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USERS' MANUAL FOR THE FEDERAL AGENCIES' COMPUTER TIME-SHARING SYSTEM

Technical Report No. 68

Prepared by
the Standing Committee on Computer Technology
of the
Federal Construction Council
Building Research Advisory Board
Commission on Sociotechnical Systems
National Research Council

NATIONAL ACADEMY OF SCIENCES
Washington, D.C.
1976

FEDERAL CONSTRUCTION COUNCIL

of the

BUILDING RESEARCH ADVISORY BOARD

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In this pursuit, its specific objectives include: Assembly and correlation of available knowledge and experience from each of the agencies; elimination of undesirable duplication in investigative effort on common problems; free discussion among scientific and technical personnel, both within and outside the government, on selected building problems; objective resolution of technical problems of particular concern to the federal construction agencies; and appropriate distribution of resulting information.

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FOREWORD

For the past several years the Federal Construction Council (FCC) of the Building Research Advisory Board (BRAB) has been exploring the question of whether the engineering personnel of most federal construction agencies utilize the full potential of the electronic computer, and in 1974 it concluded that computers were being underutilized by the federal construction agencies because: (1) too few fully tested programs were available to them, and (2) most of the available programs were written in a way that permitted their use only by engineers with extensive computer knowledge or special training on the use of these specific programs. In an effort to overcome these impediments, the FCC was instrumental in establishing an interagency program to: (1) make available to the federal construction agencies, through remote terminals, an extensive library, known as FACTS (Federal Agencies' Computer Time-Sharing System), of fully tested, easily utilized computer programs dealing with construction related engineering problems, and (2) promote the continual expansion of the FACTS library through the coordinated efforts of the various agencies.

In connection with its continuing role as coordinator of the interagency program, the FCC Standing Committee on Computer Technology has prepared this manual to provide federal construction agency engineers with the information they need to use FACTS.

Walter R. Hibbard, Jr., *Chairman*
Building Research Advisory Board

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I
INTRODUCTION

The Federal Agencies' Computer Time-Sharing System (FACTS) is the cornerstone of the recently initiated Federal Construction Council (FCC) program aimed at facilitating the use of computers by federal construction agency personnel. Under the FCC program, the federal construction agencies are, in essence, pooling and sharing their computer-program resources through FACTS and coordinating their computer-program development efforts for the benefit of all.*

FACTS is installed on the Remote Access Multi-User System (RAMUS) of the General Services Administration, and federal agencies can make it available to their personnel and authorized contractors by subscribing to RAMUS (information on RAMUS is presented in the appendix to this manual). A variation of a system originally developed by the U.S. Army Corps of Engineers to make it easier for engineers doing construction-related design work to use a computer, FACTS is designed to be usable by an engineer with no computer experience after only a few hours of training. It consists of two basic parts: (1) a library of engineering programs, and (2) an executive system that provides the user with access to those library programs. FACTS will, upon request, give the user a list of available library programs and an explanation of what each program will do. Once the user has chosen what programs he or she wants to run, FACTS automatically generates a link to the desired programs. At every step in the process, the user is given instructions by FACTS on the operation of the system.

This manual was prepared to serve as the text for a training course for potential users and as a simple reference document on FACTS. As such it does not describe the system's operation in detail (this information will be provided in a future manual for experienced computer programmers).

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*For information on the FCC program, see A Program for Facilitating the Use of Computers in Federal Construction Agencies, FCC Technical Report No. 64 (Washington, D.C.: National Academy of Sciences, 1974).

II
BASIC CONCEPT OF FACTS

In order to understand FACTS, it is first necessary to understand a little about RAMUS. Like most computer time-sharing systems, RAMUS is composed of:

1. An executive system that acts as a master control center;

2. Permanent files that contain a number of standard programs and sub-routines (including engineering-oriented programs) available for use by all subscribers;

3. User files that contain user-developed programs and serve as a temporary storage area for data to be used by the computer in solving specific problems (ordinarily, such files can be accessed only by the user who created them); and

4. A processing section that makes the actual calculations.

As shown in Figure 1, the RAMUS executive system serves as the interface between the user and the computer. Using preprogrammed procedures, the executive system carries out user instructions to retrieve programs from the permanent files, retrieve or insert data or programs from or into the user's file, execute programs, and transmit results to the user.

