

NETWORK TECHNICAL SUPPORT PLAN DESCRIPTION FOR THE AT&T COMMUNICATIONS COMPANY

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A. NTS Operations and NTS Engineering	5	1.01 This section describes the objectives, opera- tions, and administration of Network Techni- cal Support (NTS). This includes the working relationships that NTS requires in order to perform effectively.	
B. NTS Interfaces with AT&TC Support Centers	6	1.02 This section is reissued to revise the basic plan for AT&T Communications (AT&TC) Com- pany personnel. Revision arrows are used to empha- size the more significant changes.	
C. NTS/Service Manager and NTS/ Marketing	6	1.03 The Network Technical Support Plan was in- troduced in 1981 (SR 81-07-300), primarily to provide a "Court of Last Resort" for resolving diffi- cult customer service problems. The plan is Opera- tions driven with Transmission Engineering support.	
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NOTICE

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Appropriate NTS contacts have been designated in all Regions and Headquarter organizations to provide this support.

1.04 Services provided directly by the AT&TC require that personnel have technical knowledge and understanding of the various network equipment and facilities. These designated NTS personnel, referred to as contacts, are required to resolve complex network service problems. As problems occur in the installation and maintenance phases, the network forces need assistance quickly. The NTS plan affords this assistance directly and quickly by Operations and Engineering NTS personnel.

1.05 The term network as used in this section is defined as all equipment and facilities furnished by AT&TC and services between any network interface (NI). The NI is defined as the location on all connecting entity premises at which any AT&TC offering is terminated on a physical interface for connection to the network. Network channel terminating equipment (NCTE) may be required in order to properly terminate the service in terms of design, installation, and maintenance parameters.

1.06 It is expected that NTS contacts will be needed to help solve the new or different problems that normally require assistance and that result in excessive outage times and user dissatisfaction. Although it may primarily involve services in the Special Services category, it is not limited to those services. All types of facilities or equipment could be involved. Official or internal services are included.

2. DESCRIPTION OF SUPPORT

2.01 The NTS contacts are a nucleus of existing personnel located in each operating region in both Operations and Transmission Engineering departments. The primary function of these contacts is to meet service needs by assisting and supporting field forces in performing tasks that are new or rarely encountered.

2.02 The primary objective of NTS is to improve AT&TC services by bringing service problems to the attention of qualified technical personnel through the use of escalation procedures. The use of these procedures in conjunction with existing Bell System Practices can aid in reducing long service outages or delays which cause acute customer dissatisfaction.

2.03 An initial step toward improving network services is to ensure that the field forces are properly trained and equipped to carry out basic work assignments. The NTS contact is in a position to recognize the need for improved test equipment and training for the field forces to perform their normal tasks. Any deficiencies that are found by NTS should be referred to the proper departmental staff group.

2.04 The objectives of the NTS Plan are:

- To provide timely, effective technical support to solve difficult and/or time consuming problems experienced by users of AT&TC services.
- To provide NTS personnel with an immediate NTS contact in all areas of the country. This contact needs to be technically trained, equipped, and responsible for helping to solve escalated technical service problems.
- To inform, train, and keep current a small group of specialists in the fast-changing technologies involved in new service offerings.
- To ensure that the NTS designee establish an interface with the local subject matter expert (SME) in all areas of transmission, signaling, and switching.

A. Organization

2.05 Operations is the organization that is measured to meet results criteria both for productivity and service quality. Engineering traditionally provides the design function and technical support for maintenance functions. Many situations could require that both organizations become involved. The framework shown in Fig. 1 indicates coordinated effort when required.

2.06 A list of the AT&TC NTS contacts in Operations and Engineering is published in Section 010-522-101, and the BOC NTS contacts are in Section 010-523-101. All initial requests for assistance from field forces or support groups will first go to Operations and then Engineering support when needed.

B. Availability and Staffing

2.07 The NTS contacts should not be so encumbered with other duties that they are not immediately available to the field for technical support activities. Resolving network technical problems arising from user reports should be the highest job function priority. Contacts in both Operations and Engineering organizations in each region and company headquarters have been designated as the point of contact for that entity.

