

## Chapter 5

# Service Operation Issues

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Although INS-Net is a public network, many of its application formats involve leased-circuit-like, center-to-end usage—mainly by corporations. Because of this, INS-Net service operation functions must take into account not only public network service aspects but also a private network approach that focuses on individual user systems (Figure 1).

A coherent response to installation and maintenance is important to customers. To respond to this, new rules governing inter-divisional operations must be formulated, along with the establishment of an organizational structure. Such a structure must designate a group to handle operations in a unified manner (Table 1).

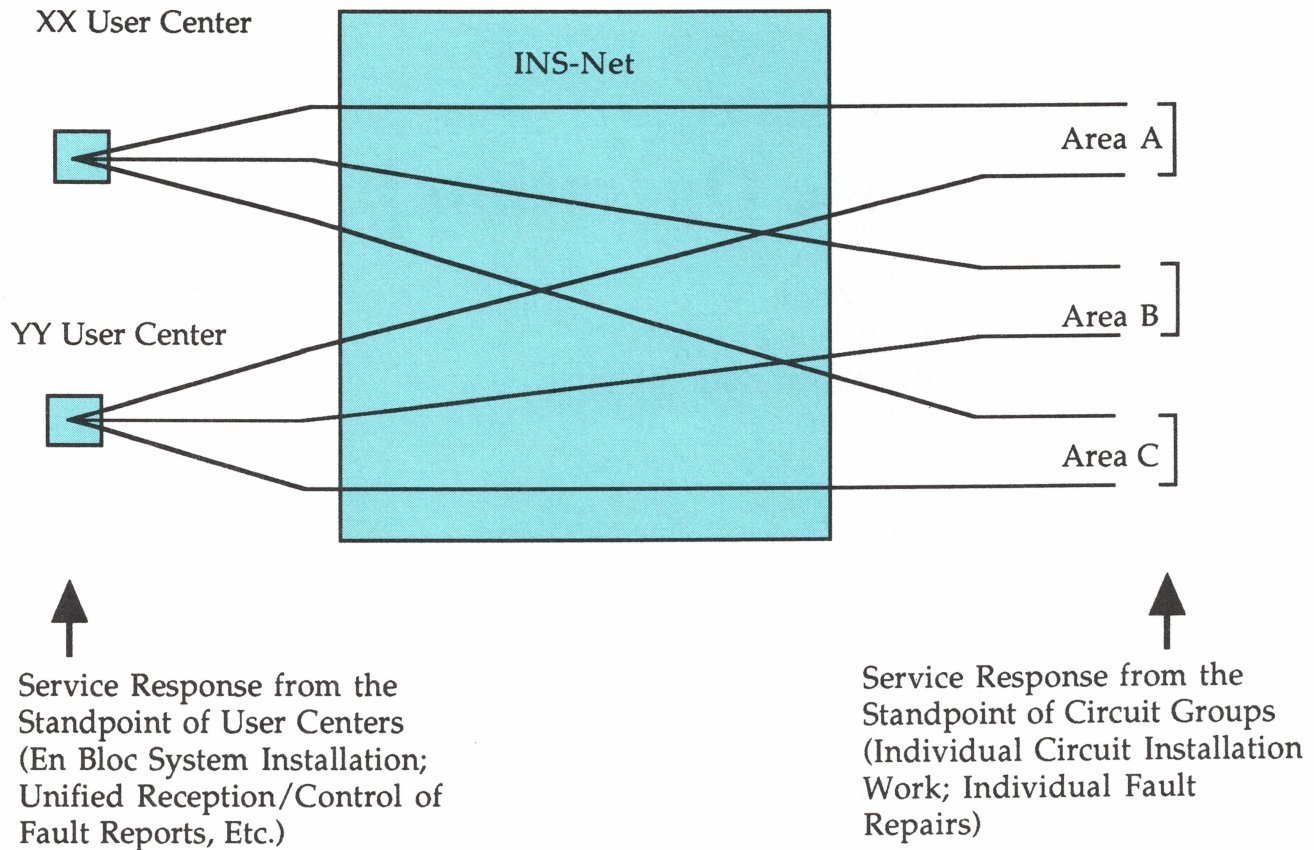
Figure 1 shows service response routes between user centers and circuit groups. Table 1, on the other hand, compares INS-Net and the existing analog telephone network in terms of service responses across several organizations.