RAMUS and similar time-sharing systems are of considerable value to engineers with computer programming experience. Engineers without such experience, however, generally are unable to use such systems effectively since the development of a "commands program" is frequently needed to execute programs in the files and since a knowledge of programming often is required if the capabilities, limitations, and input requirements of available programs are to be understood. Even experienced programmers sometimes find it difficult or impossible to use available programs when, as is frequently the case, only sketchy information (documentation) is available.

FACTS, a subsystem of RAMUS, was developed to overcome these limitations of RAMUS and other time-sharing systems. Thus, FACTS offers users uniform access to the computer and immediate access to quality computer programs; it requires minimum data and computer program storage and minimum computer programming and debugging. In addition, it provides for immediate technological exchange between users.

User
Terminal

RAMUS

User Files		RAMUS Executive System		Permanent Files

Processing Section
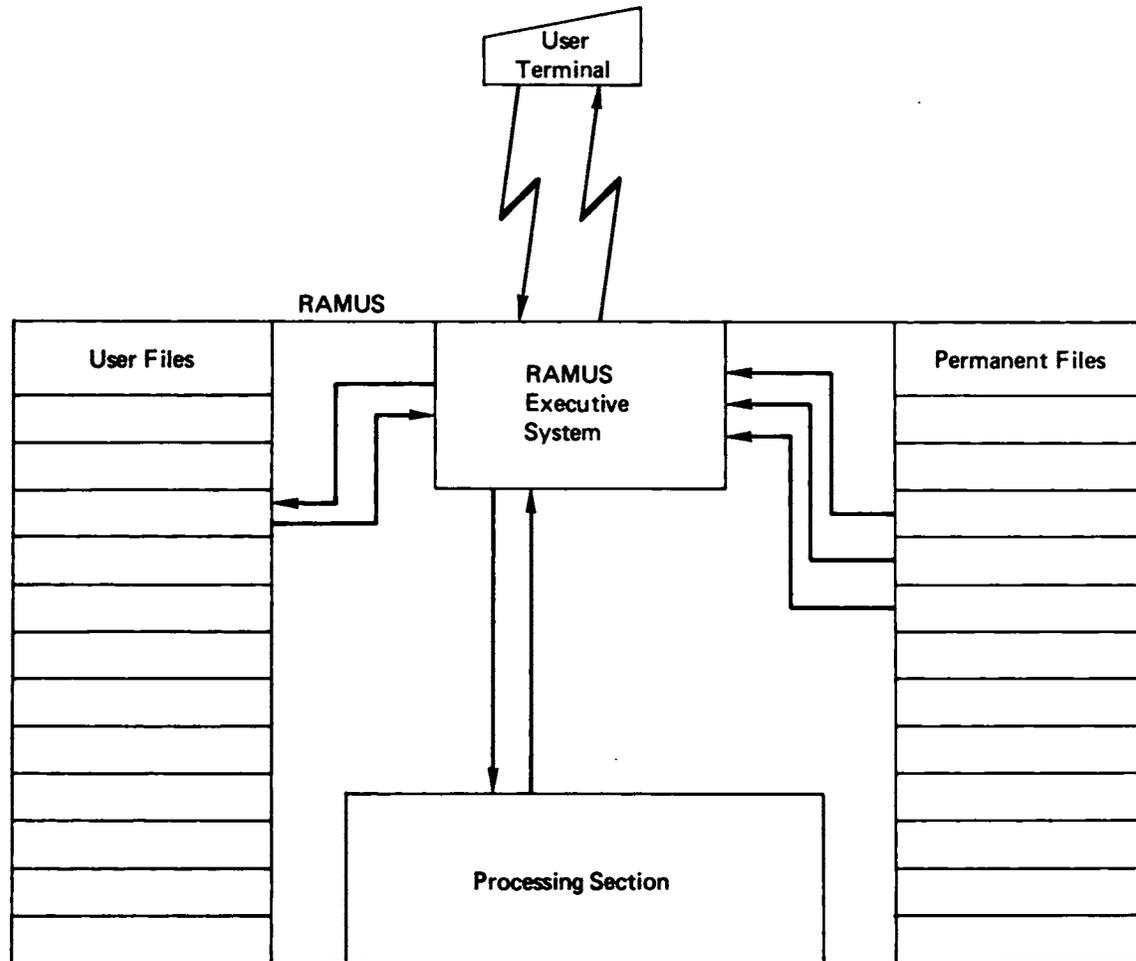
FIGURE 1 Basic RAMUS configuration.