3. NTS PERSONNEL

3.01 This part describes the typical qualifications and responsibilities of NTS contacts.

A. Qualifications

3.02 In order to perform effectively, NTS contacts must have knowledge, experience, or understanding in the following areas:

- Methods of testing data and voice, private line, switched network, and private switched network services
- Central office switching equipment
- Signaling concepts
- Tariffed offerings
- Registration, interconnection, and interpositioning
- Satellite vs. terrestrial transmission effects
- All types of wire and carrier systems
- Test equipment and testing techniques
- The effect of station equipment, data set, and terminals on network service
- Bell System practices, drawings, and technical references
- Network channel terminating equipment
- Central office transmission and signaling equipment
- Power and grounding.

3.03 In addition to these qualifications, the NTS contact should have a good appreciation for modulation theory, coding schemes, computer technology, and software support systems.

3.04 The NTS contacts will communicate with many work groups both inside and outside the Bell System. They must have sufficient technical background to communicate effectively in these encounters.

B. Responsibilities

3.05 The primary function of NTS personnel is to assist in resolving unique problems on AT&TC services. All services, customer or internal, will have equal importance to NTS personnel in terms of priority or type of assistance rendered. In response to a request for assistance, NTS will consult with the Plant Control Office to determine which tests have been made, analyze test results, and recommend solutions. These trouble solving activities may include all or some of the following responsibilities:

- On-site field assistance
- Methods counsel
- Policy counsel
- Informal on-the-job training of field forces during case resolution
- Monitoring quality of service to customers
- Monitoring test equipment needs.

On-Site Field Assistance

3.06 The NTS contacts will go to customer locations, central offices and outside plant locations as required to identify and resolve unusual service problems. They are expected to coordinate their efforts with the normal repair forces/work groups responsible for that equipment. They will coordinate their activities with other technical support personnel to obtain assistance at work locations outside their assigned territories.

Methods Counsel

3.07 The NTS contacts will offer technical advice on reasonable questions about service. These questions may originate from other AT&TC organizations, such as:

- Work centers (Special Service Centers, Serving Test Centers, Switching Control Centers, etc)
- Network Administrative Centers for technical assistance
- NTS contacts in other regions for help on circuits, trunks, or facilities into that region
- Management or Sales on formal or informal customer complaints
- A design engineer on a problem regarding design of a circuit or service
- A maintenance engineer regarding corrective action on equipment
- Others.

Policy Counsel

3.08 The Network Technical Support contact may be called upon to implement system policy regarding the Company's obligation and responsibilities as outlined in tariffs, technical references, and maintenance practices. The NTS contacts, of course, do not make policy but will need to contact those people who do and to convert that policy into the actions required by work forces. Examples of this type consultation might involve access, interconnection, interpositioning, registration, etc.

On-The-Job Training

3.09 On-the-job training will be accomplished by the NTS contact working on-site, as well as by telephone, with field people to resolve difficult problems. This training function will occur and should be encouraged. However, the use of NTS personnel as formal trainers should be avoided.

4. CASE ESCALATION

4.01 Formal escalation procedures are necessary to provide the proper resources to resolve a particular service problem. Complex problems encountered by the field forces, such as incompatibility between AT&TC service offerings and customer provided equipment, systems, and networks, often require expert assistance for a fast resolution of the problem. To improve the installation and maintenance of AT&TC services and to help avoid long service delays or outages and customer complaints, the field forces must be provided with rapid access to technical personnel who can assist in resolving these problems. It should be stressed that a request by field forces for on-site technical assistance does not relieve those field forces of the responsibility of resolving the problem.

4.02 There are two types of escalation for service problem cases: administrative and technical. The NTS contact should not be involved in administrative matters and concentrate on solving technical problems. These two types of escalation and the conditions under which they apply are outlined below.

A. Administrative Escalation

4.03 Administrative escalation is the normal organization techniques for resolving problems that are fairly well defined. This procedure refers problem cases through the chain of command successively higher until a supervisory level is reached that can resolve the problems on an intra- or interdepartmental basis. This type of escalation is effective in dealing with administrative problems but is not always the most effective method of rapidly resolving difficult technical problems.

