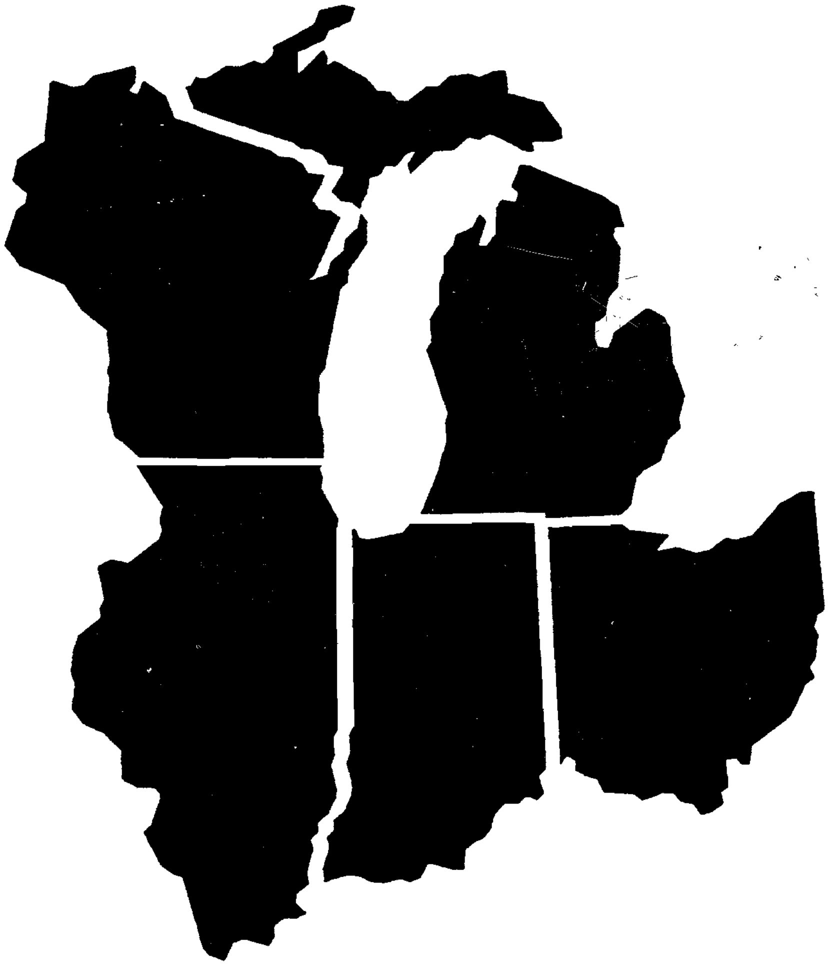
Administration, Installation and Maintenance - Transition Plan Outline

AMERITECH

AMERICAN INFORMATION TECHNOLOGIES



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1.0 Opportunity Statement

In today's Installation and Maintenance Operations environment, POTS, Special Services, Message Trunks and Interoffice. Facilities are supported by two major operating systems. POTS is primarily supported by the AT&T developed Loop Maintenance Operations System (LMOS). Special Services, Message Trunks and Interoffice Facilities are supported by the Bellcore developed Circuit Installation and Maintenance Package (CIMAP). As a result of this dual system support, our organizational and operational structures have developed with a clear division of functions. In recent months, we have seen the blurring of the lines between POTS and Special Services which highlight our need for greater flexibility in mechanized support. That is a single platform which will cross traditional boundaries and provide the flexibility to support any operational and organizational structure.

Conceptually, a single platform would be very beneficial in view of the previously stated trends. However, the migration from our current environment to a single platform must be conceptually as well as economically sound. In October, 1989 an Ameritech staffed task force was formed to investigate the feasibility of migration from our current dual system environment to a singular solution.

It was ultimately decided, based on the empirical data collected, to migrate to one system using the Bellcore developed systems and strategy called Work and Force Administration (WFA). The Bellcore WFA solution matched well with the Ameritech AWF concept and consequently, a planning effort began to merge the two concepts. This will be accomplished by building upon the existing Bellcore CIMAP and Generic Dispatch System product lines and migrating them into the WFA product lines. Coincident with the migration of CIMAP and GDS to WFA, we will also migrate specific LMOS functionality until LMOS is ultimately retired.

The migration to one platform can occur in five years and will cost approximately $152 million dollars. Comparatively, our current method of operations will cost approximately $202 million dollars during the same time period. The difference of fifty million dollars is significant within its' own context, but when consideration is given to other benefits such as the option to consolidate work and forces, the overall benefits increase substantially.

Once the migration to a single platform is complete, Ameritech will begin to realize a minimum of $18 million dollars in annual savings. This savings will directly result from reduced data center operations cost, increased mechanization and flow-through, elimination of redundant processing software and databases and the decrease in developmental cost for new products and services. The key to maximizing the benefits of transitioning to AWF will be the development of a detailed migration plan which will consider the most economical and opportune approach.