### **Necessary Installations**

Customers using INS-Net service can be divided into two categories: customers that construct center-to-end user systems, and customers that use individual circuits such as those for telephone and facsimile services. Let's examine the construction of center-to-end user systems, which are mainly used by large-scale corporate users.

- (1) Coordination and adjustment required to construct center-to-end corporate user systems.

Figure 1



As described, in the case of center-to-end user systems using the existing analog network, service operations are carried out in the same manner as for general telephone circuits without the distinction of whether they are user systems or involve a center-to-end communications format. However, unlike the self-contained existing telephone network (service), INS-Net service can only be provided when the necessary communications infrastructure has been developed. In short, INS-Net service requires the digitalization of switching and transmission facilities.

Regardless of demand, digitalization of existing networks has been systematically carried forward from the standpoint of increasing communications service quality and reducing communications costs. Facilities particular to INS-Net such as the ISDN Service Module (ISM) and Remote Terminal (RT) are installed when demand arises or is forecast.

To construct nationwide center-to-end user systems, requiring a large volume of circuits using INS-Net service, appropriate coordination and adjustment is necessary. ISM or RT facilities must be available when users need them.

In order to meet customer installation requests, adjustments in the overall construction schedule are required to smoothly complete a nationwide installation of a large volume of circuits.



Table 1

Table 1

		INS-Net Service (*) (Center-to-End Format Applied by Large-Scale Users)	Existing Telephone Service (Analog)
Sales ~ Installation	Sales	Individual Users (Account Managers)	Marketing (Mass Marketers)
	Billing	There are cases in which users require bills under the same user name but involving different telephone offices to be consolidated.	Per Circuit
	Installation	En bloc installation by individual user system units. (Coordination among related divisions essential.)	Installation by Circuit
Maintenance		Operations for Individual User System Units 1) Unified reception of fault reports. 2) Securing center-to- end communications. 3) Notification to user centers in case of file updates, etc.	Operations for Customer Groups 1) Fault report reception on area units. 2) Securing circuit communications. 3) Notifications provided within a circuit area.
Service Management		Service management on individual user system units. Traffic management on individual user system units.	Service management on plant units and area units. Traffic management on plant units and route units.

(\*): Service response for users of INS-Net is almost the same as that for users of ordinary telephone service.



Because it has been a relatively short period since INS-Net service started, INS-Net user systems have the following features:

- Service content provided by the network differs depending on each user system.
- Newly developed circuit-termination units and terminals are used in many cases.

These factors may lead to changes in the user system construction schedule (schedule dates or system introduction areas) or to changes in the service content required of the network. Flexible responses to these changes must also be provided.

Under such circumstances, new implementation systems and operational rules are required to manage and monitor the progress of construction for individual users. However a unified system of rules must be developed, and this system differs from the rules applied to conventional analog telephone service. This holds true from the circuit application stage to service start-up in cooperation with the sales division (account managers).

(2) Construction coordination, adjustment systems and operation rules.

Center-to-end user systems can be classified into two groups: cases in which a nationwide system is constructed and cases where a system is constructed within relatively closed specific areas. To handle both cases smoothly, installation management departments exclusively for such system construction have been established at the head office and eleven regional headquarters throughout Japan. In the nationwide scenario, the head office installation management department takes charge of overall construction management and cooperates with installation management departments at each regional headquarters. This system provides unified management of the specific user system nationwide (Figure 2).

For the regional system, the appropriate regional headquarters is responsible for the overall installation management. This regional headquarters would be based in the same area where the system is to be constructed. It cooperates with installation management departments at related regional headquarters (Figure 3).

