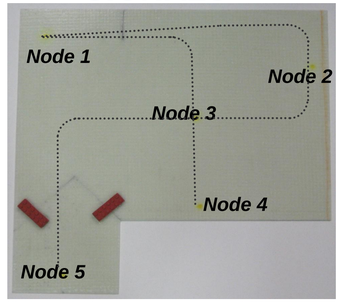
PASSIVE AND ACTIVE METHODS



- Passive methods use passive optical techniques like mirrors to couple light signals into the fiber

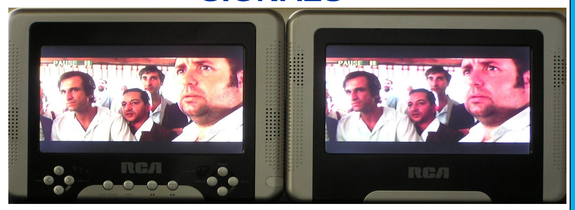
- Active methods use active materials like impregnated dyes to convert free space light of one wavelength to fiber coupled light of a different wavelength like green to red

OPTICAL PORTING OF AUDIO SIGNALS



- Embedded network in composite panel demonstrated I/O nodes, pass through nodes, star node, modularity and redundancy for audio signals

OPTICAL PORTING OF VIDEO SIGNALS



- Optical porting of video signals was demonstrated outside a composite panel

ACKNOWLEDGEMENTS

This work is supported by the Army Research Laboratory through the Composite Materials Research program.