2.0 Current Environment

The Present Method of Operations (PMO) consists of LMOS/MLT to support POTS Maintenance in all five Ameritech Operating Companies (AOCs). For POTS Installation, Michigan and Illinois use a system developed by Telic called Installation Force Management (INFORM) which mechanizes the distribution of services orders to the ICCs. In Ohio, Indiana and Wisconsin the Installation of POTS service is manually supported. CIMAP SSC and CIMAP CC are deployed in all five AOCs and supports the Installation and Maintenance of Special Services, Interoffice Facilities and Message Trunks. The Generic Dispatch System - Special Service Dispatch Administration Center (GDS-SSDAC) supports the field dispatch of Special Services for both Installation and Maintenance and is currently being deployed in Indiana, Wisconsin and Michigan. For Ohio, planning is underway to implement GDS for POTS installation and Special Services I&M. The following are systems which will be affected and must be considered in the transition plan:

1. Loop Maintenance Operations System (LMOS)

   The LMOS system mechanizes the administration support of POTS-like trouble reports. Starting with Repair Service Answering, Automated Screening and continuing through field dispatch and completion. There are several systems related to the LMOS system that comprise the Automated Repair Service Bureau environment.

   *The LMOS system will be retired upon the completion of the AWF transition effort to WFA.

2. MLT (Mechanized Loop Test)

MLT is a mechanized test system that provides mechanized testing of the local loop circuits in conjunction with the central office switch. It is directly related to LMOS for circuit data and communication. In today's environment, there are two versions of MLT, MLT-1, which is the older of the two generics, and MLT-2.

*MLT must be decoupled from LMOS to support the transition to WFA. Ideally, MLT will be able to interface directly with WFA in the short term.

3. CRAS (Cable Repair and Analysis System)

The CRAS system is a cable trouble report analysis system. With links to the LMOS host and MTR, CRAS collects data and allows the end-user to request analysis data to determine cable repair trends.

*The CRAS functionality and databases could be taken over by NSDB and WFA. The most economical approach will be chosen in the detailed plan.

4. ACE (Automated Cable Expertise)

ACE uses data collected by CRAS to analyze the completed cable trouble reports in an effort to determine potential problems and chronic areas in the local loop plant.

*As with CRAS, the ACE functionality can be subsumed by WFA and NSDB.

5. VCAS (Voice Customer Access System)

VCAS is a PC voice interface system that allows customers to enter trouble reports directly into the LMOS system. It also allows customers to check the status of previously entered trouble reports. VCAS will become part of the RSA strategy which most likely will be apart from WFA.

6. Ameritech Service Management System (ASMS)

ASMS is a Bellcore developed software application that allows customers to access LMOS and CIMAP to enter and obtain status on trouble reports. It also allows customers to perform electronic test and request traffic management reports.

*ASMS must be able to access WFA and the associated databases.

7. CAS (Craft Access System)

The CAS system allows field technicians to access LMOS to receive and close trouble report data via hand held terminals. Field technicians are also able to request MLT test request through the LMOS work manager.

*CAS is the field access system of choice for Ameritech and must be able to work with WFA. Initially, this will be accomplished through the CAS/Gateway product.

8. Mechanized Trouble Analysis System (MTAS)

MTAS was developed by a small software company called Spencer and Spencer and is used to collect completed trouble report information from the LMOS host and provide internal measurement reports. The MTAS software is owned by Ameritech and resides on mainframe computers.

*MTAS functionality can also be subsumed by WFA and NDSB or, optionally, modified to work with WFA. Again, this will be decided during development of the detailed plan.

9. Predictor

Predictor is a system that collects data from various systems where preset thresholds are invoked to determine probable areas of trouble in the outside plant environment. Predictor is part of the ARSB network of systems.

*Predictor functionality must be cared for in WFA or in the *SANS* architecture. The driver will be *SANS*.

10. Circuit Installation and Maintenance Package (CIMAP)

    CIMAP mechanizes the administration support of the Installation and Maintenance for Special Services, Message Trunks and Interoffice Facilities. The CIMAP system consist of two primary software modules. CIMAP/SSC (Special Service Center) mechanizes work flows, document access and transfer processes for Installation and creates, distributes, tracks and logs trouble reports for Maintenance.

    CIMAP/CC mechanizes the flow of installation and maintenance work to the end central office technician.

    *CIMAP/SSC will become WFA/Control and CIMAP/CC will become WFA/Dispatch-in.

11. Generic Dispatch System (GDS)

    GDS mechanizes the administration support for the Installation and Maintenance of POTS and Special Services. It is inter-related to the CIMAP product line and forms the basis for Bellcore's WFA Systems.

    *GDS will become WFA/Dispatch-out.

12. Trunk Integrated Record Keeping System (TIRKS)

    For Operations, TIRKS is used as the source for obtaining the word document for provisioning via an interface to CIMAP.

    *TIRKS will continue to feed WFA Control the word document.

13. Switched Access Remote Test System (SARTS)

    SARTS is a remote test system that permits testing of special service circuits form the SCC without the assistance of technicians in the central offices.

    *SARTS must work with WFA directly or through some type of interface like ITS.

14. Mechanized Time Reporting (MTR)

    MTR is the system used to report hours and minutes associated with work function codes of the employees. CIMAP and GDS-SSDAC have interfaces to the MTR system.

    *WFA will provide direct input of time reporting data into the MTR systems.

15. SOAC (Service Order Analysis and Control)

    The SOAC interface system is a part of Bellcore's FACS system and serves as an interface between the local Service Order Processor (SOP) and GDS. It receives the service order data from the SOP and automatically queries LFACS and COSMOS for the cable and pair and office equipment facilities.

    *SOAC will serve as the interface between the SOP and WFA.

16. CAS/Gateway

    The CAS/Gateway application is a component of the CAS system and is currently used to obtain trouble report history information from the LMOS host by the field technicians. It is also used to obtain cable and pair information from LFACS and planning is underway to provide access to GDS from the hand held terminal.

    *CAS/Gateway will interface with WFA for field technician access.

