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FIELD SERVICE PLANNING INFORMATION PROGRAM

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FIELD SERVICE BRIEF
REMOTE DIAGNOSTICS -
THE TERMICARE SYSTEM
OCTOBER 1979

FIELD SERVICE PLANNING INFORMATION PROGRAM

OBJECTIVE: To provide senior field service managers with basic information and data to support their planning and operational decisions.

DESCRIPTION: Clients of this program receive the following services each year:

- Field Service Briefs - Six reports which analyze important new technical and management issues within the field service areas. Reports focus on specific issues that require timely attention by senior management.
- Major Planning Reports - Three reports that will present an in-depth analysis and recommendations of a major technical or management issue that will assist in the formulation of major policy alternatives in the planning of field services.
- Annual Report - This report will summarize major activities in the field services industry during that year in order to determine major trends and their effect on the establishment of future field service planning. Forecasts will be provided of the likely technical and management changes that may occur in order to meet the future requirements of users of these services.
- Annual Presentation - INPUT staff will make an annual in-house presentation to field service executives to summarize the results of the previous year's research and to formulate jointly the strategic guidelines for the research program for the current year. These presentations will occur in the Spring of each year.
- Consulting Support - Individual consultation with INPUT research staff on an as-needed basis through telephone inquiries and visits.

RESEARCH METHOD: INPUT carries out extensive research in computers, communications and associated fields:

- Research topics are selected by INPUT based on discussions with client representatives.
- Research for this program includes professional interviews with users, vendors, universities, industry associations, and other analysts.
- Conclusions derived from the research are based on the judgement of INPUT's staff.
- Professional staff supporting this program have 20 or more years of experience in data processing and communications, including senior management positions with major vendors and users.



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REMOTE DIAGNOSTICS - THE TERMICARE SYSTEM

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REMOTE DIAGNOSTICS - THE TERMICARE SYSTEM

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I INTRODUCTION

I INTRODUCTION

A. BACKGROUND

- The rapid growth of communications terminals in the 1970s introduced many new problems and challenges to the industry.
 - One of these problems was the need to develop an effective service support system that would meet both the needs of the customer and the vendor.
 - Historically, service systems lack the system perspective and control mechanisms to meet the needs of this growing communications terminal population in a timely manner.
- It became readily apparent that the individual unrelated service call and its attendant administrative problems would prove to be inadequate to meet the needs of the new terminal environment.
- The functions of service support and product reliability have emerged as one of the most critical paths in the development and utilization of data communication terminals.
- What was needed was a systems approach that would address the following key elements:

- Product Performance.
 - Customer Satisfaction.
 - Field Service Operation.
 - Management Operating Data.
- One of the earliest companies to develop such a systems approach to the terminal maintenance problem was the Western Union Data Services Company.
 - This service was called "Termicare."
 - Termicare is a centralized computer communications oriented system handling all maintenance problems nationwide from a single control center.
 - This systems oriented approach to the terminal maintenance problem has become a model for an increasing number of vendors in the communications and data processing industries.

II TERMICARE SYSTEM DESCRIPTION



II TERMICARE SYSTEM DESCRIPTION

A. CONCEPT AND OBJECTIVES

- Termicare is a centralized management and control system that directs the customer service support activity.
- This activity is managed in three primary dimensions. They are:
 - From a customer perspective.
 - From a product perspective.
 - From a field service perspective.
- The Termicare system provides management with the operating capability to address these three areas and an ongoing stream of operating information with which to measure the performance.