4.04 Examples of administrative matters are basic planning shortcomings, service order incompleteness, lateness or errors, design deficiencies, equipment or facility availability or known incompatibilities, shortage or recognized inadequacy of test equipment, incomplete testing, training deficiencies, business service needs, or difficulties in scheduling coordinated tests. It is extremely important that NTS contacts do not become involved in either resolving or escalating these administrative matters. Although it is sometimes difficult to separate administrative matters from technical service problems, every effort should be made to do so. However, a series of seemingly administrative matters can eas-

ily result in a technical problem—the overall service may involve many elements of facilities, such as equipment, switching, signaling, equalization, etc. Each is a simple matter in itself, but when integrated with others, the individual causes may not be identifiable. An example situation is where a particular modulation scheme is vulnerable to a particular transmission parameter. These cases can take excessive time to resolve if not spotted early.

B. Technical Escalation

4.05 Escalation of technical problems must follow an entirely different path from administrative problems if the problems are to be resolved quickly. Simply stated, NTS must expeditiously define the problem and get to the person who knows the solution. Therefore, the escalation procedure for resolving technical problems is designed to find the most direct route to get help, as shown in Fig. 1. Each step in the escalation will afford a broader scope of contact for solution of the problem. The main purpose is expediency. If at any step the contact is unavailable, that step should be bypassed in order to get the answer quickly, with follow-up as appropriate.

4.06 The first escalation step is the most critical but the most difficult to enforce. When Bell System Practices or other guidelines are followed, they usually resolve the vast majority of the problems that are encountered. The remainder results from conditions or situations that were not envisioned and will require special expertise. It is for these reasons that this phase of the escalating process must be made mandatory.

4.07 There are three general situations where the first step of escalation from field forces to Regional NTS contacts is mandatory:

- AT&TC specifications are met but the customer is still not satisfied.
- AT&TC specifications cannot be met and the reason cannot be found and up to four working hours are allowed for determining the cause before escalation.
- Problems of a chronic nature have resulted in repeated trouble reports (over 3 per month on the same problem) where the source of the problem cannot be determined using normal troubleshooting procedures.

4.08 Most cases will be resolved at this first level of escalation by telephone conversation. However, some cases will require on-site assistance to utilize the experience, training, or testing capability of NTS contacts. The training and test equipment required for this level of investigation would not be economically feasible for normal work forces.

4.09 The second step in the escalation process is to Headquarters. Although this level of escalation is seldom required, the broader scope of experience in other communications areas and with other communications companies may be available through Headquarters subject matter expert. On-site assistance by Headquarters NTS will seldom be required. A close contact with all region NTS contacts is required to assure that all avenues have been investigated and that experts in all fields have been consulted.

4.10 The third step of escalation will be made by Headquarters with the person(s) that developed the equipment, system, or plan in question. Field visits will be limited to cases not resolved by telephone.

5. WORKING RELATIONSHIPS

5.01 This part discussed some of the coordination aspects with other groups involved with the NTS effort. These coordination procedures are intended to supplement, not replace, existing administrative and control office responsibilities and practices by efficiently bringing in the proper NTS assistance on complex technical problems.

5.02 There must be efficient coordination and cooperation among all the parties concerned with the provision of AT&TC services. This applies equally to both inter- and intracompany relationships. When more than one NTS contact is involved with a particular service problem, the NTS contacts may agree to identify one as the "lead NTS" to coordinate the efforts involved. In this case, the NTS contact that resolves the problem should always provide feedback of the results to the other NTS contacts that have assisted.

A. NTS Operations and NTS Engineering

5.03 The Operations and Engineering contacts for the NTS Plan will interface with each other regularly, maintaining a close working relationship.

Certainly, both disciplines are involved. The NTS concept is Operations driven with the full support of Transmission Engineering. The need for technical assistance can result in, and from, a myriad of causes or events. The intent is for Operations NTS to (1) assure that maximum use is being made of existing centers, functions, practices, and capabilities, (2) resolve cases utilizing available resources, and (3) request support on those technical cases that truly require Transmission Engineering assistance.

5.04 It is expected that a high percentage of cases will be handled by telephone, with on-site assistance provided only as required. This on-site assistance can be provided by either or both specialists, depending upon the availability of proper test equipment, expertise, and the preference of the specialists. However, requests for technical assistance should be met immediately.

5.05 If the field escalates a case directly to the NTS engineer, the engineer will contact the appropriate NTS Operations personnel to be sure they are aware that technical support has been requested.

5.06 If the Operations step is bypassed because the contact is unavailable, the Engineering contact should attempt to correct the problem as quickly as possible and make the appropriate follow-up calls to Operations later.