17. Service Order Processor (SOP)

    The SOP issues the service orders to Operations Support Systems and accept completion information which is subsequently distributed to the billing system. GDS will automatically enter completion statistics to the SOP via a generic SOP interface.

    *The SOP will send service order data to WFA but more importantly, WFA will directly send completion data to the SOP.

18. Automatic Line Record Update (ALRU)

The ALRU process takes completed service order data via computer tapes and reformats the information. It then uploads the information into the LMOS host which establishes a permanent line record for the circuit in the LMOS database.

*The ALRU process will be completely eliminated with the implementation of WFA.

19. Mizar (Versanet)

The Mizar system is a memory administration system used by the RCMAC to translate line service order data into recent change messages in an ESS office. The system automatically generates recent change messages and updates switches on the appropriate date as well as making switch changes for residential service without the need for physical wire changes.

VERSANET is the Illinois Bell version of MIZAR and is currently scheduled to be replaced by MIZAR in the fourth quarter, 1992 to first quarter, 1993 timeframe.

20. OPS/INE

The OPSE/INE system mechanically converts and transmits TIRKS provisioning data to Intelligent Network Elements (INE). All provisioning functions are automatic and flexibly driven by date and time. INE memories are permanently stored in OPS/INE databases from which failed INEs can be restored. OPS/INE will be moved to a fault tolerant environment in the 1992 timeframe and FLEXCOM will be replaced by LINC in 1993.

3.0 Business Vision

The Business vision for AWF must consider the technological impacts of new products and services such as Fiber in the Loop and Intelligent Network. The overall objective of AWF is to be able to support any product or service within any operational or organizational structure. This will be accomplished by allowing the end user with as much control of the system parameters and administration.

At the same time, we will provide the opportunity to consolidate functions and processes. For example, in today's operations environment we have established approximately twenty different types of administration centers and of the twenty types, over two hundred and fifty total. The business vision must include the capability to reduce redundancy and streamline functions whenever possible. This business vision was developed based on the following assumptions.

Assumptions:

1. The ongoing maintenance and enhancement cost of a dual system environment will continue to outpace the similar cost of a single platform.

2. Because of the need to decrease the time interval for delivery of new services and products, a single platform will be critical in the long term.

3. It is no longer necessary to support our services with multiple systems, as a result of the blurring between POTS and Specials.

4. We must be able to react quickly to change and substantially reduce the current 18 month interval for major enhancements, if we are to be competitive in the future business environment.

5. We must obtain as close to 100% flow-through as quickly as possible, if we are to be truly a low cost provider.

6. The ability to efficiently utilize our human resources will be directly related to the mechanized support system.

7. We are firmly committed to strategies and new technologies i.e., OSCA,OSI and SDA.

8. There will be a desire to consolidate as many administration center as possible as we move forward.

9. The need to provide flexible organizational and operational structures will increase along with the ability to facilitate changes will.

3.1 Macro Economics

The macro economics associated with the AWF transition plan are listed below. The figures are sectionalized into major categories and can be used for projecting five year expenditures. The economics were taken from the AWF ten year CUCRIT study and reflect the Bellcore software packages cost, the anticipated hardware cost and the total support cost which includes staff and administrative support. The incremental savings reflect the estimated savings by comparison to the projected PMO cost.

($=Millions)

CATEGORY	1991	1992	1993	1994	1995
BCR S/W Packages	6.571	5.800	5.676	5.366	5.367
Hardware/Capital	0	6.000	6.000	12.000	0
Total Support	14.800	15.400	16.100	17.700	18.500
Incremental Savings	-0.700	1.200	5.700	8.200	15.200

3.2 Technology Platform

Architecturally, we envision a single network database which will be accessed by a single layer of processing software which will be accessible by multiple user layer software and . Eventually, the software application that makes-up AWF will be completely modular. That is, each modular component will be interexchangable without any degradation to the total system. In addition, the software modules will be defined with standard and open interfaces so that any vendor choosing to supply software will be able to compete for our business. This multiple vendor environment will be beneficial to Ameritech and should result in reduced development cost.

Although the technical aspects of AWF will be ultimately decided by our technical organization, the AWF systems must be able to provide rapid recovery of system outages and as near to 100% availability as technically possible. This means of course, the ASI technical organizations will be responsible for selection of the appropriate hardware and operating environment to obtain the AWF goals.

4.0 AOE Strategy and Milestones

The Ameritech Operating Environment strategy is to begin to deploy those systems that are considered common and in accordance with our strategic direction. With each implementation, we should move closer to the ultimate goal and realize immediate incremental benefits.

STRATEGY-FIRST STEP
The first step in our strategy to reach AWF is to begin to Convert our POTS ICC'S to GDS Installation support. At the same time, we need to ensure the current deployment efforts of CIMAP/CC and GDS-SSDAC are completed as soon as possible.

STRATEGY-SECOND STEP
Next, we must provide POTS Installation and Special Services I&M field access support via the Craft Access System. This effort will entail utilizing the CAS/Gateway product developed by Ameritech in conjunction with AT&T.

STRATEGY-THIRD STEP
Once we have provided flow-through to the field technician, then we will begin to convert CIMAP and GDS into WFA Control and WFA Dispatch out respectively. This must be completed before 1993 since CIMAP will no longer be supported after 1992.

STRATEGY-FOURTH STEP
Finally, once WFA is deployed, we can then begin to migrate POTS maintenance support from LMOS into WFA. First we will migrate into WFA Dispatch Out and then into WFA Control. Upon Completion, we can then retire LMOS and establish a single platform. The dates below are broad estimates and will be finalized after review with the AOC subject matter experts.