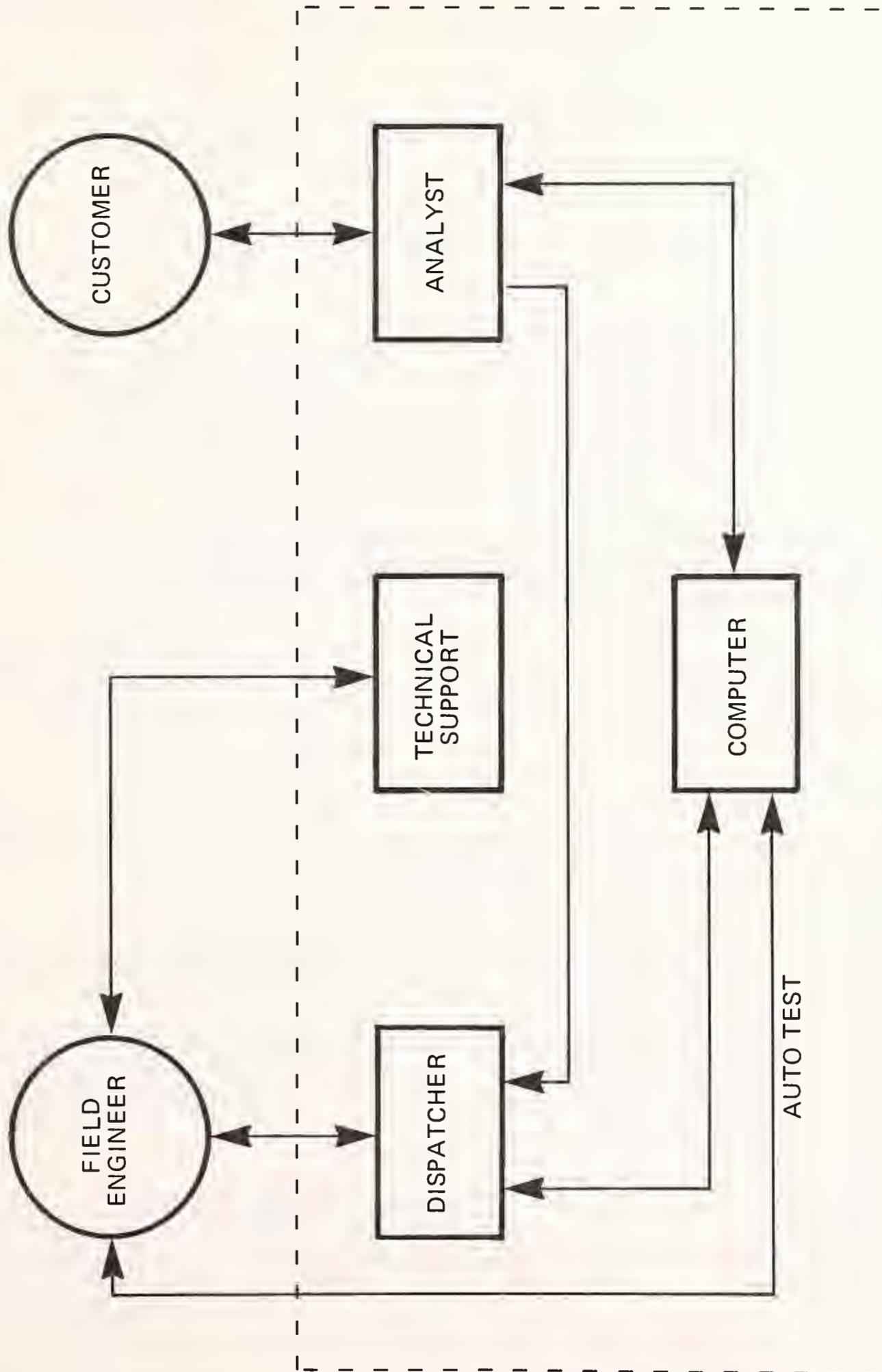
B. STRUCTURE OF THE TERMICARE SYSTEM

- The heart of the Termicare system is the central control center located at Mahwah, New Jersey. All information regarding installations and service calls

is controlled and directed from this center. A system function flow is presented in Exhibit II-1.

- There are four major functions at the central control center.
 - The customer service analysts receive all incoming trouble calls from customers. They are responsible for the receipt of the trouble call, the ensuing analysis, and testing with the customer to establish the nature of the trouble.
 - Each dispatcher is responsible for a defined geographic area of the United States and receives the trouble call electronically from the service analyst.
 - The dispatcher contacts the field engineer and gives him all of the data necessary to respond to the call, including any analyst's remarks developed during the test and analysis to aid in his response.
 - When the field engineer restores service to the customer, he notifies the dispatcher of the time of trouble clearance, the nature of the trouble, and the corrective action taken.
 - The dispatcher is in constant communication with the field service organization and also accepts requests from the field for emergency parts and materials required by the field.
 - The technical support engineers are the "supertechs" of the force. In the event that a field engineer experiences difficulty and needs higher level help, a call to the central control center puts him in touch with a tech support engineer who assists him with his problem.
 - An administrative section at the center is responsible for the development of management information reports.

TERMICARE FUNCTIONAL DIAGRAM



- These reports include operating information on customers and products, as well as the field technical force.
- . The total staffing of the central control center which supports more than 20,000 terminals is 40 to 50 people.
- There are two computer systems supporting the Termicare operation.
 - The main computer system contains the operating data base for the company and has the identity and location of each piece of terminal equipment leased or serviced by the Western Union Data Services Company. Each terminal has a unique identification number.
 - The product section of the data base contains the location configuration and trouble history of each piece of equipment.
 - The data base contains the time that each trouble call was received, the time that the trouble was cleared, and completion reports of installations.
- Pertinent information is available on inquiry by the service analysts, field engineers, and other selected management personnel.
 - The data base serves as the master file of all operating information.
- The Termicare central control center also contains minicomputers which are programmed for remote diagnostics and automatic testing by customer and field personnel.
- The ATD (Automatic Test Device) contains a growing list of remote diagnostic capabilities. These tests are programmed on the basis of cumulative experience by the Termicare system and are aimed at addressing the more frequent types of difficulties or those requiring additional diagnostic help from the field engineer. Some of the representative types of remote diagnostics

performed on remote terminals by the ATD from the Termicare central control center are:

- Printer test messages such as: quick brown fox, left hand margin test, maximum hammer fire test, pattern tests, etc.
 - Selectable character test transmits repeatedly to the terminal under test any single character selected by the field engineer.
 - A store and forward test which can be accessed by a remote terminal and can have any message up to 240 characters stored in the ATD which is then transmitted back to the terminal under test by command from the field engineer.
 - A reader test which performs standard automatic reader tests. Upon receipt of a selected stop code, the ATD will automatically transmit the selected start code back.
 - There are several other kinds of tests such as line feed tests, form feed tests, answer-back tests, and originate calling tests.
 - One type of test which is particularly helpful in isolating terminal problems from line problems is the "bust back echo test."
 - The ATD provides for modem tests in two levels of bust back - either full duplex or half duplex. It is capable of testing for bias and distortion, as well as parity errors transmitted and received by the remote terminal.
- This remote testing capability not only serves as an aid in the diagnosis and repair of the problems, but serves as a final check out to establish that the problem has been corrected and information can be transmitted and received by the remote terminal.

- This final check-out capability is also utilized in the installation of the equipment to determine that the installation has been made and that the equipment is operating correctly.
- The communication network utilized by the Termicare system consists primarily of a series of inbound and outbound WATS lines.
 - Dedicated systems are accessed by either having a dedicated spur from the customer's private network into the center or a dial-up link into the customer's computer control center.
 - All incoming calls from the customer access the center via a toll-free number.
 - Communications to and from the field engineers, as well as remote testing, also utilize this WATS system.
- An alternative variation to the generalized inbound/outbound WATS system is the use of regional concentration centers that are accessed by the customers and field engineers.
- This network is also used for remote inquiry into the data base by the field service and sales offices.
- The administrative and operating group of the central control center constantly monitors the utilization and traffic on the WATS lines, changing them from time to time to optimize traffic flow and minimize costs.

C. DESCRIPTION OF OPERATION

- All incoming calls to the Termicare central control center are received at a master switchboard. Exhibits II-2 and II-3 provide a functional flow of both incoming and outgoing system activity.
- Based on the nature of the call (customer or field engineer), it is routed to the appropriate activity.
- A trouble call received from a customer whose terminal is down, is immediately routed to a service analyst.
 - The first key piece of information required by the analyst is the terminal identification number. This number, which is clearly visible on the customer's terminal, is reported by the operator who is calling in the trouble.
 - Upon receipt of that number, the service analyst immediately calls up the historical file from the data base containing all pertinent information regarding that specific terminal. It includes the type and model of terminal, as well as the configuration and included options.
 - This enables the service analyst to know immediately what piece of equipment he is working with.
 - Also available to the service analyst on his visual display terminal is a summary of all trouble experienced by this terminal during the previous three months.
- Armed with this information, the service analyst proceeds to discuss the nature of the problem with the customer.

