I. SUMMARY
The period from July 1, 1995 through June 30, 1996 was one of euphoric highs and dismal lows for the Office of Telecommunications. The $15.8M, 5-year long program to upgrade critical Telecommunications infrastructure was staffed sufficiently to allow formal work to start on Monday, July 3. Design, planning, customer coordination, and other tasks were soon in full swing, with the team working to enable physical installations to start in Spring 1996. Despite the usual challenges, activities were proceeding smoothly until April, when it became apparent that the late 1994 "release" of funds within the state government still required actions beyond those identified by personnel with both the University as well as within the state's Department of General Services. The resultant impact due to this unanticipated situation cannot be determined until the requested funds, for the first phase of the program, are freed. In the meantime, while design work continues, all scheduling, solicitations, procurement, and installation planning has been halted pending resolution.

Of a similar nature, initial optimism about possible allocation of the necessary complementary ongoing funding soon also was tempered by the likelihood that recurring costs for operations and maintenance, eventual replacement, personnel, and other ongoing needs would likely have to come from other sources, perhaps even through internal University cost-recovery. Numerous financial models were examined, with the result being that adequate central funding was earmarked to allow work to proceed. Unfortunately, these funds depend as much upon release of those above as vice versa, and plans are therefore currently curtailed.

Notwithstanding the challenges of managing the infrastructure upgrade project, substantial headway as made in terms of deployment of interactive video services at non-UP locations prior to the start of Fall semester. These services are heavily used by the various campuses, both for academic as well as administrative purposes. In addition, although the set of complimentary services for University Park are delayed as part of the above program, funds were allocated to activate one additional location at UP—in Henderson Building—and the opportunity was taken to utilize a new capability introduced by the vendor. Reportedly, Penn State was the first university to provide "T-l" quality interactive video services via a trio of "dial up" (ISDN) lines. In addition to the UP installation, a similar installation was completed at the Hershey Medical Center campus some weeks later. Arrangements are being developed to provide this type of service at other Penn State locations by retrofitting current equipment with the necessary upgrades.

By the end of the 95/96 school year, 1,996 residence hall students had taken advantage of Ethernet networking services in the residence halls at UP, with over 2000 doing so system-wide. Although the year started with numerous complaints due to vendor equipment supply problems, which persisted through most of Fall semester, those problems eventually cleared, and the year ended on an extremely positive note with an agreement being established with Housing to install the necessary electronics to serve all 12,000+ wired outlets during Fall Semester 96. This progressive step will substantially reduce the time necessary to activate a requested connection, and will establish Penn State as one of --if not THE--largest institution in the country--or the WORLD--to take this step to better serve our students.

II. GENERAL ACTIVITIES AND PROJECTS
CQI
OTC's Administrative Director led a core process team charged by the University's Information and Learning Technologies Task Force to identify the University's customers, core processes, and needs as related to information technology. The multi-organizational, six-month-long effort culminated in a report to the task force being delivered on May 15, with a subsequent briefing being given by the team leader on July 3, 1996. The report identifies seven customer groups and summarizes the needs of each, designates access, training, and support as the three key information technology processes, establishes a framework within which options might be considered, and includes general and specific recommendations for the Task Force to consider.
To improve the quality of life for International Students when they arrive on campus, OTC, with assistance from the Penn State Office of International Programs and AT&T, created multi-lingual instructions for use of Residence Hall telephones. Dialing instructions will be provided in five languages: Chinese, Indian, Japanese, Korean, and Tai. An ACUS (AT&T College and University Solutions) personal security code will be distributed with the instructions to enable students to make long distance calls as soon as they check into their residence hall room.

A Bursar billing form that can be printed from a LaserJet printer rather than typewritten was the result of collaborative efforts of OTC and Systems and Procedures. Upon the request from OHR, OTC also provided training on the new Bursar Billing Form to the OHR, Work/Life Division.

WinRental billing statement changes have been implemented per recommended revisions from the CQI team. Most notably, the report is now in landscape mode, rather than portrait.

INTERNATIONAL VISITORS
OTC hosted a Tonga native, Sitiveni Finau, as part of his participation in the Hubert Humphrey program. Although Mr. Finau had to unexpectedly leave to take advantage of another professional opportunity part way through the year, the months that he worked within OTC learning various aspects provided both him and OTC personnel insight into the each other's backgrounds and cultures.

In early February, the Administrative Director spent time with government visitors from Norway who were interested in the technology and management techniques used within Penn State for Telecommunications. Both, Stig Klingsted (Director General, Ministry of Church Affairs) and Morten Flate Paulsen (Senior Lecturer, Polytechnical College) appreciated the breadth and depth of services we provide, especially on a statewide level, and took copious notes about ideas they might apply to their needs in Norway.