As indicated above, FACTS is composed of two basic parts--an executive system and a library of construction-design oriented programs--both of which are integral parts of RAMUS (Figure 2). FACTS communicates with the user in the conversational mode (rather than in special computer terminology), employs standard engineering terms in all conversations, and controls every aspect of commands program generation and other library functions for the user.

Two particular features of FACTS make it possible for engineers without computer experience to use RAMUS (and for engineers with such experience to use RAMUS more easily):

1. The FACTS executive system actually writes the commands programs needed to execute library programs, thereby assuming this task for the user; and

2. FACTS library programs have been written in such a way that the user is given step-by-step instructions on their use in the course of using them.

Another advantage of FACTS, which could be of considerable value to some users, is that it permits certain library programs to be linked automatically to form a larger and more effective program, a process that is difficult with the standard programs usually found in computer libraries. The explanations provided by FACTS for linkable programs indicate with which programs linking is possible.

FACTS possesses these unique features primarily because all of the programs in the FACTS library have been written or rewritten as subroutines with special information, called a preamble, inserted at the beginning. Since the difference between a program and a subroutine is of minor significance to the FACTS user and since the term "program" is more widely understood, FACTS subroutines are referred to as programs in this document.

When this manual was prepared the FACTS library contained approximately 70 programs, but it is being expanded continually. Many programs in the library have been tested for accuracy, and in the list of programs the computer provides the user, such programs are identified by the note "FACTS approved" (other programs will be evaluated in the future).

Since the primary purpose of the FACTS executive system is to generate commands programs for the execution of FACTS library programs, either singly or in groups, these commands programs are saved for the user in his own file and their names are recorded in the user's computer-generated directory file.* Once a commands program has been generated by FACTS and

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*It should be noted that commands programs are very small compared to library programs and do not require much storage space or incur high storage charges for the user.

RAMUS

User Files		RAMUS Executive System		Permanent Files

User Terminal

FACTS
Executive
System

FACTS
Users

FACTS
Library

Processing Section
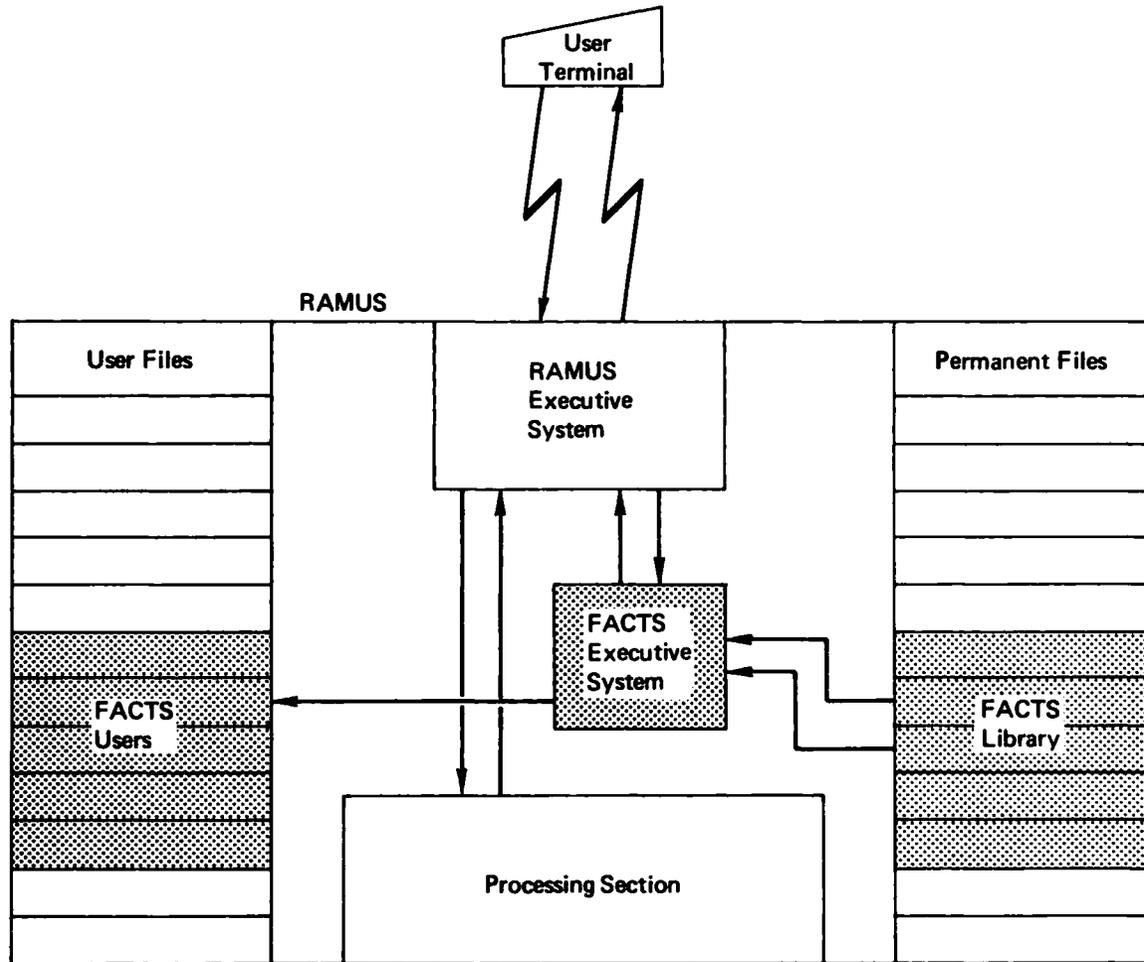
FIGURE 2   FACTS in relation to RAMUS.