EXHIBIT II-2
TROUBLE CALL
INCOMING TO TERMICARE

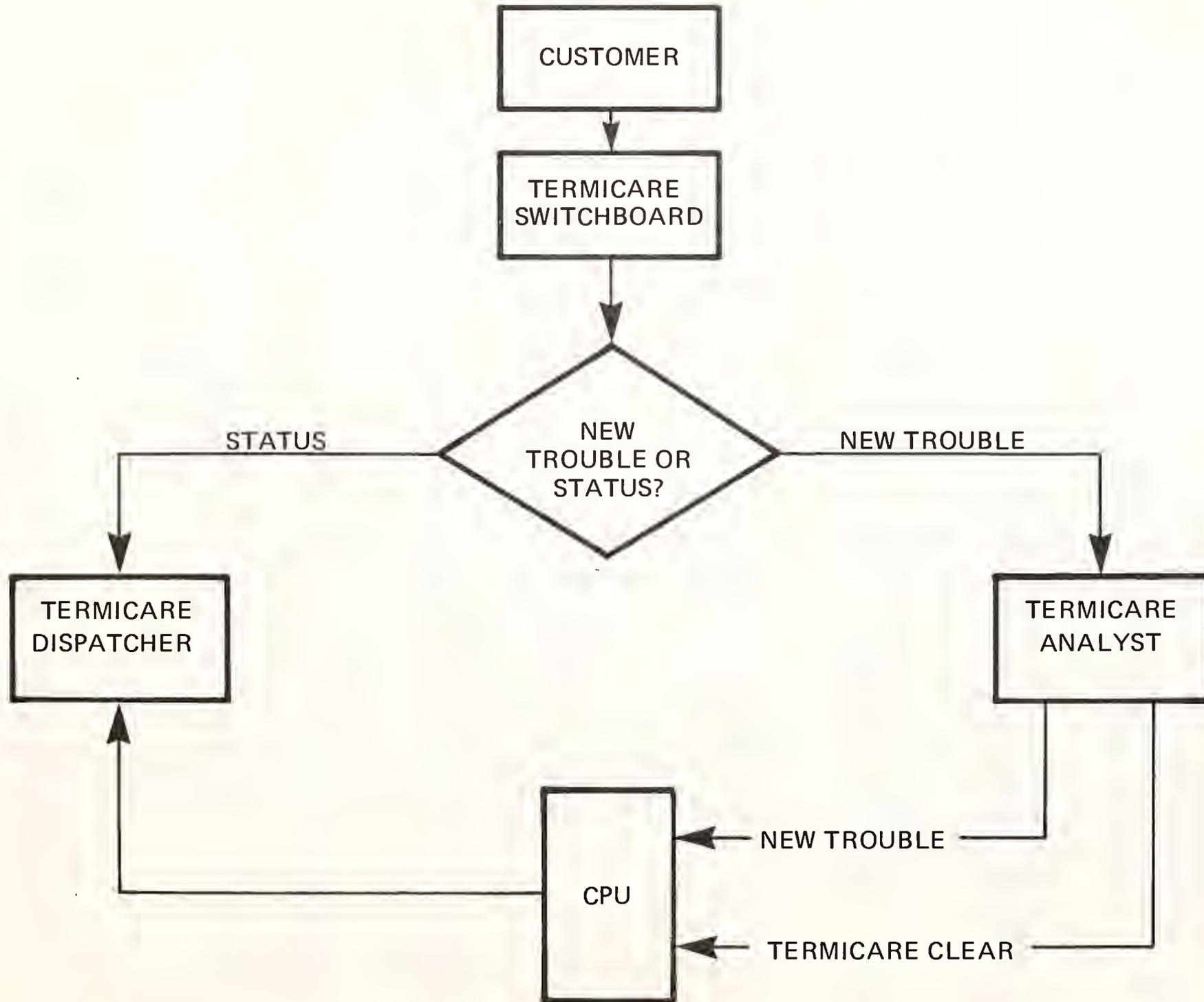
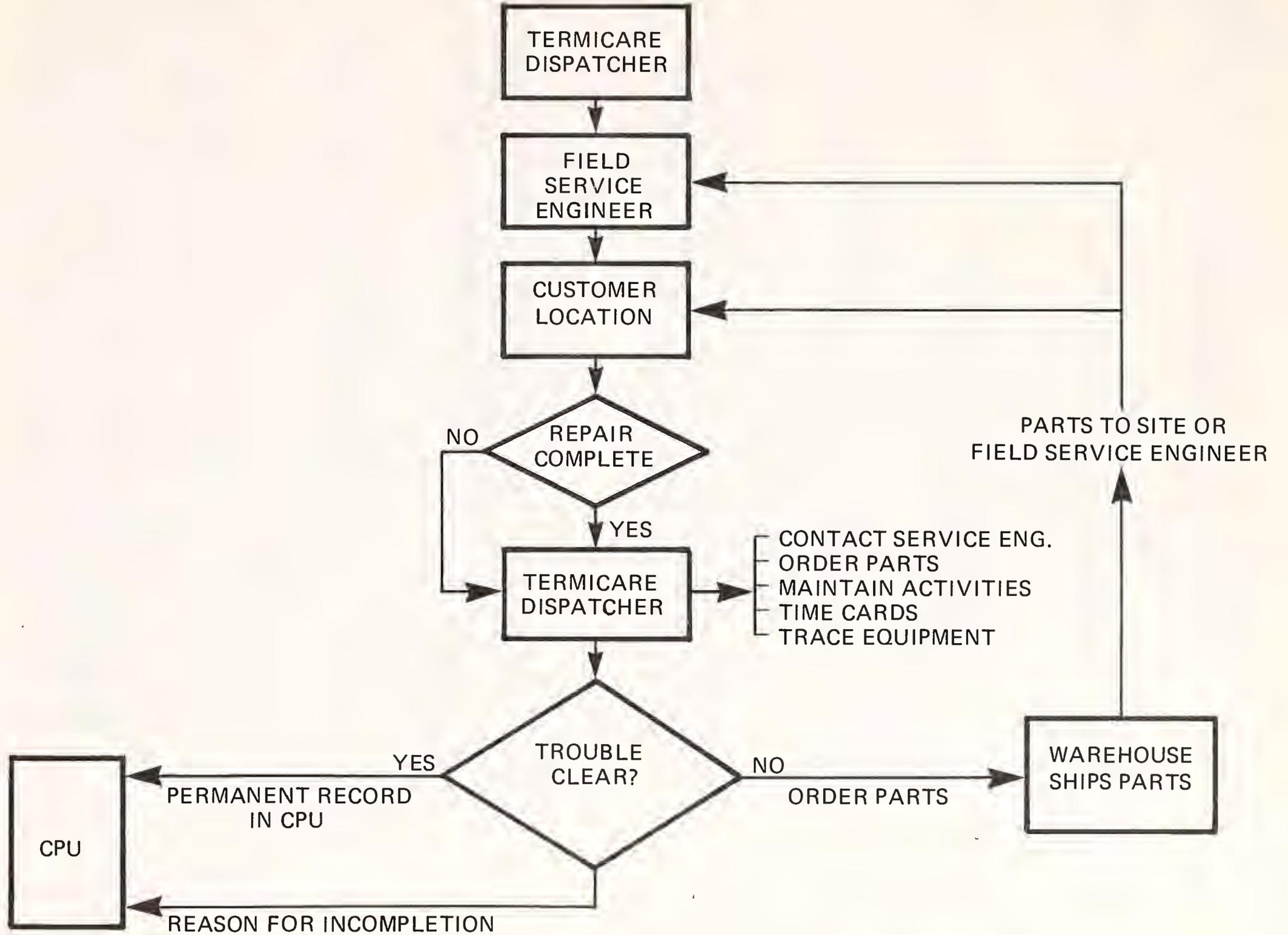