STRATEGY-FIFTH STEP

The cumulative effects of these prior steps will have sufficient weight to justify creation of the MIC's Manage Implementation Administration Centers (MIAC), Manage Implementation Dispatch Administration Centers (MIDAC) and Survey & Assure Network Administration Centers (SANAC) within each operating company. Today each AOC has at least ten different MIC type centers accounting for over 230 separate hubs. Initially these centers can be combined by basic function associated with a particular type of application like Plain Old Telephone Service (POTS) or Central Office (CO). Later total responsibility for a particular function, regardless of service focus, can be centralized into hubs for control (MIAC), dispatch (MIDAC) and surveillance (SANAC). In either case, the Ameritech Operating Companies (AOC) will continue to have a multitude of centers, but less than the 230 + that exist today.

4.1 MILESTONES

MILESTONES	YEAR
Begin GDS POTS Installation (OHIO)	1990
Complete deployment of CIMAP/CC	1991
Complete deployment of GDS-SSDAC	1991
Install WFA Release 1.0	1991
Install WFA Release 1.1	1991
Begin to migrate circuit data to NSDB	1991
Begin field access for Specials	1991
Begin GDS POTS-Installation field access	1991
Begin GDS POTS Installation (Regionally)	1991
Begin CIMAP migration to WFA control	1992
Begin CIMAP migration to WFA dispatch IN	1992
Begin GDS migration to WFA dispatch OUT	1992
Complete WFA deployment POTS-1 and S.S.	1993
Begin WFA POTS-M and craft access test	1993
Begin merging of WFA POTS I&M/SS dispatch OUT	1993
Commence the implementation of MIDACs	1993
Begin the deployment of SANAC	1993
Start implementation of MIACs	1994
Begin merge of MS/AS into WFA control	1994
Begin retirement of LMOS	1995

*The dates listed above are broad-gauge estimates and will be finalized during the development of the detailed transition plan.

5.0 Critical Success Factors

First and foremost, we must purchase the WFA software and associated products if we are to begin to migrate to WFA. Next, and extremely important is our willingness to migrate to the current WFA release levels as quickly as possible. By remaining current with the WFA and associated software release levels we can migrate to one system more quickly.

Near Term (zero to two years):

1. 1991 Bellcore funding packages:
   - WFA Dispatch out
   - WFA Control
   - OPS Migration
2. Trial of GDS POTS Installation
3. Complete CIMAP/CC deployment
4. Individual AOC AWF strategy sessions
5. Short Form Transition Plan
6. Reduce/Eliminate funding of non-common projects
7. Complete deployment of GDS SSDAC
8. NSDB deployment must precede WFA deployment
9. Resources and commitment from ASI, AAT and the AOCs.
10. Detailed Transition plan 1-5 years.
11. Integrated Migration Strategy with other systems
12. The inclusion of WFA with the Data Center consolidation plan
13. Field Access capability across Operations
14. Consolidated Operations support and planning

LONG TERM (two to five years):

1. Migration of LMOS MMA and WFA Dispatch out
2. Migration of LMOS Host data and NSDB
3. Migration of LMOS Screening and WFA Control
4. Integration of all Dispatch-out functions
5. Integration of all Dispatch-in functions
6. Integration of all Repair Service Answering
7. Integration of all WFA control functions
8. Begin administration center consolidation
9. Begin retirement of LMOS

III. "TO BE PROVIDED IN A LATER ISSUE"

IV. SURVEY AND ASSURE NETWORK SERVICES (*SANS*)

1.0 Opportunity Statement

To effectively address the changing and merging of technologies requires the introduction of complexity and flexibility in the Surveillance and Assurance of the network in the future. Surveillance and Assurance is critical to the company's introduction of new services, achieving major operating efficiencies and accelerating customer response time. Surveillance and Assurance is an area of great strategic importance because of its critical effect on day-to-day operations and its absolute necessity to future competitive success. Therefore, the performance and capability of Surveillance and Assurance can severely impact the achievement of corporate goals.

Survey and Assure Network and Services (*SANS*) architecture will address the functional area of surveillance and assurance as required by the present and future needs of the business. It will fully mechanize and automate surveillance and assurance processes. And continuously performs surveillance and assurance of the loop interoffice and switching networks by providing an integrated end to end network view. It will optimize network performance, identify abnormal network situations and activate network controls or corrective actions in real time. Provide common systems for surveillance, network traffic management and data collection. *SANS* will conform with the corporate goals and strategies which dictate the best service provided in the most efficient manner.

SANS functional architecture will consist of three high level applications which will perform the following functions:

1. Survey all network facilities (interoffice, local loop, and switching elements) to identify both potential and actual performance outside of established maintenance perimeters.

2. Survey and correlate both network interoffice switching trunk and switching machine usage for down stream (non-real time) applications.

3. Survey network interoffice switching trunks and assure the network's ability to process customer call requests by initiation of corrective measures (real time).

The monitoring, message analysis, and control functions of *SANS* will be "global" in the sense that they will encompass (1) all classification of network plant, (2) essentially all vintages of network equipment, both new and embedded, and (3) and entire geographic area.

SANS continuously performs monitoring and analysis of the network. Gathers and analyzes maintenance messages, including alarms, performance data and traffic flow data automatically generated by the network and by individual requests. Once a degradation of service is detected, *SANS* determines its source and severity, and provides analyzed trouble indications to *Work Force Administration* (WFA). In addition *SANS* is able to shut down, turn up and reinitialize NEs, cut off local alarm indications, set and reset performance parameters and thresholds, reroute traffic, and control spare resources used for the restoration of service.