B. NTS Interfaces with AT&TC Support Centers

5.07 The NTS contacts are designated primarily to assist AT&TC field forces and work centers. When these centers request technical assistance, it should be considered as the primary mission of NTS. It is important to stress that NTS does not replace or supplant any existing functions but is intended to help in those cases that go beyond the normal practices or require special testing or expertise.

5.08 Over the years, specific coordinators or functions have been identified, such as Data Specialist, Digital Data System (DDS) Coordinator, Other Common Carrier (OCC) Contact, Common Control Switching Arrangements (CCSA) Coordinator, Signaling Contact, etc. The NTS contact can act as a source of information for these functions and help to avoid repetition or duplication of efforts. The NTS function is intended to provide technical support and will not replace or duplicate these other func-

tions. The NTS contact knows who to go to for help in a particular discipline or responsibility.

C. NTS/Service Manager and NTS/Marketing

5.09 The NTS will not normally accept trouble reports that have not been reported to a Serving Bureau (SVB), Special Service Center, Serving Test Center, etc.

6. NTS INTERFACES WITH OTHER ENTITIES

6.01 There will be instances when communication between AT&TC NTS contacts and local exchange carriers (LECs), interexchange carriers (ICs), and customer premises equipment (CPE) suppliers are required. During the trouble clearing process, regular work forces may have interfaced with the technical support contacts of other entities. However, there should be some control over the amount of this interaction and the exchange of information. There must be assurance that legal constraints are being met while observing the changing environment and that all guidelines for entity interaction are being followed. The escalation hierarchy for resolving problem cases involving outside entities is shown in Fig. 2. Although there will be contacts for information purposes, when an escalated trouble case is involved, the first step must be to **assure that normal trouble reporting processes have been followed.**

A. AT&TC and Bell Operating Companies

6.02 Interfaces between BOCs and AT&TC specialists are expected to be many and varied. Requests for technical assistance from line forces and/or centers should be directed to their own company NTS contacts. Then the NTS contact may request assistance from other support groups or centers or directly from other NTS contacts. The primary motivation should be to get the problem resolved. Once a problem is escalated to an NTS contact, the contacts for any other companies providing that service could become involved.

B. NTS/OCC

6.03 The NTS will interface on OCC matters only through the Trouble Reporting Control Office (TRCO), the Bell System point of contact (BPOC), or the Engineering point of contact (EPOC). These guidelines are not intended to supplement or replace

the functions presently performed by the TRCO, BPOC, or EPOC personnel. The NTS will not accept troubles that have not been reported to a TRCO.

C. NTS Customer Premises Equipment Technical Support Organizations

6.04 The NTS will interface on technical matters concerning station equipment troubles with CPE technical support organizations equally. These interfaces are not clearly defined at this time. It should be noted that the CPE organization (DATEC, VOITEC and SOFTEC) is now the technical support for AT&T Information Systems and is treated as CPE Technical Support Organizations.

7. EXCHANGE OF TECHNICAL INFORMATION—LEGAL CONSTRAINTS

7.01 It will be necessary for AT&TC NTSs to exchange technical information with technical support groups associated with outside entities. For example, each will need to know the technical parameter being measured at a location or access point in order to isolate the cause of problems with the service. **However, this exchange should only include that information relating to the trouble.** As a rule, the exchange of technical information should be limited to that information needed to resolve the problem.

7.02 Legal constraints that must be observed are (1) safeguarding proprietary information, (2) protecting customer information, and (3) avoiding comparing the equipment or services of one supplier or carrier with that of another. The NTS contacts must also be familiar with the legal advice contained in the following two booklets:

- Bell System Competition Guidelines—dated November 1981
- Bell System Competition Guidelines—MFJ Supplement—dated January 1983.

While following these guidelines and meeting a personal commitment to the Company's Code of Conduct, customer service needs must be met.

7.03 Examples of information that should **not** be provided are listed below.

(a) AT&TC Network Proprietary Information that should not be provided is as follows:

- Unpublished details of network design, interfaces, or standards
- Construction plans
- Descriptions of new network services, capabilities, modifications, operations, costs, features, performance characteristics, or objectives.

(b) Customer Proprietary Information that should not be provided is as follows:

- The kinds and quantities of service a customer has
- The locations or termination points of a customer's service
- Traffic and usage data
- Changes in a customer's service
- Charges billed to a customer or an account
- Derived information (such as analyses or studies).