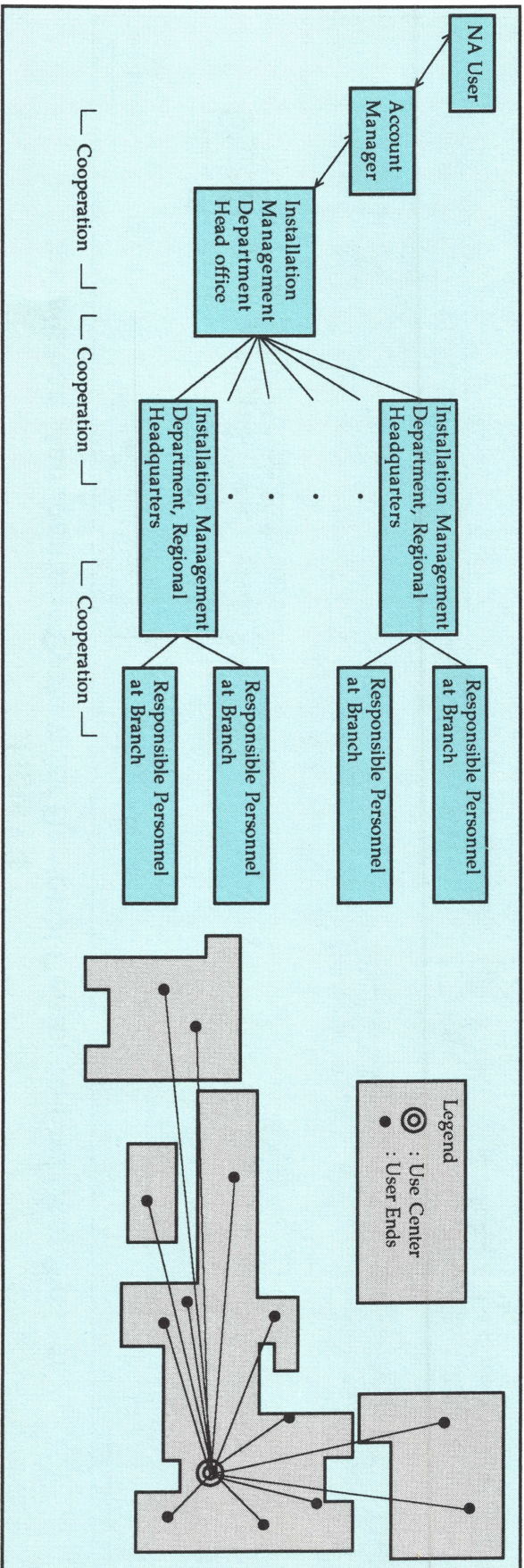
Table 2 describes the main work contents and main target users of the installation management departments at the head office and each regional headquarters.

Centralized testing and fault-report accepting centers, whose territories cover wider areas than those for the existing analog network, have been established for customers using individual INS-Net circuits. There are currently 33 centers nationwide. These centers provide maintenance service on area units.

One of the largest systems using INS-Net service in Japan is a 24-hour, on-line, POS data transmission system that connects the data center located