In May, visitors from China who were participating in the Hubei Education College Tour were provided a behind-the-scenes look at our network management and video operations when they and their interpreter were hosted on a tour through the Telecommunications Building. Demonstrating his enthusiasm for this, one OTC staff member even came in during a scheduled day off to assist in making this a quality experience for these visitors. Of course, these particular activities are intended to augment ongoing involvement in international conferences (such as INET) and organizations (such as EDUCOM, ITCA, and ICA) by various staff members of OTC to maintain awareness of changes in telecommunication services, capabilities, policy issues, and regulatory environments at the international level.

AT&T STRATEGIC ALLIANCE
This report marks the end of a second successful year of the Penn State/AT&T alliance. Some $323,000 in funds generated by this alliance were released to the Provost's office and are aiding continuing education, the Catalyst Center for Information Studies, and student services. In addition, $50,000 was provided by AT&T College and University Solutions (ACUS) for student programs and support of a Lady Lion program.

UNIVERSITY CALLING CARDS
To avoid calling card problems as long-standing agreements end between AT&T and local exchange companies, a new calling card access number - 888 PSU 1PSU - was created to assure that all University calling card calls could reach an AT&T network and receive the lowest possible rate. Penn State calling card holders were advised of the new dialing option via a letter sent in April 1996. A calling card sleeve was enclosed with the mailings to protect users’ current corporate calling card and to remind them of the new access number.

UNIVERSITY PARK 800 ACCESS SERVICE
In April 1996, OTC announced University Park 800 Access Service via a letter to current University Park corporate calling card holders. This new service allows traveling Penn State Faculty and Staff to call University Park campus from anywhere within the continental United States at low fixed rates. This service can be used for making calls from any domestic phone to any voice and data service available via the University Park exchanges of 862, 863, and 865. Since the service was announced in April, 321 Faculty and Staff personnel have enrolled.
PENN STATE PRE-PAID CALLING CARD PROGRAM
A contract with a local State College firm, Smart Choice Long Distance, was negotiated for Pre-Paid Calling Cards. These cards, which will be available to any college, campus, or department, can be purchased for resale or promotional activities.

BELL ATLANTIC
Several attempts were made to negotiate a new Centrex agreement with Bell. Although the current agreement doesn't expire until the end of 1999, new service capabilities, lowered electronic costs, and the need to have more direct control over the switching software warranted modifications to the current arrangement. Unfortunately, no agreement with Bell could be attained. Hence, for now, capabilities will be added to the existing Centrex on an as-needed basis rather than as part of a planned revision.

On a positive note, a lowered rate for modem lines used by the Center for Academic Computing (CAC) was negotiated. This provided a significant savings - over $38,000 annually - for growth of the modem pool to provide better service for off-campus dial-in users.

AUDIO CONFERENCE CALLING
According to statistics reported in the charts on Appendix A, Operator Assisted Conference Calls and the "Meet-Me" Conference call service continue to be utilized by University personnel. Recent positive changes pertaining to TSR (Telecommunications Service Requisition) submittal have made these services more desirable.

$15.8M TELECOMMUNICATIONS INFRASTRUCTURE UPGRADE (DGS800-243)
The design of the first phase of the project was submitted to the Commonwealth's Department of General Services (DGS). DOS has approved this phase and requested funds be released from the State Budget Office. The Budget Office has not yet provided a date when the funds will be released.

The first phase, totaling $1.7M, contains the following activities: completing wiring upgrades for Willard and Eisenhower Auditorium; acquiring electronics for creating LANs and connecting them to the campus backbone; adding video equipment to Rider 2, HUB, Willard, Wartik, Hammond, and Kern Buildings, activating a video scheduler for use by all Penn State campuses; upgrading the existing videoconference bridge, and improving the security of telecommunications rooms.

More information about this project can be found on the OTC Home Page.

Appendix B shows the status of wiring to date.

PROJECT VISION EXPANSION
To allow this innovative project to begin, a number of significant activities occurred. Cable infrastructure upgrades were completed at the first three designated "Vision Campuses" - Berks, Delaware and Mont Alto. Since central funds of the amount required were not available, internal OTC reserve funds were utilized to complete the campus cable system upgrades to meet the resultant accelerated schedule. These funds will be recovered over several future years. Following the installation of the new wiring, residence hall LANs were designed and installed, and additional modems were added at these campuses. OTC also worked to develop advantageous calling plans for the Vision students who live off-campus to provide low-cost access for dialing into the campus modems. With OTC encouragement, support structures were developed between University Park and Non-University Park groups to provide a uniform approach to student registration and equipment procurement.

More recently similar plans have been developed for expansion to three additional campuses - Altoona, McKeesport and York - for the upcoming academic year.