EXHIBIT II-3
TROUBLE
OUTGOING TO FIELD



- The service analysts have been trained to go through a series of check-out procedures depending on the terminal and its configuration.
- Often the service analyst will be able to clear the trouble up without dispatching a field engineer.
 - . Trouble may be due to operating deficiency, simple switch settings, low paper alarms, or even the power plug not being plugged in.
- The analyst then proceeds to go through a series of diagnostic tests and operator feed-back in an attempt to determine the nature of the problem.
- Once the analyst has established that he cannot solve the problem himself and has gathered sufficient available information, the customer call is terminated and a trouble dispatch message is transmitted automatically by the analyst to the appropriate dispatcher.
- The analyst has up-dated the data base with the receipt of the trouble call showing the time, date, and nature of the perceived trouble. This time starts the clock in the measuring of subsequent performance in the resolution of the customer's problem.
- Depending on the time of the day and the location of the field engineer, the dispatcher will either call the service center or await field engineer's check-in on the completion of a previous call.
 - Since the dispatcher knows the location of the field engineer, he can be contacted, if necessary, at the site at which he is working. Upon contacting the field engineer, the dispatcher relays all pertinent information regarding the trouble call. This includes any observations or data submitted by the analyst.

- The field engineer, armed with this information, proceeds to the customer's site to repair the terminal.
- While at the customer's site, the field engineer may make further use of the automatic test device in order to assist him in diagnosing the problem, if it is not readily apparent.
- If the problem is particularly elusive, or the terminal is one in which the field engineer has not had extensive experience, he will call the central control center to enlist the aid of one of the "supertechs." Supertechs are armed with prints and specifications to assist the field engineer in the resolution of his problem.
- When the field engineer feels he has corrected the problem on the customer's terminal, he will call the automatic test device and exercise several routine tests to see that the unit is operating correctly before he leaves.
- When the field engineer is satisfied that the trouble has been corrected and the unit tests OK, he will make a call back to the dispatcher to report that the trouble has been cleared. At that time, the dispatcher will update the data base indicating the time that the trouble was cleared and the nature of the corrective action.
- The dispatcher at that time will also indicate what further trouble calls, if any, require action by the field engineer.
- Key operating information throughout the entire process is recorded in the data base where it remains available for status inquiry and subsequent management reports.
- In the event that the service engineer believes that an emergency terminal replacement is required, a call to the dispatcher will initiate the shipping of an emergency replacement terminal to the customer.

- This is done by the dispatcher contacting the material department with the necessary information and action follow-up to indicate what time the emergency replacement unit was shipped.
- Again, this information is entered into the data base by the dispatcher.
- Since all orders and shipment dates are also maintained in the data base, field engineers and field management are aware of impending installation requirements via periodic inquiry into the data base.
 - Based on the information in the data base, field engineers can anticipate the receipt of terminals at their field locations for subsequent installation on a customer site.
 - When the installation is completed and tested, it is called into the dispatcher at the central control center where it is logged into the data base.
 - This automatically triggers the billing cycle based on the successful installation of the terminal.
- The Termicare center is then in a position to make an installation follow-up call to the customer (usually in about a week to ten days) to determine the customer's satisfaction with the installation and to identify any early problems. This call not only has several operational benefits, but immensely increases customer good will.
- The Termicare center also provides the means for rapid message relay to and from field personnel and headquarters personnel.