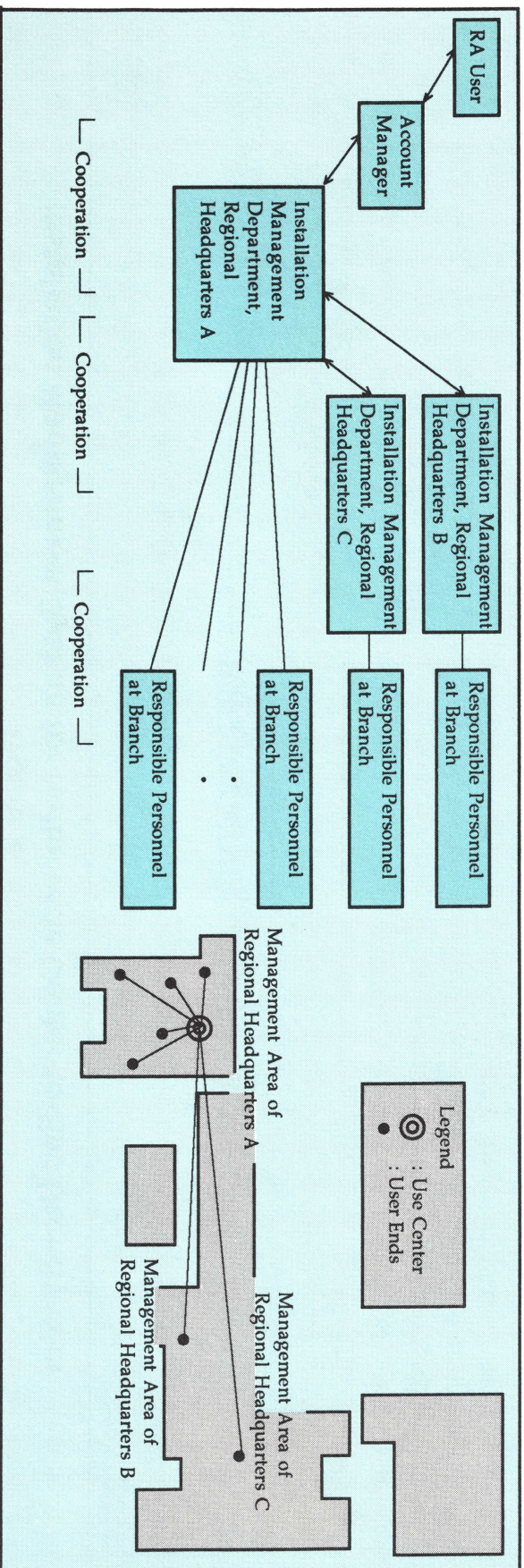


**Figure 2**  
**Installation Management System for Nationwide Center-to-End User System**





**Figure 3**  
**Installation Management System for Regional Center-to-End User System**





**Table 2**  
**Main Work of Installation Management Departments**

	Main Work	Main Target Users
Head Office	(a) Installation management of ISM, RT and other facilities, and adjustment of service start-up period. (b) Regional adjustment of circuit opening test, etc. (c) Adjustment of circuit opening work schedule. (d) Cause investigation in the event of trouble in executing installation work, and formulation of measures to prevent recurrence, as well as nationwide evolution of such measures.	*Nationwide, large-scale user systems. *Users constructing unique systems even though the system scale is small. (Referred to as "NA users".)
Regional Headquarters	Providing instructions and support to responsible branches in terms of the following items. (a) Providing instructions and support to carry out accurate installation work. (b) Providing complete guidance on circuit opening test methods, etc. (c) Confirming circuit installation completion, and reports to the department requesting such work. (d) Providing support for early recovery in the event of trouble in executing installation work, and making sure that measures to prevent recurrence are widely known.	*NA users for which installation management requested by head office. (NA users in areas under its management.)
	(a) Installation management of ISM, RT, and other facilities, and adjustment of service start-up period. (b) Regional adjustment of circuit opening test, etc. (c) Adjustment of circuit opening work schedule. (d) Cause investigation in the event of trouble in measures to prevent recurrence, as well as evolution of such measures within its territory and related regional headquarters territories.	*User systems within its territory, or user systems mainly located within its territory, but partially involving territories of other regional headquarters. (Referred to as "RA users".)

in Tokyo to about 4400 sales outlets nationwide. Installation work of this center-to-end system was smoothly completed in about three months between April and July 1991. This task was completed due to the fact that the installation followed several necessary practices including: the use of a construction coordination and adjustment system; the operational rules mentioned above; and close cooperation between the head office and relevant regional offices.

As described above, maintenance for INS-Net service falls into two categories: one format involves customers using the service as a center-to-end user network; the other concerns customers using individual circuits as a public network.



### Maintenance Approach for User Networks (Service Operations)

Since customers constructing a nationwide, large-scale user network using INS-Net require individual system maintenance in addition to a unified response to fault reports, the following centers have been established to handle service operations on a centralized basis. (The unified reception of fault reports and service management for individual user systems are defined as "service operations" in this section.)

#### 1) ISDN Control Center

Established within the regional headquarters' management area in which the customer center is located to carry out service operations for the user system on a unified basis.

#### 2) ISDN Area Center

Established within the regional headquarters' management area where user terminals are located. It carries out measures in response to instructions from the control center.

Functions of the control center and area centers are described in Table 3.