ACCESS MODEMS
Modem lines have been upgraded and additional units were installed at Harrisburg and Abington-Ogontz
locations as part of the Access Project. There are now six non-University Park sites that are equipped with 28.8kbps modems. Upgrades and expansions at Behrend, McKeesport, and Wilkes-Barre will be completed by Fall semester. The addition of 256 analog lines in the Computer Building for modems for dial-up data services was completed, bringing the total to 574 Access modems at that location.

VOICE MAIL
University Park (UP) voice mailbox growth continues at a steady pace, as evidenced by the chart in Appendix C. Negotiations are in progress to provide a Works Application software to the University Park voice mail system. These enhancements (to the voice mail system) would enable the Network Management Center to extract caller information from a remote database. When implemented, services such as T.I.P.S. and the Penn State Jobline will be able to utilize the enhanced capabilities of the UP voice mail system, through the Works Application software, to record and store multiple greetings and messages.

OTC published and distributed the first voice mail newsletter. The quarterly newsletter was designed for current and prospective University Park voice mail users and focuses on features of, technical updates on, and frequently asked questions pertaining to the voice mail service at University Park.

Over the past year, five Non-University Park campuses (Berks, Hazleton, Great Valley, Schuylkill, and Penn State-Behrend College) have installed and been offered training on the Intuity Audix voice mail platform, now in place at those locations.

OTC TRAINING
OTC has continued to support the telephony and videoconferencing service by offering free training to University personnel. Many Penn State faculty and staff personnel have taken advantage of these individual or group training sessions as shown in Appendix D.

DATASWITCHES
The University’s aging IDX data switches were decommissioned on July 1, 1996. Conversions to a replacement service were offered and geared towards isolated users that weren't able to get a backbone connection but still required low speed asynchronous data services. Of the 325 connections on the IDX switch at the start of the project, 260 have been dropped by users and 65 have been converted to the replacement service. OTC received 15 orders for new installations.

TECHNOLOGY TEST AREA
An area for testing and demonstrating emerging integrated technologies was created in the Telecommunications Building. An example of the expected uses of this is the creation of an ATM service between the Telecommunications Building and the University Support Building 2 to demonstrate IP over ATM and video distribution over ATM.

NETWORK OPERATIONS CENTER (NOC)
As this was a period of rapid user growth in the services we provide, NOC services were more in demand than ever before. OTC provides a number of avenues for assistance and support in the use of voice, video and data technology. This includes Communications Analysts, various training courses, and the NOC. The growth in registered host connections and the mass installation and activation of residence hall data connections during fiscal year 1995/1996 resulted in thousands of calls for assistance, as shown in Appendix E.

ISDN
In our efforts to provide a residential-to-campus ISDN connection, OTC is gearing up to introduce an ISDN dial-up terminating service. This service will enable faculty and staff members who already have ISDN service in their homes to achieve better utilization of an ISDN link. The goal is to provide 128kbps service for the dial-up connection. Efforts continue to successfully connect an OTC authentication client to the CAC's authentication database. The linkage is needed to enable OTC's ISDN dial-up service to be authenticated and to make improvements to the campus dial-up access system. General cost elements for this new service includes an approximate monthly fee of $50.00, with one-time hardware and installation costs ranging from $500.00 to $1,000.00. Charges for usage of the new OTC ISDN service can vary depending on the type of equipment and
software and line configuration selected.

Authorization from the departmental Dean, or equivalent executive, will be required for residential-to-campus ISDN connections.

LOCAL AREA NETWORKS (LAN)
Over 30 LAN designs have been completed in the past several months. OTC now supports more than 60 LANs throughout the University as shown in Appendix F.

MOBILE COMPUTING
In collaboration with other C&IS units, OTC is developing a plan for deploying secure, mobile-capable Ethernet segments at designated Penn State sites. When completed, this will allow portable computing devices such as personal laptop computers to be easily reconnected among University Network locations.

DATA BACKBONE
The design effort for upgrading the network service at Ag Extension offices located throughout the state continues to make progress. To date, one site has had the Penn State data backbone extended to their location over a circuit similar to those used to connect other campuses to University Park. Sometime in the near future, Internet style dial-up capability will be added to that site. Other aspects – concerning reducing or controlling overall costs - continue to be examined by the College of Agriculture and OTC.

Data backbone host connections are increasing as illustrated in the charts in Appendix G.

The inter-campus network data link has maintained an exceptional percentage of availability during the second half of this fiscal year as shown in Appendix H.

VIDEO SERVICES
As evidenced in the chart located in Appendix I, use of video service continues to grow. As the number of locations with videoconferencing capability grows, the need for maintenance becomes more significant. In response, OTC has developed a plan using an outsourcing approach that could provide affordable and reliable maintenance for any interested University videoconferencing location.