Network controls enables administrators to set the following controls: (1) Analysis Controls, (2) Message Alert Controls, (3) Maintenance Center Controls, (4) Patch Line Administration Controls.

Network management application receives and analyzes real-time traffic load data from Network Elements (NE) to detect traffic congestion conditions in the network. In turn, it implements commands to NEs to (1) shed traffic from the network of (2) reroute traffic through the network.

Enables users to set parameters for sending and receiving messages automatically with NEs, intelligent NEs, remote alarm gathering devices surveilled by *SANS*. It also provides the user a real time manual means of communication with the network. *SANS* provides communications using multiple protocols and languages including the standard interface recommended by the T1M1.5 committee. This function supports the capability to interface with multiple vendor deployment in the network.

Network data collects, validates, archives, and distributes traffic measurement data to requesting client Operation Support (OS) systems.

2.0 Current Environment

The Present Method of Operations (PMO) is divided by organizational boundaries. Each discipline (interoffice facilities, local loop, and switching) have their own operational support systems which provide a piecemeal network view. Some systems are utilized by more than one discipline. Hardware on some of these systems are manufactured discontinued and on all the systems the maintenance costs are increasing. Some maintenance centers are utilizing multiple systems to surveil its network which means multiple terminals on users desks. Notification of events between maintenance centers is done manually, if done at all. Systems that are deployed in all five companies are not standard and not all companies have the same systems. The following list is of systems that are currently being used in the *SANS* architecture:

(For milestone dates for the following systems, see pages 4-7 and 4-8.)

1. Automated Cable Expertise (ACE)

   The Automated Cable Expertise (ACE) provides a computerized approach to analysis of outside plant problems. Migration plans to NMA will be provided in the future.

2. Alarm Management System (AMS)

   The AMS system surveils the microwave interoffice facilities for the Facility Management Administration Center (FMAC) and the Corporate Surveillance Center (CSC). It is currently deployed in Indiana Bell, Michigan Bell and Wisconsin Bell. Migration plans to Network Monitoring and Analysis (NMA) are being worked on in each company currently.

3. Dataloc

   The Dataloc system surveils Indiana Bell's Digital Loop Carrier (DLC) for Distribution Services. Migration plans to NMA are currently being worked on by Indiana Bell.

4. Digital Facility Monitoring System (DFMS)

   The DFMS system provides centralized administration and control of the digital facilities network for the CSC in Michigan Bell. Migration plans to NMA are currently being worked on.

5. Engineering and Administration Data Acquisition System (EADAS)

   EADAS automatically collects traffic data from electromechanical and certain electronic switching systems. Migration plans to a Network Data Collection Operations Systems (NDCOS) are currently being worked on. NDCOS will be available for deployment in 1993.

6. Engineering and Administration Data Acquisition System/Network Management (EADAS/NM)

   EADAS/NM provides centralized near real time surveillance and control of network systems and trunking network within a specific geographic area. Currently Network Traffic Management Operations System (NTMOS) vendor selection is in progress for a replacement of EADAS/NM. This system is deployed in all five companies and is used by Network Management Centers. (NMC).

7. Integrated Network Trouble Analysis (INTA)

   INTA performs historical analysis on interoffice path failures from large geographical areas and resides on NSCS. This is an interim system and is used by NMC.

8. Network Data System (NDS)

   NDS provides for managing the collection manipulation and analysis of traffic data in accordance with user requests. It is currently being deployed in all five companies.

9. Network Monitoring and Analysis (NMA)

   NMA is a maintenance surveillance and analysis support system designed to monitor the total end-to-end network continuously. Currently being deployed in the FMAC and CSC centers of all five companies. This new system is planned to replace embedded systems currently used today. It will integrate interoffice facilities, local loop and switching disciplines into one common system and provide an end to end view of the network.

10. Predictor

Predictor is a computer based system designed to receive outside plant related maintenance messages. Migration plans to NMA will be provided in the future.

11. Switching Center Control System (SCCS)

SCCS provides the facilities to control, administer, and maintain switching systems from a remote, central location. Migration plans to NMA are being worked on currently in all five companies.

12. Signaling Engineering and Administration System (SEAS)

SEAS is the primary support system for Common Channel Signaling (CCS) network. It supports memory administration of the Signaling Transfer Point (STP), near real time network surveillance, monitoring the performance of the CCS network and development of busy hour statistics used for engineering the network. It is an interim system and migration plans to NMA, NTMOS, and other systems will be provided in the future.

13. Telecommunications Alarm Surveillance and Control (TASC)

TASC is an automated system that provides centralized alarm reporting status surveillance and remote control of the telecommunications equipment. It is deployed in all five companies and is used by all three disciplines. Currently migration plans are being developed in all companies to migrate to NMA.

14. T-Carrier Administration System (TCAS)

TCAS is a system which analyzes T-Carrier alarm status and creates trouble cases based upon that status, for clearance by field forces. Currently Illinois and Michigan have completed migration off TCAS to NMA; the other companies are in the migration process now.

15. Total Network Data System/Equipment (TNDS/EQ)

TNDS/EQ provides for managing the collection, manipulation and analysis of traffic data in accordance with user requests.

The following list of systems are planned for the *SANS* architecture:

1. Network Data Collection Operating System (NDCOS)

   NDCOS is a system for collecting traffic data from network elements. It is the replacement system for EADAS in 1993.