8. JOINT AND COOPERATIVE TESTING

8.01 During the investigation of escalated cases, it may be necessary to work with outside technical support contacts, either while performing tests at the same interface location or with each other at separate locations. The results of these measurements must be shared and discussed. As conclusions are made, corrective action or more exhaustive tests may be required. Overcompensation of any segment of a service rather than correcting another should be avoided. The BOC should assure that its own service responsibilities have been met. **The NTS personnel must make certain that all LECs and CPE suppliers are treated equally.**

8.02 Prior to performing joint and cooperative tests, the NTS person should determine if tariff charges apply and advise sales and the customer in advance of any such charge. These charges are found in the "Additional Administrative and Operational Functions" section of the tariff.

9. NTS REPORTS

9.01 A monthly report form is to be prepared by each Regional contact as an analysis tool for determining causes of problems. This report will aid in quantifying the level of activity performed by NTS personnel. This report should be forwarded to the Headquarters Operations contact by the tenth working day of the month for the previous months activities. An example of this report is shown in Fig. 3.

9.02 The following is an explanation of entries for the case summary form (Fig. 3).

① **Carrier, Long Haul:** Carrier systems designed for transmission of signals over 200 to 250 miles, such as L, T2, T4, P140, FT3, TD, TH, AR6, 45MB/90MB radio, satellite, and ocean cable.

② **Carrier, Short Haul:** Carrier systems designed for transmission of signals under 250 miles, such as T1, TIC, N, ON, TJ, TL, TM, and TN.

③ **Cable:** Metallic pairs used for dc control, telegraph, and voice frequency transmission.

④ **Switching Equipment:** Circuit switching systems and related equipment, such as crossbar, step-by-step, panel No. 1, 2, 3, 4, or 5 ESS* switch, and Traffic Service Position System.

⑤ **CO Equipment (Term & Sig):** Central office toll terminal equipment used for circuit terminations and signaling, such as repeaters, amplifiers, ringers, pads, single-frequency metallic terminal facility units, cross-connect frames (intermediate and main distribution frames), etc.

⑥ **Network Channel Terminating Equipment:** Equipment located at the end users premises and on the line side of the network interface and used to perform specific network functions. Examples of NCTE include:

Metallic Terminating Unit (MTU)
Data Interface Unit (DIU)
Channel Service Unit (CSU).

⑦ **Customer Premises Equipment (Nonnetwork):** Any device located at the customer

premises that is connected on the customer side of the network interface.

⑧ **Customer Related:** Problems caused by customer administration of the communications system, such as nonhardware and customer related problems.

⑨ **Design or Service Order:** Problem caused by improper design of the ordered service or an inappropriate type of service being sold to the customer for the particular application needed.

⑩ **Standards, TOP, Training, Policy, and Procedures:** Incorrect or incomplete documentation in standards, drawings, vendor publications training courses, general policy, or current procedures.

⑪ **Test Equipment or Testing Methods:** The test equipment or test procedures needed to determine the problem were not generally available to field forces, eg, special test equipment, elaborate test procedures, etc.

⑫ **Other:** Any other cause not covered by the specific categories above.

9.03 The case summary form shown in Fig. 3 is not a standard form at this time and should be reproduced for local use.

10. NTS TRAINING

10.01 There are formal NTS training courses available at the Bell System Center for Technical Education (BSCTE) at Lisle, Illinois. These courses consist of the following:

Data

- Data Services, Network (DSC-Network)—A 2-week course that covers transmission impairments on the network that affect data transmission.
- Data Services, Teleprocessing (DS-TP)—A 2-week course that covers teleprocessing protocols such as X.25 packet switching and SNA.
- Data Services, Terminal Equipment (DS-TERMS)—A 2-week course that covers

* Trademark of Western Electric.

the testing of various terminal equipment such as data sets and terminals.

- Data Services, Digital Data System Maintenance—A 2-week course that provides management personnel with the skills and knowledge needed to technically support the Digital Data System (DDS).