The control center is designed to handle multiple user systems to improve efficiency. For the time being, one control center is established at each

**Table 3**

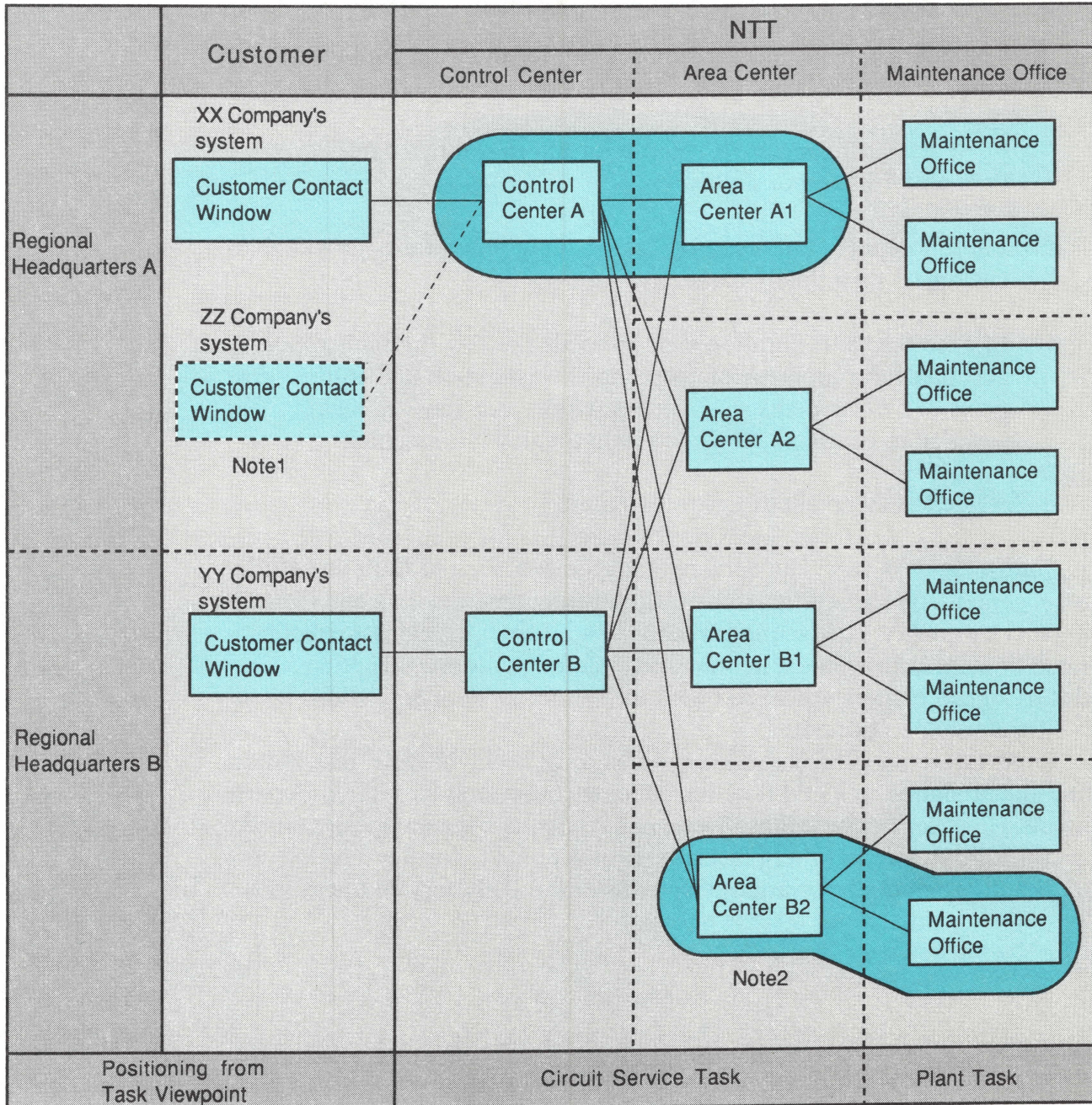
	Function
Control Center	<p>(1) Service operations carried out for system on user units.</p> <p>i. Unified fault report reception, circuit sectionalization, repair arrangement and control of fault repair among related offices, technical support to area centers, and recovery reports to users.</p> <p>ii. Service and traffic management for user systems, and requests to related offices for facility improvement and routing changes based on these management results.</p> <p>(2) User consulting in terms of user system operations, and work management, such as for circuit opening work at the time of user system changes.</p>
Area Centers	<p>(1) Carrying out instructions from the control center at the area.</p> <p>i. Faulty circuit sectionalization, arrangement, etc., based on instructions from the control center.</p> <p>ii. Taking action, such as routing changes, in response to requests from the control center.</p> <p>iii. Performing sensor-like roles in the area, such as collection of traffic and plant information concerning users.</p> <p>(2) Service Operations for Circuit Groups in the Area</p> <p>i. Plant examination based on traffic conditions.</p> <p>ii. Unified work management within the area, such as routing involved in circuit opening and ISUP installations.</p>



