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**MTU Wideband  
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# MTU Wideband System

## Current Status:

The MTU Wideband system is a cable television network that covers a large portion of the campus. It consists of a headend in the EERC building with trunk and branch lines distributing to the various buildings. There are likely hundred of ports on the system, but few are actually used. There are fewer than three dozen known active drops with up to three active television channels on this system at this time.

It has a system capacity of 450 MHz with frequencies higher than 220 MHz used as forward channels. The frequencies below about 180 MHz are available as reverse channels. In the past five years no reverse channels have been active. This is largely due to increase use of fiber or IP based delivery.

## History:

- PRE-1982 RF data system in use, (Sperry Link & Point-Point modems)  
Headend in Admin 2nd floor computer room (mid-split system)
- PRE-1983 E.D.S. Channel added by Teachers Education Department (Apple II)
- 1982 - 1983 Upgrades to system made (Magnavox equipment)
- 1983 Satellite downlink put on system for video conferencing
- 1988-1989 System upgraded to high-split design  
Headend moved to EERC

## Users of system:

Educational Technology Services has approximately 24 lobby and public viewing area TVs tuned to the EDS channel on this system. There also approximately 5 classrooms that may use the EDS / SCOLA / Bloomberg on an occasional basis. The School of Business has one drop --for students to watch news on Bloomberg in a room in the Academic Office Building.

## System Footprint:

|         |             |              |           |
|---------|-------------|--------------|-----------|
| Admin   | AOB         | ROTC         | MEEM      |
| Chem    | MUB         | Lib          | EERC      |
| Library | Rekhi       | Fisher       | Dillman   |
| M&M UG  | DHH         | Walker       | Forestry  |
| SDC     | Wads (café) | McNair(food) | Sat Shack |

## Channel Lineup:

| Ch | Service Name                               |
|----|--|
| 25 | Bloomberg                                  |
| 27 | SCOLA 1: News (** may no longer be used**) |
| 29 | EDS  |

**Technical Issues:**

Due to the high number of reverse channels and the high frequency split design it is impossible to perform FCC / FAA aeronautical frequency leakage checks in the civilian aircraft band. Although the system is generally assumed to be exempt, a full system audit has not been performed to certify it as such.

The hardline coaxial cable that was installed over twenty years ago is now failing due to age. This is mostly due to the fact there is no jacket on most of the outer cable and pin connectors. On any newer cable installations we ensure the cable has a plastic covering and often heat-shrink over any exposed connections. Much of the wideband system had used inexpensive bare aluminum cable. After years of corrosion in manholes some connections have literally fallen apart.

Spare parts for this system are almost depleted for critical system components. The manufacturer discontinued even the special production runs for components used in this design around 2000. Our stock of replacement modules is now nearly depleted. We currently have no spare working line-powered, or AC power modules left. In checking with the manufacturer a few years back they were not able to offer any suggestions for a suitable replacement on the product and recommended a system redesign.

No regular preventative maintenance has been performed on system. As a service supporting few active drops work has been performed as-needed. This has essentially become 'after it breaks we fix it' process. Unfortunately many of the repairs can require significant work-around solutions. The 'fix' is often not a permanent solution, but simply a patch to buy more time.

**Other Issues:**

No entertainment channels are offered and this may be a reason the system has not been more widely deployed. Due to licensing costs we are unable to make the wideband system more content rich, historically this has been a free service.

Most tap ports are vacant with few active drops wired and in service. This poses a significant risk of both ingress and egress radiation leakage. The system should be 'sealed' with terminators on all unused taps to ensure the signal quality is preserved. Many abandoned cables may have been cut and stuffed in the wall, posing an even higher risk of signal leakage. As we have found open ports they have been capped, but a conscious effort to audit all ports on this system has not been done.

**Discussion of possible solutions:**

1: Retention of system (as-is) should not be considered due to the poor physical condition of the cable plant. If retained as a campus cable system significant repairs will need to be made in the near future, but should be completed within about a year. The cost estimates for repairs will approximate the next option.

2: The next option is a complete system rebuild. The main advantage is we should expect approximately 10 years of reliable service on the core cable and electronics. The use of newer digital cable delivery should be built-in along with preserving existing analog channels. There would likely continue to be no charge for end user use of the Wideband system so a maintenance budget should be established out of the general fund. Costs for replacement of the aging hardline cable was estimated at \$210,000, See Appendix A. Rebuilding of the headend for digital delivery is estimated at about \$8,000 - 11,000. Costs for replacement of the active and passive electronic components are approximately \$12,000-14,000.

3: Expansion of the MTU cable system into academic buildings is another option that may be worth consideration. However the cost for licensing the drops may become very costly to the end users. Each drop will require approximately \$20/mo in fees to be paid for the content. Much of the content is not desired, or required, for academic use. However, if the content is needed in a specific area it could be purchased on a semester basis by those who desire it. To service the existing public drop locations the cost would be about \$600/mo.

The approximate costs to expand the MTU Cable service will be approximately \$112,300 + \$20/monthly for cable service. A partial expansion of MTU Cable is an option that may also be considered on a per building basis. This would enable expansion on a strategic basis, and limit the capital expenditures on the system expansion. The MTU Cable system is registered with the FCC as NCID MIA060, and any additional locations would increase our quarterly leakage sweep requirements.

4: The final option to consider is IP multicast delivery of current content that is now on the Wideband system. This will require an encoder for the EDS channel, and a decoder at each end station. Although potentially more costly to the end-users it has the advantage of using an existing network infrastructure. It can be sent or viewed by any location on the campus network via either a PC or dedicated hardware. We have used multicast delivery of video on the MTU cable system for the past two years. There are also many other network streams available today from the Internet2, including Bloomberg.

To upgrade the existing 30 drops to a multicast a system with the EDS encoder would cost approximately \$9600 in equipment + \$403/monthly for network service. See Appendix B for equipment quote. Additional jack installation, for locations not already serviced, would cost approximately \$500 to 1000 for each location.

**Recommendations:**

It is recommended that only the MTU Cable and Multicast options be seriously considered. With obvious budget issues to address these options have the most practical and flexible options and are worth exploring further.

The most versatile system is IP Multicast delivery. This would allow ANY public network port on campus to participate in the reception of content. (Or even the world --if desired.) However, there is a regular recurring cost for network service that may need to be considered. Budget conscious departments may desire to have these channels without the ongoing costs. Every existing lobby television would require an IP set top box for decoding the multicast stream. This has the best strategic interest of the university covered for a direct Wideband system replacement. This would also allow content delivery anywhere the network exists, irrespective of a coaxial cable system. To help cover the conversion to IP Multicast a supplemental budget request may be required for the equipment and installation costs.

Expansion of the MTU Cable system is an option that may be explored. In addition to the current wideband needs we have had occasional requests from various departments to have cable television available in classrooms. Without the infrastructure in place this has been impossible to satisfy on an economical basis. The up-front cost to get the signal to the buildings has been the largest barrier. If available the take rate may be higher, but to date the only non-student drops are activated are in the Library and some select lobbies.

Only with additional significant academic demand should this option be seriously considered. The ongoing costs to deliver this service option are significantly higher than the multicast option. To cover the existing lobby sets would require that most buildings be put onto the MTU Cable system.