D. REMOTE DIAGNOSTICS - FUTURE OUTLOOK

- The role of remote diagnostics and their value have clearly been established by the experience in Western Union Data Services' Termicare system. As communication terminals become more sophisticated and electronic in nature, on-site repair will be replaced by diagnostic efforts and subcomponent replacement.
- As the software content of communication terminals increases, remote diagnostics will play a stronger and stronger role in trouble identification. The power and speed of a remote diagnostic computer will be required to adequately exercise all of the software functions in a communication terminal or terminal system.
- As product lines increase in scope, the inventory of knowledge and experience will soon exceed the practical limitations of an individual field engineer. The remote diagnostic capability will become as much a part of the field engineer's basic tools tomorrow as a screwdriver and scope were yesterday.
- Much work has been done in the development of self diagnostic capabilities of communication terminals.
 - It will be a natural and logical step to couple these diagnostic capabilities remotely. The I/O portions of these self diagnostics will readily lend themselves to remote control.
- Remote diagnostics may well develop a whole new level of expertise in field engineering work.
 - The skill and judgement of using a diagnostic capability and the judgement and evaluation of its output will become one of the most valuable skills in the service industry.

- Remote diagnostics accompanied by interpretive skills will serve as a catalyst in providing the customer an increasing ability to maintain more and more of his equipment at his own site.
- The long-range potential for the benefits of remote diagnostics will be influenced substantially by the interplay between service organizations and their experiences with product engineering capabilities.

E. ADMINISTRATIVE AND LOGISTICS FUNCTIONS

- The master computer utilized by the Termicare center performs the central record keeping of all operating data of the company. Because of this, there are virtually no administrative personnel in the field engineering organization.
 - All operating and performance reports are generated by the central computer. Any operating information, status, or schedules are available to field personnel by inquiry from the master computer.
 - Labor cards previously filled out by the field engineer for labor cost reporting purposes have been eliminated. This information is now routinely captured in the Termicare central control center during the normal course of events.
 - Emergency spare replacements and emergency terminal replacement is also handled via the Termicare central control center. Orders are placed on the material shop activity by dispatchers in the Termicare center where subsequent follow-up is maintained.
 - General status information on orders, shipments, open troubles and installations are maintained in the central computer system and available not only to field service personnel, but also to the marketing organization in response to customer inquiries.

F. LEARNING CURVE AND TRAINING CONSIDERATIONS

- A major benefit of the Termicare system is the central accumulation of experience. This enhances the learning curve of the entire organization. By accumulating the experience of everyone in the field, each individual engineer gets the benefit of all others' experience.
 - This is particularly significant in the early stages of new product introduction. Even though a field engineer may have a minimum number of a new product in his territory, he can draw upon the experience of the entire organization by use of the Termicare control center.
 - This is also extremely helpful in cases where an unusual distribution of a product or product configuration results in a minimum number in a given field engineer's territory.
- Product performance experience is also accumulated in the Termicare system where it is reviewed and analyzed by field service management, and, when appropriate, by engineering. By identifying patterns of equipment problems on a product basis, corrective action can be taken if warranted.
- Service performance is also accumulated by major accounts. Often a major account will experience a service problem out of sync with the normal product experience data.
 - This can enable the field engineers, or the marketing technical support group, to analyze the customer's application to see if the equipment is being used in a unique manner that would generate excessive problems.
 - By looking at the equipment's performance in a given customer's application, it often enables the vendor and the customer to jointly resolve the problem.

- The vendor may modify or adjust the equipment, or the customer may similarly modify or adjust his operating procedures.
- Since these customer oriented types of performance problems are difficult if not impossible to anticipate, the quick identification of them by the Termicare system often provides the basis for an acceptable solution.
- The Termicare system also tracks service performance by individual field engineers as well as by branches and districts.
 - By analyzing this field engineer service performance, weaknesses and inefficiencies, incapability or training requirements, are often quickly spotted and corrected.
 - For example, excessive repeat calls are always suspect.
- Since each trouble call identifies the product, the customer and the field engineer, the data is then available to look at any problem situation in terms of the product, the customer, or field engineer.
 - By analyzing comparable situations in either similar products or other field engineers, the identification of the fault becomes much easier.
 - Training programs are constantly modified and updated to reflect the experience data collected by the Termicare system.