VOICE RESPONSE AND FAX-BACK
To meet the needs of an Entomology department application, OTC has programmed a voice response and FAX-back approach using a system called EDIFY. With this system, Agricultural specialists send voice messages and FAX information into the EDIFY system.

Agricultural parties around the State may make inquiries into the system, via a touch-tone phone, to access the stored information. An 800-line was implemented for disseminating information to Agricultural parties around the State to improve general knowledge of pest activity, in order to more properly manage these pests. With the voice response and FAX-back method, callers may access an initial message which will then allow them the option of accessing information according to geographical region. To further enhance the 800-line information, the FAX-back option was incorporated to allow a caller to receive, via facsimile, a hard copy of the commodities information after listening to the outgoing message. Thus, more detailed information can be sent, such as tables and whole newsletters.

III. STUDENT SERVICES
RESIDENCE HALL DATA SERVICES
In addition to the information in the Summary section, work has also begun to install equipment for new services at Altoona, Beaver, Hazleton, McKeesport, and Penn State Harrisburg locations. Expansion of the service at Mont Alto campus is also underway. By Fall 1996, LAN service will be available to 15% - 20% of all rooms at Non-University Park campus locations. Additional information is contained in Appendix J.
At the end of Spring Semester 1996, the number of connections were:
University Park: 1,996
Beaver: 50
Berks: 17
Hazleton: 70
Penn State Erie: 52
Mont Alto: 23

ACUS OFF-CAMPUS STUDENT PROGRAM
As part of the $50,000 that was provided as a result of our alliance with AT&T, plans for providing an off-campus student program continued and will be introduced with Fall Semester, 1996. Initially, this service will only provide for long distance calling. Plans to expand this with an internet offering and other services or discounts are being conceptualized for the future.

INTRANET APPLICATION DEVELOPMENT
OTC has entered into a software development effort with CAC and Housing and Food Services, The application, WinSIBC, will provide information for management, installation, and maintenance of Student Individual Backbone Connection (SIBC) in residence halls. Of special interest will be a web-based front end that students will be able to use to initiate requests for service installation.

IV. UNIVERSITY PARK ACTIVITIES
PRIVATE FIBER
Private fiber was installed between Applied Science Building and the Water Tunnel for expansion of their networking infrastructure. Private fiber was also installed between Shields Building and the Computer Building to be used to extend equipment as part of the OAS (Office of Administrative Systems) consolidation.

CLASSROOM COMMITTEE
As a result of a request from the Classroom Committee, a backbone connection and LAN order has been processed for Schwab Auditorium. This technology will enhance the effectiveness of instructions held at Schwab.

PRESIDENT CLINTON VISIT
On May 10, 1996, President Bill Clinton addressed the Graduate School in Commencement ceremonies held at the Bryce Jordan Center. To accommodate the entourage of Press and Secret Service personnel with communications needs, OTC assisted the White House, Bell Atlantic, and University Relations by establishing 29 dial-tone lines at the Nittany Lion Inn, and 40 dial-tone lines for the Press, providing circuits at various locations for Secret Service radio communications, and assisted in various capacities to assure the myriad of special communications needs were met.

V. NON-UNIVERSITY PARK ACTIVITIES
DIGITAL TRUNKING
A conversion from analog to PRI trunking was installed at Altoona campus making the service equivalent to a T-1 circuit. Additional trunks were also added to allow the campus to support a P.03 or better grade of service on all inbound and outbound calling. This trunking upgrade will also support the new residence hall scheduled for completion in Fall 1997.

PBX UPGRADES
New PBX equipment was installed at Behrend College, Great Valley and Schuylkill campuses during the first half of fiscal year 95-96. During the second half of fiscal year 95-96, the Hazleton campus replaced their existing GTE OMNI SIII telephone systems with a new AT&T Definity G3V4 PBX and an Intuity Audix Voice Mail system. The new telephone systems at Hazleton campus handle 450 stations. The Berks campus also installed the Lucent Intuity Audix Voice Mail system in June 1996. To make the transitions to the new systems smoother, OTC conducted training sessions on the new feature phones and analog sets as well as the new voice mail systems. The Non-University Park training summary for fiscal year 95-96 is located in Appendix Dehart #2.
VI. INTERNAL OTC

To improve service, upgrades were made to several internal systems and processes:

• The creation of an OTC Home Page and acquisition of a production web server.
• The installation and trial of two desktop video systems running Intel ProShare Video Conferencing Software.
• Continued progress occurred in converting our LAN operating system from Banyan VINES to Windows NT. A related activity involves the conversion of most desktop operating systems from Windows 3.1, Windows for Workgroups and others to Windows NT workstations.
• The annual internal software piracy audit was performed.
• SQLBase, the primary database engine used for internal administrative systems applications, was converted from an OS/2 operating system to an NT Server.

August 12, 1996
OTC Annual Report
Revised October 15, 1996