Voice

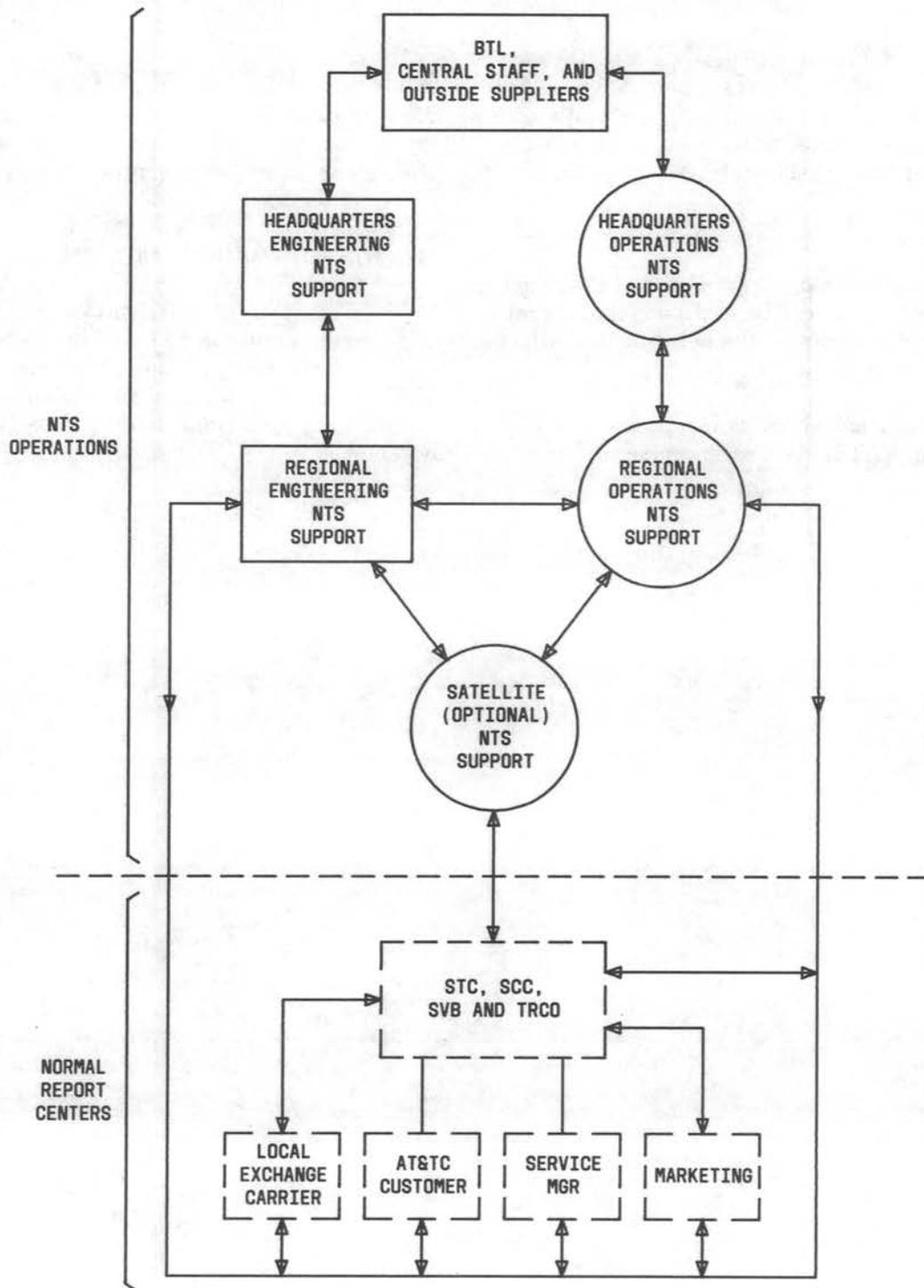
- Voice Technology (VOITEC)—A 2-week course that covers transmission and signaling impairments on the network that affect voice transmission.
- Trouble Analysis of Transmission and Signaling (TATS)—A 2-week course that covers

transmission and signaling analysis on all voiceband channels on the network, with special emphasis on Special Services.