stored in the user's file, it is executed like all other programs in the RAMUS system (Figure 1)--that is, the user executes that commands program through the RAMUS executive system without going through the FACTS executive system--and the user must re-enter the FACTS executive system only when he wants to solve a different type of problem. Commands programs generated by the FACTS executive system can be run repeatedly and will remain on the user's account until he desires to purge them (this purging process, plus other library-type functions that are performed with the FACTS executive system, are discussed in the next section).

III
FACTS IN USE

FACTS has been designed to be used by engineers with no previous computer experience, and it is believed that any engineer will be able to use the system after studying the material which follows for just an hour or so. The material is divided into two parts--a brief explanation of the meaning of the basic commands used with FACTS and an annotated series of examples of FACTS computer runs.

A. FACTS Command Structure

The FACTS executive system is divided into 11 sublevels, each of which performs a specific function. The user gains access to the sublevel he wishes to use by typing the appropriate command (i.e., ABBREVIATE, BRIEF, CONSTRUCT, DELETE, DIRECTORY, FULL, HELP, LIST, MESSAGE, RAMUS, or STOP).

After the user has contacted the RAMUS computer and has been connected to the FACTS executive system, he will immediately be asked to type one of three commands--ABBREVIATE, FULL, or HELP--that, as explained below, tells the system whether to include instructions in subsequent conversation with the user and whether the user wants an explanation of the system before proceeding. Next, the user will be asked to type in any one of the 11 basic commands.* Commands can be entered in any order and repeated if desired. Except in the case of the STOP command, the user will be asked to enter another command after the previously entered command has been executed. The purpose of each command and the actions that it causes to occur are described below.

1. ABBREVIATE

The ABBREVIATE sublevel instructs the computer to delete instructions on the use of the system in subsequent conversations with the user. This mode of operation is appropriate only for users with considerable experience with FACTS. In this mode of operation, the system operates faster than when full instructions are provided. Provision has been made for a fast mode of operation in deference to experienced users who prefer not to have to wait to receive instructions that they already know.

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*Since ABBREVIATE, FULL, and HELP are 3 of the 11 basic commands, the user can change a command given previously.

2. BRIEF

The BRIEF sublevel provides the user with detailed information on the purposes and limitations of programs in the FACTS library. Such information is provided when the user enters program names one by one. The information permits a user to determine, without having to refer to a printed document, whether a particular program will meet his needs.

3. CONSTRUCT

The CONSTRUCT sublevel generates for the user commands programs for the library programs he wishes to run and stores the generated commands programs in the user's file. In order to have a commands program generated, the user types in the name(s) of the library program(s) he wishes to use. The commands program contains all the commands that are necessary to solve the problem and includes such things as file generation, sorting, and computing. Without the commands program, the user would need to construct his own program for controlling the processing sequence. These programs are the link between the user and the FACTS library programs.

In addition to generating and storing one or more commands programs, the CONSTRUCT sublevel creates a directory file for the user in which it stores the name of the commands programs generated, the names of the FACTS library programs that are used, and the date the commands programs were created. If the user has an existing directory file (one that the computer created at some previous time), the computer appends the new data to that file.