2. Network Performance Management System (NPMS)

   NPMS will provide an integrated view of Network Traffic Management (NTM) and Network Trouble Patterning (NTP). Bellcore and Ameritech have established requirements and developed a prototype of NPMS.

3. Network Traffic Management (NTM) System

   NTM Operational System (OS) will preserve the call processing and traffic routing integrity of the network when it is being stressed beyond its engineering capacity. It is the replacement system for EADAS/NM. Deployment will be in 1991.

4. Network Traffic Patterning (NTP) system

NTP OS will identify and isolate irregular and/or intermittent service completion failures that are due to unrecognized hardware and software errors in the network. It is the replacement system for INTA.

The following list of systems will be impacted by the *SANS* architecture and should be considered in the transition plan:

1. Ameritech Service Management System (ASMS)

   ASMS is a software application that allows customers to appear to access the *SANS* operational support systems. This will allow the customer to track maintenance troubles in their network and control the traffic over their network.

2. Centralized Automatic Reporting On Trunks (CAROT)

   CAROT provides demand and scheduled testing of analog trunks and some switched special service circuits.

3. Circuit Installation and Maintenance Package (CIMAP)

   CIMAP is an automated pricing, loading, and tracking system designed to support Maintenance and Control Center operations in effective force and work management, work status tracking, performance and productivity tracking. Will be replaced with Work Force Administration (WFA) in 1992.

4. Central Office Equipment Reports (COER)

   Provides traffic data measurements using EADAS input. Will use NDCOS data in 1993.

5. Computer System for Mainframe Operations (COSMOS)

   A real time computer designed as a wire center administration system for subscriber services: responsible for assignment and inventory control of central office facilities. SWITCH will replace COSMOS.

6. Integrated Network Planning System (INPLANS)

   INPLANS is a planning application that provides the capabilities to develop integrated plans, plan custom networks and plan for the rapid deployment of new technologies, architectures, and services, and to track traffic sensitive networks.

7. Network Services Data Base (NSDB)

   NSDB is the common data base for circuit information; C1 inventory in the Trunk Integrated Record Keeping System (TIRKS). The interface effected will be to NMA.

8. Service Management System (SMS)

   Provides monitoring and updating of the CCS network.

9. SWITCH

   The new nodal inventory and assignment component for integrated provisioning, assigns both line and trunk switch ports. It replaces COSMOS and TIRKS/Generic TAS systems while adding enhanced functionality.

10. Trunk Integrated Record Keeping System (TIRKS)

TIRKS provides for the creation and maintenance of equipment inventory and assignment records, and pending equipment orders. It also provides for the creation and maintenance of central office switching equipment assignment records including trunk relay, traffic measuring, and test access. The interface to TIRKS for the *SANS* systems is through NSDB.

11. Work Force Administration (WFA)

WFA will replace CIMAP in the future and it will also replace the trouble ticket administration function in NMA. Deployment of WFA will be in 1992.

3.0 Business Vision

ASSUMPTIONS:

1. The ongoing maintenance and enhancement cost of a multiple system environment will keep increasing.

2. New services and technologies will cross organizational boundaries which demands the integration of interoffice, loop and switching organizations.

3. To be able to support new services and technologies a total end to end view of the network is needed.

4. We are committed to the Ameritech Operating Environment (AOE), Software Operating Environment (SOE), to Data Center Consolidation, Maintenance Center Consolidation, Operations System Computing Architecture (OSCA), Operations Standard Interface (OSI), and Ameritech's goals and strategies.

5. If we are to be competitive in the future, we must reduce the time interval of software fixes and enhancements. And *SANS* infrastructure must be flexible to easily respond to new services, products and conditions.

6. *SANS* is consistent with Ameritech's Enterprise Modeling Methodology (EMM).

7. To be a low cost provider we must obtain 100% flow through as soon as possible.

3.1 Macro Economics

The macro economics associated with the *SANS* transition plan are listed below. The figures are sectionalized into major categories and can be used for projecting five year expenditures. The economics were taken from all the projects WEPs that make up the SANS architecture. They reflect the Bellcore and AT&T software costs, the anticipated hardware cost and the total support costs. The incremental savings are not provided at this time.

($=Millions)

CATEGORY	1991	1992	1993	1994	1995
BCR S/W Packages	19.242	21.678	23.391	22.029	21.969
AT&T Software	4.042	1.867	1.500	1.500	1.500
Hardware/Capital	23.007	19.060	5.270	5.300	5.150
Total Support	3.522	3.522	3.799	3.575	3.575
Incremental Savings					

3.2 Technology Platform

SANS will provide an integrated total network view for the maintenance centers, which will reduce dispatch cost on troubles in the network. To be able to surveil and assure our network 24 hours a day, seven days a week, fault tolerant hardware will be deployed where necessary to assure that availability. Eventually, *SANS* software applications will be modular, which will allow software modules to be interexchangeable without effecting other modules. This will necessitate each module supporting the standard and open interfaces which will assure a multiple vendor environment. This environment should result in reduced development cost to Ameritech.

4.0 AOE Strategy and Milestone

The Ameritech Operating Environment (AOE) strategy is to begin to deploy systems that are common and in accordance with our strategic direction. The deployment of each module of *SANS* will move us closer to that goal.