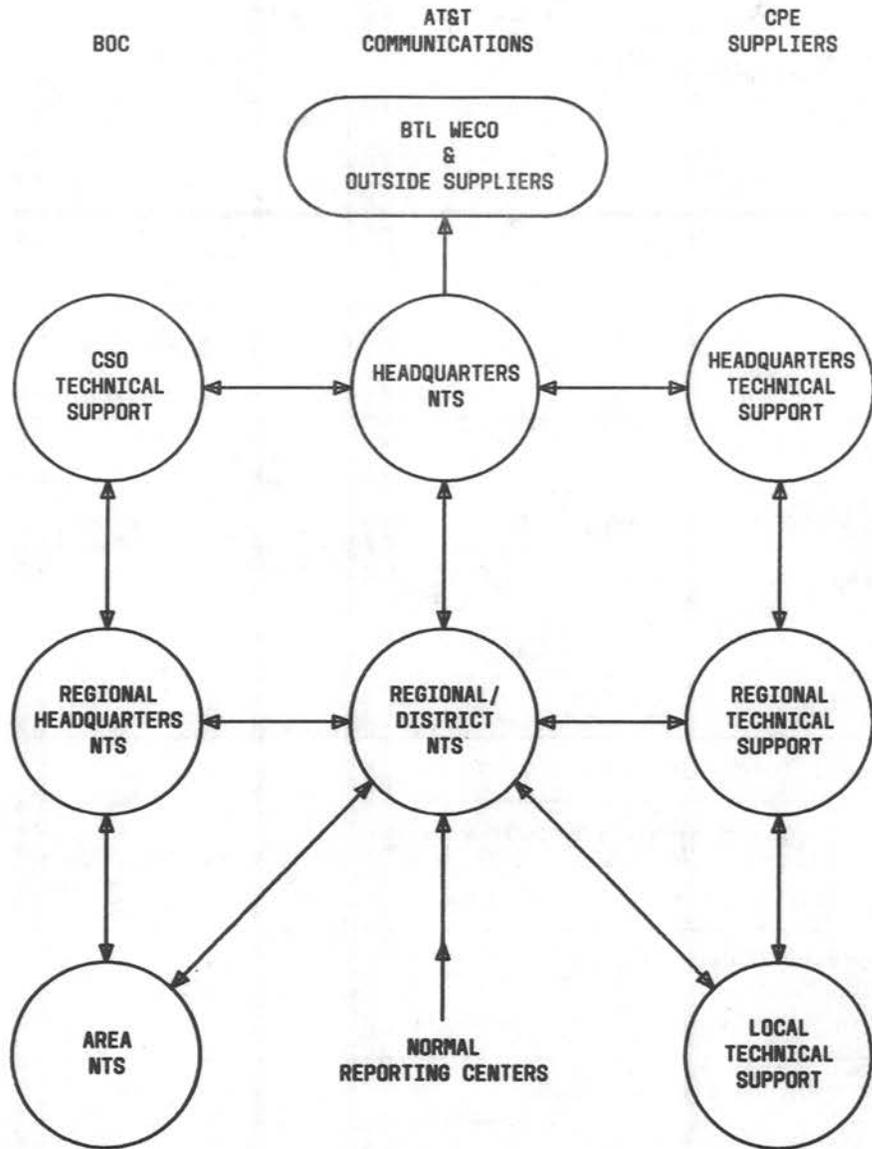
In addition, various courses that are technology specific (ie, Analog Transmission Systems, Digital Transmission Systems, Switching System, etc.) are available and may be appropriate depending on individual needs.

11. NTS INFORMATION AND SUPPORT SYSTEM

11.01 Technical information to assist the NTS organization can be found in the Network Operations and Transmission Engineering Support (NOTES) publication and the Computer Assisted Technical System-Data Base (CATS-DB) support system. ♦



◆ Fig. 1—Escalation Flowchart ◆



◆ Fig. 2—Network Technical Support Interface Flowchart ◆

Network Technical Support Case Summary

		Prepared By	Date	
Region			Month	
		TYPE OF CIRCUIT		
		TOTAL SERVICE		TRANSPORT SERVICE
		ACCESS CIRCUIT	AT&TC CIRCUIT	
Category		No. Cases	No. Cases	No. Cases
①	Carrier, Long Haul			
②	Carrier, Short Haul			
③	Cable			
④	Switching Equipment			
⑤	C.O. Equipment (Term & Sig)			
⑥	Network Channel Terminating Equipment			
⑦	Customer Prem. Equipment (Non-Network)			
⑧	Customer Related			
⑨	Design Or Service Order			
⑩	Standards, TOP, Training, Policy, Procedures			
⑪	Test Equipment Or Testing Methods			
⑫	Other			
⑬	Total ↗			

Send To

AT&T Long Lines
 Network Technical Support
 Room 3C230
 Bedminster, N.J. 07921

◆ Fig. 3—Example of Case Summary Report ◆