The computer automatically assigns a name to each directory file it creates; the name comprises a three-character prefix that the user supplies plus a three-digit suffix, beginning with the digits 100. Most users need and have only one directory file; however, a user can have a number of directory files if he wishes (up to 899 in fact, but it is doubtful that any user would want more than 10). The computer also automatically assigns a name to each commands program it generates. This name comprises the same three-character prefix as the directory file plus a two-digit suffix, beginning with the digits 00. Thus, the directory file(s) of each user can contain data on as many as 100 programs.

4. DELETE

The DELETE sublevel provides the user with the contents of his directory file(s) and allows him to eliminate commands programs and their references from the file system.

5. DIRECTORY

The DIRECTORY sublevel prints for the user the information that is stored in his directory file(s) when the user provides his directory file name.

6. FULL

The FULL sublevel directs the computer to include complete instructions on the use of the system in subsequent conversations with the user. This mode of operation is appropriate for all users except those with considerable prior experience with FACTS.

7. HELP

The HELP sublevel provides the user with a fairly detailed explanation of FACTS and the system commands used with FACTS. This explanation is made available primarily to assist those users who use FACTS infrequently and do not have immediate access to a copy of this manual. On the assumption that any one desiring an explanation of FACTS is probably an inexperienced user, the HELP sublevel also directs the computer to include complete instruction on the use of the system in subsequent conversations with the user.

8. LIST

The LIST sublevel provides the user with the names of the programs in the FACTS library for the various engineering disciplines and single-line descriptions of each program listed. The list for each discipline is generated separately, and the user is instructed to type in the functional area code of the discipline for which he wants a list. If desired, the computer will, on command, also provide the user with a listing of the area codes for the engineering disciplines. The user can obtain, one by one, as many lists as there are area codes (i.e., disciplines).

9. MESSAGE

The MESSAGE sublevel allows the user to leave a message for the FCC Standing Committee on Computer Technology, which oversees FACTS, concerning the system or programming problems encountered during use of the system. It also provides the user with the names and phone numbers of FCC contacts who can give immediate system help.

10. RAMUS

The RAMUS sublevel provides the user with a very brief explanation of the relationship between FACTS and RAMUS. For complete instructions on the use of RAMUS, the user must consult a copy of the

RAMUS operating manual, which most users should already have since the General Services Administration provides one to all RAMUS subscribers.

11. STOP

The STOP sublevel causes the computer to terminate the processing of FACTS and returns control to the RAMUS executive system. Since all commands programs are executed in the normal RAMUS mode, once FACTS has created the desired commands programs, the user need not use FACTS again until he wants to review the library, delete files, or generate a new set of commands programs.

B. Typical FACTS Computer Runs

Presented on the following sheets are typical FACTS computer runs in which the various FACTS commands are used. Underlined items in the printout indicate user commands and responses. For the 11 basic commands, the computer will accept either the entire command word or a two-letter abbreviation of the command (which, with one exception, is the first two letters of the command); in the example, abbreviations have been used. The Ⓡ indicates the nonprinting carriage return character that is supplied by the user immediately following his response to a computer inquiry. All computer inquiries and user responses have been annotated to make the sample computer run more informative; the annotation references--e.g., (1)--appear beside both the computer printout lines to which they refer and the corresponding explanatory notes.

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GSA 440 TIME-SHAPING SYSTEM 2   ON AT - 13:08 PM:07 TTY:62

01/19/76. PUNBIG AREA EXPANDED TO 30.5 K WORDS. PLEASE LIST INFORM***:

USER ID-- P100 (R) (1)
PASSWORD
█████? (R) (2)
TYPE OLD OR NEW:OLD:FACTS *** (R) (3)

READY
RUNNH (R) (4)

FACTS RESPONDING. INDICATE LEVEL OF PROMPTING AT ***? PROMPT
ENTER   TO GET
-----   ------
   AP   ABBREVIATED PROMPTING
   FL   FULL PROMPTING
   HE   FULL PROMPTING + SYSTEM EXPLANATION
*** ? HE (R) (5)

FACTS CONSISTS OF AN EXECUTIVE SYSTEM AND A LIBRARY OF FULLY TESTED
ENGINEERING AND SCIENTIFIC COMPUTER PROGRAMS.