First, completion of deployment and deployment of Bellcore's Network Data System (NDS) product family in the region. NDS will provide functionally that collects traffic data, utilizes it to perform service surveillance and to provide data to other OSs requesting data for their individual purposes. The main network data systems within NDS are Data Collection Operations System (DCOS), Traffic Information Distributor & Editor (TIDE), and the Flexible Reporting (FLEX) system. NDS product family will replace these embedded systems: Total Network Data System/Equipment (TNDS/EQ), Traffic Data Administration System (TDAS), Engineering & Administrative Data Acquisition System (EADAS).

Second, is completion of integrating interoffice, loop, and switching within Network Monitoring and Analysis (NMA) surveillance system. NMA has been deployed as a facility surveillance system in the Ameritech Operating Companies (AOCs) and switch surveillance will be deployed in 1991, at which time NMA will be integrated.

Third, to fully deploy our Network Service Data Base (NSDB), which will provide a corporate circuit data base. NSDB is currently needed to support NMA and our Work & Force Administration (WFA) systems.

Fourth, the deployment of our Network Traffic Management Operations System (NTMOS) in the region. The selection of AT&T's NetMinder system for NTMOS was made September 1990. First deployment will be in Illinois Bell with the other AOCs following. This system replaces the embedded Engineering and Administration Data Acquisition System/ Network Management (EADAS/NM).

Fifth, continue the development of Network Performance Management System (NPMS). Currently a prototype was built by Bellcore for Ameritech, and it is currently working in Illinois Bell. Deployment of NPMS is needed to provide a total network support view.

Sixth, define the requirements and develop Network Trouble Patterning Operation System (NTPOS).

Seventh, deployment of NTPOS to replace the embedded integrated Trouble Analysis (INTA) system.

4.1 MILESTONES	YEAR
Start NMA/Facility deployment	1989
Start migration off TASC	1989
NMA/Switch buy-in	1Q90
RFP issued for NTMOS	2Q90
Start prototype trial of NPMS	3Q90
Completion of NMA/Facility deployment in the region	3Q90
Select vendor for NTMOS	3Q90
NSDB - NMA/Facility interface working	3Q90
Complete prototype trial of NPMS	4Q90
Start software development for NDCOS	4Q90
Continue NDS deployment	4Q90
Start migration off Dataloc in Indiana	1Q91
NSDB established	1Q91
Start deployment of NTMOS	1Q91
Start migration off EADAS/NM	1Q91
Start NMA/Switch deployment	2Q91
Start migration of SCCS	2Q91
NSDB - NMA/Switch interface established	2Q91
Start migration off DFMS in Michigan	2Q91
Start migration off AMS	2Q91
Load NMA release 3.2 Analog switch analysis	3Q91
Integration of NMA/Facility and NMA/Switch	3Q91

4.1 MILESTONES (Cont'd)

MILESTONES	YEAR
Completion of TCAS migration to NMA in the region	4Q91
Completion of AMS migration to NMA in the region	4Q91
Completion of Dataloc to NMA in Indiana	1Q92
Completion of DFMS to NMA in Michigan	2Q92
Completion of NTMOS deployment	4Q92
Completion of EADAS/NM migration to NTMOS in the region	4Q92
NDCOS software soaked	4Q92
Completion of TASC to NMA in the region	4Q92
Start deployment of NDCOS	1993
Start migration off EADAS	1993
NDCOS release 2.0	1994
Completion of deployment of NMA/Switch	1995
Completion of SCCS migration to NMA	1995
Completion of deployment of NDCOS	1995
Completion of EADAS migration to NDCOS	1995
Start migration off SEAS	1996
Completion of SEAS migration	1997

* The dates listed above are broad-gauge estimates and will be finalized during the development of the detailed transition plan.

5.0 Critical Success Factors

Near Term (1-5 years)

1. 1990 Bellcore Funding packages:
   NMA/Switch
   NDCOS
   NPMS requirements
   NPMS prototype trial
2. Completion of NMA/Facility deployment.
3. NMA/Switch deployment.
4. Integration of NMA/Facility and NMA/Switch.
5. Establishment of NSDB/NMA interface.
6. RFP issued for NTMOS.
7. Short form Transition Plan.
8. NTMOS vendor selected.
9. NMA analog switch analysis.
10. NDCOS deployment.
11. NTMOS deployment.
12. NPMS prototype trial completed.
13. NTPOS requirements development.

Long Term (3-7 years)

1. Detailed Transition Plan 1-5 years.
2. Integration of *SANS* Transition Plans with AWF, NSDB, and TNS.
3. Center consolidation plans.
4. Migration plans to support OSCA and OSI.
5. Migration plans for SEAS.
6. Migration plans for INTA.

V. TEST NETWORK & SERVICES (TNS) TRANSITION PLAN OUTLINE

1.0 Opportunity Statement

Existing test systems are primarily focused in the technology they respectively address and are extremely rigid in architectural design, i.e., an inability to plug-in new functionality in a modular fashion. This lack of flexibility is increasingly cumbersome and continues to require multimillion dollar work efforts to rewrite the code, and eighteen to twenty-four months to complete the work. Meanwhile, work-arounds, portable test sets and new stand-alone systems are being employed to test new services and network elements.

Although various vendors have developed test measurement hardware that will meet our testing needs, it is not compatible with the embedded proprietary interface systems. Vendor-specific proprietary interfaces for the testing systems have and will perpetuate a non-competitive environment that promotes high enhancement costs and a lackadaisical response to Ameritech's needs.