III ORGANIZATIONAL IMPLICATIONS



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A. POSITION IN OVERALL ORGANIZATION

- The Termicare system concept has strong organizational implications and affects the operating style of the organization.
- It is essential that the Termicare concept operate in an independent and objective mode. It reports directly to top management and is organizationally independent of the field engineering force.
 - While it is in a position to substantially increase the effectiveness of the field service organization, it is not and should not be subservient to it.
- It is this posture of independence and objectivity that gives strength and value to its function.
 - While the field service organization participates extensively in the establishment of performance objectives, the measurement of those objectives and related performance data is generated independently by the Termicare system.

- The integrity of the data base and its accuracy are essential in assuring an effective operating relationship between the Termicare system and the field engineering organization.

B. IMPLICATIONS FOR FIELD SERVICE ORGANIZATIONS

- The day to day work direction of the field engineers is done by the Termicare system. It also handles the administrative data collection and reporting.
 - This allows the field engineering management to focus its efforts on the actual work performance of the field engineering force and on the correction of problems identified by the Termicare system.
 - Much of the field engineering management's time is spent on a man to man basis assisting and helping in the development of the field engineers.
 - A significant portion of the field engineering management's time is also spent with customers.
- This environment creates the need for and rewards for such virtues as independence and self-starting behavior on the part of the field engineering organization.
- Since the Termicare concept elevates service to a company level mission, field engineers feel a greater sense of self-worth and esteem among their peers within the organization.
 - In that the Termicare system (as seen by the field engineer) can be a highly supportive one, he is able to perform at a higher level of success in the eyes of the customer.

- It is the customer's reaction that is among the most immediate of all feedback to the individual field engineer.
- One of the more subtle yet powerful effects of the Termicare system is that it keeps the field organization constantly in touch with headquarters.
 - This lets the lonely field engineer in a remote location feel more a part of his company on a nationwide basis through the constant reinforcement of daily contact.
 - It keeps him in touch with what's happening in the company.

C. IMPLICATIONS FOR USERS

- The Termicare concept brings several new experiences to the user.
 - Since the initial trouble call is immediately in the hands of a knowledgeable concerned analyst, the whole trouble reporting process becomes a different one for the customer.
 - The corrective process to the customer's problem begins immediately with that call. This is quickly felt by the user.
- Since the extensive information collected in the Termicare data base is captured by customer, as often as not customer management has a quicker and more complete overview of his terminal system performance than through his own internal means.
- Several major accounts with extensive systems receive regular monthly reports from the Termicare system analyzing the performance of the system and the service response thereto. Indeed, to the sophisticated communications manager, it becomes one of his key management control tools.

- Since each trouble call is preceded by a procedural check, there is a degree of customer training inherent with each call to the Termicare center.
- While unmeasurable, it is probably safe to assume that some number of calls that would have otherwise been made are not made because of the operator's ability to analyze the situation prior to the service call.
- The ability to quickly get status information from the Termicare center is utilized extensively by communications managers in responding to internal pressures or questions from out of service locations within their own organization.

D. RELATIONSHIP TO MARKETING

- The relationship of the marketing organization to the Termicare concept is a strongly supportive one since customer satisfaction is a basic objective for any marketing organization.
 - The Termicare system allows marketing management and sales representatives to monitor the performance on selected accounts.
 - It allows them to discuss problem situations objectively in the light of hard data rather than emotionally as is often experienced by marketing people and customers.
- Through status inquiry, sales representatives can monitor the installation progress of their accounts and respond to customer questions regarding time of installation and trouble restorals.
- Because the Termicare concept reflects a commitment to service in a very tangible way, marketing people are more comfortable in selling and supporting

the service capabilities of their company. In fact, in an arena where the difference between products is not significant, the competitive edge often lies in the customer's perception of the vendor's service capability.

IV MANAGEMENT'S EXPERIENCE IN USING IT

IV MANAGEMENT'S EXPERIENCE IN USING IT

A. ADVANTAGES

- The Termicare concept represents a strong visible commitment to the concept of service excellence. Every company indicates that service is important, but tangible actions are necessary to show this commitment.
- One of the major nemesis of the service business is the false call out.
 - While even Termicare cannot eliminate them completely, approximately one fifth of all calls made by customers are resolved without having to dispatch a field engineer.
 - At a representative rate of \$100 per call, this can represent a significant savings in cost and time to the vendor.
- One of the strong advantages to management of the Termicare system is the timely visibility to what's happening regarding service performance.
 - Conventional means of getting management operating reports often take days, if not weeks, and are often distorted as they progress up and through the organization.

- One of the key tools utilized by both field service and general management is the daily review of aged outages.
 - Triggers can be put in the system to show outages over a 4 hour, 8 hour, 12 hour, 72 hour, or whatever level as desired by management.
 - Procedures can then be instituted for progressively higher courses of action at each higher level of outage. Obviously the mere existence of such a system has a high deterrent value.