THE FACTS EXECUTIVE SYSTEM ALLOWS THE USER TO FULLY UTILIZE THE FACTS
LIBRARY OF ENGINEERING AND SCIENTIFIC COMPUTER PROGRAMS BY (1) PROVIDING
LIBRARY VISIBILITY, (2) CONSTRUCTING COMMANDS PROGRAMS FOR THE USER WHICH
TAKE CARE OF ALL SYSTEM DETAILS THAT ARE NECESSARY FOR SETTING UP AND
RUNNING FACTS PROGRAMS AND (3) PROVIDING USER LIBRARY MANAGEMENT. THESE
FUNCTIONS ARE ACCOMPLISHED WITHIN SUBLEVELS OF THE EXECUTIVE SYSTEM. SUBLEVEL
STATUS IS ACHIEVED THROUGH THE USE OF COMMANDS GIVEN TO THE COMPUTER IN
RESPONSE TO THE ***? PROMPT PRINTED IN THE EXECUTIVE SYSTEM COMMAND LEVEL.
THE THREE PRINCIPAL FUNCTIONS OF THE FACTS EXECUTIVE SYSTEM ARE AS
FOLLOWS:

(1)LIBRARY VISIBILITY IS ACHIEVED THROUGH THE LIST AND BRIEF SUBLEVELS

   \LIST SUBLEVEL\-PROVIDES A LIST OF COMPUTER PROGRAMS CURRENTLY AVAILABLE
IN THE FACTS LIBRARY. THE FACTS LIBRARY, WHICH IS CONSTANTLY EXPANDING,
IS DIVIDED INTO SUBAREAS THAT ARE IDENTIFIED BY EITHER A SINGLE ALPHABET
LETTER OR BY A LETTER AND A NUMBER. A LIST OF THE SUBAREAS AND THE NUMBER
OF FACTS PROGRAMS IN EACH SUBAREA IS AVAILABLE AS AN OPTION WITHIN THE
LIST SUBLEVEL OF THE EXECUTIVE SYSTEM.

   \BRIEF SUBLEVEL\-PROVIDES A SHORT DESCRIPTION OF THE CAPABILITIES AND
DATA REQUIREMENTS FOR EACH PROGRAM IN THE FACTS LIBRARY.

(2)CONSTRUCTION OF COMMANDS PROGRAMS IS ACHIEVED THROUGH THE CONSTRUCT
SUBLEVEL.

(1) The user enters his assigned identification code.

(2) The user enters his assigned password, which the computer over-
prints to ensure that it remains a secret.

(3) The user indicates he wants to use an existing program named
FACTS. (In the example, the user has saved time by indicating
the name of the program he wants to run after giving the
requested information; i.e., that he wants an existing pro-
gram. (If he had typed merely "OLD," the computer would have
asked for the program name on the next line.)

(4) The user directs the computer to run FACTS with no headings
(RUNNH)

(5) The user indicates that he wants to run FACTS with explanatory
prompting and that he wants an explanation of FACTS. (The
symbols *** ? indicates that the user should give one of the
11 basic commands; in this case the command HE (for HELP) has
been given, which sends the computer to the HELP sublevel.)

\CONSTRUCT SUBLEVEL\-FOR EACH FACTS LIBRARY PROGRAM THAT THE USER WANTS
TO RUN, THE COMPUTER CREATES A SMALL COMMANDS PROGRAM TO HANDLE ALL THE
DETAILS REQUIRED TO MAKE THE PROGRAM OPERATIONAL. THIS SMALL PROGRAM
IS STORED IN THE USERS OWN LIBRARY BY THE COMPUTER AND ITS NAME RECORDED IN
A DIRECTORY FILE THAT THE COMPUTER GENERATES FOR THE USER THE FIRST TIME
IT CREATES A COMMANDS PROGRAM FOR HIM. EACH TIME THE USER CREATES ANOTHER
COMMANDS PROGRAM IT IS ALSO STORED IN HIS LIBRARY AND ITS NAME IS ADDED
TO HIS DIRECTORY FILE. THUS, THE USERS DIRECTORY FILE COMTAINS A CURRENT
LIST OF THE COMMANDS PROGRAMS THAT ARE IN HIS LIBRARY. COMMANDS PROGRAMS
ARE CREATED BY THE FACTS EXECUTIVE SYSTEM PUT THEY ARE RUN UNDER RAMUS
IN THE SAME MANNER AS ANY OTHER COMPUTER PROGRAM ON THE RAMUS SYSTEM.
A COMMANDS PROGRAM, ONCE GENERATED, CAN BE USED OVER AND OVER AGAIN
WITHOUT RETURNING TO THE FACTS EXECUTIVE SYSTEM.