regional headquarters; that is, eleven control centers take care of user systems throughout the country.

The area center carries out operations based on instructions and requests from the control center designated for each user system. The involvement of control and area centers in user systems is shown in Figure 4.

**Figure 4**  
**Involvement of Control and Area Centers in User Systems**



Note1: Example of one control center handling multiple user system.  
 Note2:  Example of transitional organizational format.



With regard to specific service operations methods, a "service operations manual" is provided to make sure that service operations rules are firmly observed and operations are carried out with special attention given to the following items:

#### (1) Inter-Divisional Responsibility in Handling Faults

In coping with faults occurring in the INS-Net, the inter-divisional responsibility is made clear from the standpoint of realizing early recovery of overall end-to-end communications with a focus on the following items:

- (i) The control center takes responsibility for the total malfunctioning time.
- (ii) Each related department sets up an internal target fault recovery time under its responsibility.
- (iii) Interim reports on the progress of fault repairs are provided to customers on a timely basis.
- (iv) In case the fault duration time exceeds the day the fault report is accepted, the progress of the cause investigation and future prospects are explained to customers within that day, by making it a practice to complete all work within the day it is assigned.

#### 2) Service Management at Control Centers

Control centers carry out service management, such as fault and traffic management, on user system units with the aim of maintaining and increasing service quality. The results of such management operations are incorporated in plant improvement actions and system-operation consulting activities. (Control centers are vested with the authority to order actions by all NTT internal departments.)

Table 4 describes ISDN service support tools in the fields of installation and maintenance. NTT is now introducing these tools in related departments. However, because these tools are not adequate for service operations at control centers and other places, we firmly intend to further develop new tools and promote the creation of systems out of daily service operations.



**Table 4**  
**Various ISDN Service Tools**

Category	Tool	Functional Outline
Testing	ISDN Operating System (I-OPE)	Provides testing functions, such as the area-free subscriber-line media test, looptest, and call origination/ termination test; also provides retrieval/ registration functions of user information by means of access to I-DB.
	ISDN Protocol Analyzer (I-PA)	Connected to nationwide STMs on an area-free basis to collect and monitor multi-point protocols, and to carry out analyses and diagnoses by AI.
	Simple Testing Equipment	Compact, light-weight testing terminals which readily enable connection tests and intra-network normality confirmation tests at time of circuit opening work and in event of faults.
Network and Traffic Monitoring/ Control	ISDN Network Monitoring System (Tentatively Called INSS: ISDN Stabilizer System)	Remote monitoring system that monitors the INS-Net plant operating situation on a nationwide basis and on area units, and that permits collection of fault data on user system units. (Under study for development)
	Center Circuit Traffic Monitoring Equipment (Tentative Name)	Collects user-center circuit traffic and monitors circuit usage situation. (Under study for development)
	ISDN Network Control System (Tentative Name)	Remote network control system that permits remote network control on user system units, in addition to remote control of various INS-Net facilities. (Under study)
Operation System	Service Order (SO) Work System	Supports all SO-related work from application to service start-up, such as distribution of application slips, issuing of service order slips, and installation work progress management, by promoting the creation of centralized customer and plant DBs for INS-Net service. (Under development)
	Isis	Confirms the availability of switching equipment in connection with the user's INS-Net service usage intention, and summarizes the user usage intention situation.
	ISDN Database (I-DB)	Contains user information, maintenance information and fault-history information for INS-Net service, and permits nationwide area-free access.