- With the Termicare system, a vendor can augment the internal service capabilities with the use of sub-contractors without losing control of the customer.
 - When third party maintenance is used, the vendor seldom knows of a customer problem until it has reached a point of major proportions or cancellation.
 - The Termicare system allows the vendor to monitor the performance of his sub-contractor in that he receives the call directly from the customer and retains that relationship.
 - The vendor can then quickly see if the sub-contractor's performance is jeopardizing his customer relationship and can take appropriate action before the customer is irretrievably lost.

- Since cost data is collected automatically through the process of handling a service call, financial visibility into the service operation is up to date and objective. Factors contributing to costs are more readily visible because of the objective and timely collection of data.

- Since the rate of development and customer acceptance of a new product is somewhat unpredictable, the preparatory costs of training, stocking, and other support functions are minimized through the ability to gear the support and their attended costs to the rate of product installation growth.
- This minimizes needless training and re-training costs.

B. DISADVANTAGES

- The magnitude and scope of a concept like Termicare requires top management support.
 - There is considerable front end investment in putting such a system in place.
 - One of the major efforts is the establishment of the operating data base.
 - Individual data bases are not only costly and expensive, but much time and money can be lost in reconciliation efforts.
- Historical biases and prejudices can be a major impediment in putting in a totally different operating concept.
 - This is even more likely to be so if a major conversion from an existing system is required.

V EXTENDING THE TERMICARE CONCEPT TO OTHER
EDP/COMMUNICATIONS EQUIPMENT/SYSTEMS

V EXTENDING THE TERMICARE CONCEPT TO OTHER EDP/COMMUNICATIONS EQUIPMENT/SYSTEMS

- Essentially, Termicare is a concept for managing the customer service function.
- Its principles can be applied to any number of industries or applications where customer support and service is a major issue.
- Some of the potential areas for the application of such a concept are:
 - Remote computing systems.
 - Small business systems.
 - Word processing systems.
- Small companies lacking a service capability could use a simplified form of Termicare to manage the third party maintenance provided to its customers.
 - This would allow the vendor to retain the important customer contact and account control.
- Larger organizations will find the Termicare concept particularly attractive from an internal management and control aspect.

- In a large competitive market small differences in customer satisfaction or cost effectiveness of operations could develop significant benefits.
- A large organization could find this concept as the foundation for developing a whole new set of customer support and training services available.
 - It would not be difficult, for example, to develop customized customer training programs to address the problem of clerical and operator turnover.
 - These training programs could be developed in conjunction with the user and accessed exclusively by user personnel.
- As customer systems become more software oriented the problems of trouble diagnosis and system update will increase. It is quite possible that a concept like Termicare could be expanded to the distribution of software updates by downloading to the customer systems or to central distribution centers.

SUBSCRIPTION PROGRAMS: Designed for clients with a continuing need for information about a range of subjects in a given area. All subscription programs are fixed fee and run on a calendar year basis:

- Planning Service-for Computer & Communications Users - Provides managers of large computer/communications facilities with timely and accurate information on developments which affect today's decisions and plans for the future.
- Small Establishments Service - Analyzes and forecasts small establishments' (<500 employees) use of office, communication, and computer services and products. Applications requirements and economics are emphasized.
- Computer Services Market Analysis Service - Provides market forecasts and business information to software and processing services companies to support planning and product decisions.
- Computer Services Company Analysis and Monitoring Program - Provides immediate access to detailed information on over 2,000 companies offering software and processing services in the U.S. and Europe.
- Field Service Planning Information Program - Provides senior field service managers with basic information and data to support their planning and operational decisions.

MULTICLIENT STUDIES: Research shared by a group of sponsors on topics for which there is a need for in-depth "one-time" information. A multiclient study typically has a budget of over \$100,000, yet the cost to an individual client is usually less than \$10,000. Recent studies specified by clients include:

- Maintenance Requirements For The Information Processing Industry
- Value Added Network Services
- IBM Series/I Analysis

CUSTOM STUDIES: Custom studies are proprietary to a client. Fees typically range from \$10,000 to over \$50,000 and are a function of the extent of the research work. Examples of recent assignments include:

- Survey Fortune 500/50 companies to determine plans for distributed data processing.
- Compare the internal charges for EDP services in a large company to those of commercially available services.
- Determine the market potential for an associative Relational Data Base Management System Processor.
- Conduct the 1979 ADAPSO Survey of the Computer Services Industry.
- Analyze the opportunities and problems associated with packaging terminals and/or minicomputers with remote computing services.

ABOUT INPUT

THE COMPANY

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international consulting firm. Clients include over 100 of the world's largest and most technically advanced companies.

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