(3)MANAGEMENT OF THE USERS LIBRARY OF COMMANDS PROGRAMS IS HANDLED
THROUGH THE DELETE, DIRECTORY AND MESSAGE SUBLEVELS.

\DELETE SUBLEVEL\-PROVIDES THE MECHANISM FOR LISTING THE CONTENT
OF THE USERS DIRECTORY FILE(S) AND FOR DELETING COMMANDS PROGRAMS
FROM HIS LIBRARY. THE NAMES OF DELETED COMMANDS PROGRAMS ARE REMOVED FROM
THE USERS DIRECTORY FILE. THUS, THE DIRECTORY IS ALWAYS CURRENT.

\DIRECTORY SUBLEVEL<-ALLOWS THE USER TO LIST THE CONTENT OF HIS DIRECTORY
FILE(S).

\MESSAGE SUBLEVEL\-ALLOWS THE USER TO MAKE COMMENTS ON FACTS DURING
THE ACTUAL USE OF THE SYSTEM. MESSAGES ARE REVIEWED AT FREQUENT
INTERVALS AND THE USER IS NORMALLY CONTACTED IF ADDITIONAL INFORMATION
IS REQUIRED.
NOTE: COMMANDS AND RESPONSES SHOULD BE ENTERED ONLY IN RESPONSE TO PROMPTS;
OTHERWISE IT CONFUSES THE COMPUTER. ALSO, THINK BEFORE YOU RESPOND TO A
COMPUTER PROMPT, A LITTLE THOUGHT WILL PAY-OFF.

THE FACTS LIBRARY CONSISTS OF A NUMBER OF FULLY TESTED ENGINEERING AND
SCIENTIFIC COMPUTER PROGRAMS. THESE PROGRAMS ARE REALLY SUBROUTINES
AND EACH CONTAINS A PREAMBLE WHICH DEFINES THE PURPOSE OF THE PROGRAM,
THE DATA REQUIRED TO MAKE IT OPERATIONAL AND OTHER INFORMATION NECESSARY
FOR ITS EFFICIENT OPERATION. SINCE THESE PROGRAMS ARE SUBROUTINES, THEY
MAY BE LINKED TOGETHER FOR SOLVING EXTREMELY COMPLEX PROBLEMS WHERE
A MULTIPLICITY OF OPERATIONS ARE REQUIRED. THE FACTS EXECUTIVE SYSTEM CAN
READ AND INTERPRET THE CONTENT OF THE PREAMBLE OF FACTS PROGRAMS AND
FROM THIS ANALYSIS, CREATE A COMMANDS PROGRAM CONTAINING THE ELEMENTS THAT
ARE NECESSARY FOR MAKING THE FACTS SUBROUTINE FULLY OPERATIONAL.

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YOU ARE NOW AT COMMAND LEVEL(PROMPT SYMBOL ***).(6)
ENTER NEXT FACTS COMMAND AT ***? PROMPT.

VALID COMMANDS	ACCEPTABLE ABBREVIATION	PROMPT SYMBOL	COMMAND ACTION
ABBREVIATE	AB	***	PRINT ABBREVIATED PROMPTING
BRIEF	BR	$$$	PRINT BRIEF DESCRIPTION OF PROGRAMS
CONSTRUCT	CO	+++	CONSTRUCT COMMANDS PROGRAMS
DELETE	DE	XXX	DELETE COMMANDS PROGRAMS
DIRECTORY	DI	&&&	LIST OF PROGRAMS IN USER'S DIRECTORY
FULL	FL	***	PRINT FULL PROMPTING
HELP	HE	ããã	PRINT FACTS SYSTEM DETAILS
LIST	LI	###	LIST OF FACTS PROGRAMS
MESSAGE	ME	～～	MAKE SYSTEM COMMENTS
RAMUS	RA	<<<	PRINT RAMUS SYSTEM DETAILS
STOP	STOP		RETURNS USER TO RAMUS SYSTEM