The lack of an integrated controlling function for the various testing resources has perpetuated a redundancy of controllers, test capabilities and data bases in the separate systems. Also, there is a natural tendency to reap the particular benefits of embedded systems until they are dangerously obsolete. This has tightened the straight jacket environment in which the company must meet the present and future challenges of providing and maintaining services for customers.

This transition plan puts in place a target architecture (TNS) that will support the testing of all customer services and network elements, in the most reliable manner at the lowest cost. Testing is critical to the company's introduction of new services, achievement of major operating efficiencies, and acceleration of customer response time. Testing is of great strategic importance due to the critical effect on the Front Line Business Processes (day-to-day operations); support of the Business Processes is an absolute necessity for future competitive success. Therefore, the performance and capability of the testing AOE can severely impact the achievement of corporate strategies and goals.

2.0 Current Environment

System Overview

The Switched Access Remote Test System (SARTS) is the traditional vehicle for the Special Service environment. The Mechanized Loop Testing (MLT) system is the test vehicle for the Plain Old Telephone Service (POTS) environment. Various other systems test Digital Data Services (DDS). These systems replicate the functionality of Analyzation/Control, Test Measurement, and Network Access, in that they employ separate and unique Test System Controllers (TSC), Remote Test Units (RTU) and Test Access Units (TAU). Automated testing is accomplished through different systems for the respective service offerings. Special Services employees Expert Tester (EXT) in conjunction with Circuit Installation and Maintenance Assistance Package (CIMAP) and POTS services are automatically tested by the MLT system in conjunction with the Loop Maintenance Operations System (LMOS).

The following systems will be impacted or will impact the TNS transition plan:

1. Switched Access Remote Test System (SARTS)
2. Mechanized Loop Testing (MLT)
3. Hekimian Laboratories Inc. (HLI)
4. Teradyne
5. Switched Maintenance Access System (SMAS)
6. Loop Maintenance Operations System (LMOS)
7. Work and Force Administration (WFA)
8. Network and Services Data Base (NSDB)
9. Ameritech Service Management System (AMAS)
10. AutoTest-2 (AT-2)

3.0 Business Vision

The single objective of the TNS architecture is to provide the capability to test all customer services and network circuits. The TNS architecture is composed of three functionally unique but interdependent applications that will form one collective entity to meet all test requirements. Each unique application will consist of a modular system design which will provide the flexibility to expand and support present and future testing capacity and technology requirements. This flexibility will allow highly customized arrangements to address specific needs.

The TNS architecture will comprise three distinct functional areas working in concert:

* ANALYZATION/CONTROL FUNCTION

- provide the analyzation and control functionality for testing and evaluation in a completely automated process.

* NETWORK ACCESS FUNCTION

- provide the access functionality for connection to all circuits and network elements regardless of specific technology.

* TEST MEASUREMENT FUNCTION

- provide flexibility of plug-in functionality to address the technologies of today and tomorrow.

Assumptions:

1. New products and services will require test capabilities in an automated fashion.

2. To meet the introduction of new products and services the time frame for enhancements to the testing structure must be shortened.

3. New and embedded Test Measurement and Network Access systems must integrate with the TNS Operating System (OS).

4. Test Measurement systems must have flexibility to add technology or capacity enhancements in a modular fashion.

5. Eliminate consideration of traditional testing environments as a factor in determining future test system requirements.

6. Testing is critical to support the FRONT LINE business process, especially in the area of FLOW THROUGH for provisioning and maintenance.

7. The automation standardized test procedures will provide accurate fault analysis and will result in a reduction of skilled personnel.

8. The TNS architecture is consistent with Enterprise Modeling Methodology (EMM), Open Systems Computing Architecture (OSCA), and Open Systems Interconnection (OSI).

3.1 Technology Platform

The TNS architecture is based on the principles of OCSA and OSI. How these principles apply to the Testing architecture are as follows:

Full Access Capability

The Network Access Application architecture will permit connection to all circuits and network elements, regardless of specific technology. This will reduce the redundancy of individual access systems required to address each technology. A critical factor concerning Automated Flow Through is the ability to access all technologies as well as the circuit or network element at every logical location. This application reaches beyond the walls of the central office and into the customer premise. An Intelligent Network Termination Devise is a critical element of this application. The ability to remotely access the circuit and control it is an essential factor in providing automated testing for the Automated Flow Through process. The Intelligent Network Termination will be able to perform multiple functions to assist the Test the circuit to the point of demarcation.

Full Test and Performance Monitoring Capability

The Network Access Application architecture will permit both simultaneous performance monitoring for the SURVEILLANCE OS and intrusive testing for the TNS OS. This application will ensure nondisruptive background scanning while also supporting full test access capability. This will reduce the redundancy of separate systems providing multiple access to the same network circuit or network element at the same location.

Future Integration

The Network Access Application is transitional, in that it will bring embedded network elements into the twenty first-century, for test and performance monitoring purposes. This application will eventually be eliminated when this functionality is integrated in the network elements of the future.

Integrated Architecture

The ability to select any desired test activity from a single application will eliminate the present need to replicate existing measurement functionality in another test system. The traditional restrictions of separate systems are eliminated through the flexibility to select any desired test activity in any combination of loop-back, transmission, or metallic measurements to address any technology.

Modular Architecture

The modular architecture of the Test Measurement application will allow us to address today's capacity and measurement requirements. And, as new technologies are deployed, and new types of measurements are identified, the Test Measurement application's modular architecture will accept any new "PLUG-IN" functionality. This will enable us to support future testing requirements and maintain economic performance.

4.0 AOE Strategy And Milestones

AT&T has been selected for theTNS architecture.