

## Application Profile:

# Harvard and Boston University Link LANs With 10Mbps LAN Extension over Microwave

The main campuses of Harvard and Boston University are located within two miles of each other and are separated by the Charles River which divides Boston and Cambridge. Both universities have numerous local area networks many of which, until recently, had been interconnected at very low data rates. Connections between Boston University and Harvard's ARPANET and CYPRESSNET had been run at 56Kbps and 9600bps respectively. Under pressure from user demands for higher bandwidth and administration concerns for cost-efficiency Dr. Mikhail Orlov, Network Systems Engineer and professor at B.U., researched other alternatives to link LANs between the two universities.

Though the distance between LANs is less than two miles, the Charles River and several highways separate the campuses and limit options available for data transmission between sites. The universities wanted to have high reliability and bandwidth while avoiding the high costs and long lead time for installation of cable and fiber optics. At the time, the trade-off seemed to have been selecting between the higher bandwidth of these options and the lower bandwidth of T-carrier microwave.

"It was obvious that we had to look for some kind of bypassing technique to get us across the Charles River and roadways" Dr. Orlov said. Between the fog over the river and New England's fickle and turbulent weather, some network managers naturally were concerned with reliability issues. As Dr. Orlov mentioned, "Over the past several months we have experienced every conceivable type of weather problem, from fog, snow and freezing rain to heavy downpours, and we have not yet experienced any outages as a result".

According to Dr. Orlov, he began considering microwave and meeting with vendors in the summer of 1986. While vendors were proposing T1 microwave for LAN Extension, Dr. Orlov believed that it should be technically possible to use microwave for full 10Mbps Ethernet transmission, not just 1.544Mbps. That summer Dr. Orlov met with Microwave Bypass Systems of Cambridge, Mass and discovered that they in fact were offering a 10Mbps LAN Extension microwave link using their own microwave/LAN interface and Ethernet Bridges along with International Microwave Corp.'s wideband LAN microwave. Interestingly enough, the cost of such a system was less than that of the other vendors who proposed putting Ethernet traffic over T1 microwave.

After meeting with Microwave Bypass, Dr. Orlov explored two other competing vendors. "We decided to go with Microwave Bypass since it was the only company which specialized solely in LAN Extension and had engineering expertise in both microwave and LAN technologies. In addition, they were the only company able to offer a completely turn-key package including all system components, installation, service, and FCC licensing."

To date, Dr. Orlov and other engineers at B.U. and Harvard have been very pleased with their LAN Extension link. Howie McCausland, Harvard University's Network Manager adds: "I am quite pleased with its performance to date. The minor problems we have seen are due more to a lack of time at our end... than to any deficiency in the equipment." Barry Shein, Boston University's Manager of Special Projects: "We are the first to run TCP/IP at 10Mbps over microwave. So far so good..."

For more information call (617)494-8700 or write: Microwave Bypass Systems,  
One Kendall Square, Suite 333, Cambridge, MA 02139

*(See back side for diagram of system configuration)*

# Boston University-Harvard University

System Diagram of 10Mbps LAN Extension Microwave Link

Site A: B.U.-Warren Tower

Site B: Harvard-Wm. James Tower