*** ? RA Ⓡ(7)

<<<
ALL PROGRAMS, INCLUDING THE FACTS EXECUTIVE SYSTEM, ARE RUN UNDER THE
CONTROL OF RAMUS(REMOTE ACCESS MULTI-USER SYSTEM). IN ORDER TO RUN A
COMMANDS PROGRAM DEVELOPED WITHIN FACTS, THE USER MUST EXIT TO RAMUS. THIS
CAN BE DONE AT ANY TIME BY TYPING AN S AND THEN HITTING A CARRIAGE RETURN
OR WHEN AT COMMAND LEVEL THE USER MAY TYPE STOP. AT RAMUS
LEVEL THE USER MAY RUN ANY PROGRAM BY TYPING "RUN OPTION:PROGRAM NAME"
FOR EXAMPLE, IF THE USER WANTED TO RUN A COMMANDS PROGRAM NAMED RLR01
AND ITS RUN OPTION IS RUN, THE USER WOULD TYPE RUN:RLR01 AND THEN HIT A
CARRIAGE RETURN. (FOR GREATER DETAIL OF THE RAMUS SYSTEM AND ITS OPTIONS,
THE USER MUST OBTAIN A COPY OF THE OPERATING SYSTEM MANUAL THROUGH GSA).
YOU ARE NOW AT COMMAND LEVEL(PROMPT SYMBOL ***).
ENTER NEXT FACTS COMMAND AT ***? PROMPT.

VALID COMMANDS	ACCEPTABLE ABBREVIATION	PROMPT SYMBOL	COMMAND ACTION
ABBREVIATE	AB	***	PRINT ABBREVIATED PROMPTING
BRIEF	BR	$$$	PRINT BRIEF DESCRIPTION OF PROGRAMS
CONSTRUCT	CO	+++	CONSTRUCT COMMANDS PROGRAMS
DELETE	DE	XXX	DELETE COMMANDS PROGRAMS
DIRECTORY	DI	&&&	LIST OF PROGRAMS IN USER'S DIRECTORY
FULL	FL	***	PRINT FULL PROMPTING
HELP	HE	ããã	PRINT FACTS SYSTEM DETAILS
LIST	LI	###	LIST OF FACTS PROGRAMS
MESSAGE	ME	～～	MAKE SYSTEM COMMENTS
RAMUS	RA	<<<	PRINT RAMUS SYSTEM DETAILS
STOP	STOP		RETURNS USER TO RAMUS SYSTEM

*** ? LI Ⓡ(8)

(6) The computer indicates that it has completed the last command.

(7) The computer indicates by the *** ? prompt that it awaits the next basic command. The user enters RA (for RAMUS) indicating he wants an explanation of the RAMUS system, which sends the computer to the RAMUS sublevel.

(8) The computer indicates by the *** ? prompt that it awaits the next basic command. The user enters LI (for LIST) indicating he wants a listing of FACTS programs, which sends the computer to the LIST sublevel.

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Sample FACTS Run (Continued)

YOU ARE NOW AT LIST LEVEL(PROMPT SYMBOL ###).
ENTER ONE FUNCTIONAL AREA CODE (E.G. J) IN RESPONSE TO EACH
PROMPT. ENTER AN * FOR LIST OF CODES. ENTER WORD END TO
RETURN TO COMMAND LEVEL.
? * (R)(9)

FUNCTIONAL AREA CODE	PROGRAMS IN AREA	DESCRIPTION
E	1	ELECTRICAL
H1	8	HYDRAULICS-SPILLWAYS
H2	11	HYDRAULICS-OUTLET WORKS
H3	2	HYDRAULICS[GATES & VALVES
H6	23	HYDRAULICS-OPEN CHANNELS
H7	5	HYDRAULICS-SPECIAL PROBLEMS
J	1	ECONOMICS
L	2	MECHANICAL
M	1	MATHEMATICAL
U	1	GEODESORY & SURVEYING
X	6	STRUCTURAL
Z	1	OTHER

? X (R) (10)

XOOO1 ANALYZE RECT MULTISTORY RIGID PLANE FRAMES.
XOOO2 ANALYSIS OF RECT MULTISTORY RIGID PLANE FRAMES
XOOO3 DIRECT STIFFNESS ANALYSIS OF BEAMS
XOOO4 ANALYSIS OF PIN-JOINTED TRUSSES
XOOO5 ANALYSIS OF PLANE FRAMES
XOOO6 ANALYSIS OF GRID STRUCTURES
? END (R)(11)

*** ? BR (R)(12)

YOU ARE NOW AT BRIEF LEVEL(PROMPT SYMBOL $$$).
ENTER ONE PROGRAM NAME (E.G. H2010) IN RESPONSE TO EACH
PROMPT. TYPE WORD END TO RETURN TO COMMAND LEVEL.
$$$? XOOO3 (R) (13)

I. DESCRIPTION
    XOOO3 WILL ANALYZE BEAMS OF VARIABLE CROSS SECTION SUBJECTED TO
    ARBITARY LOADING. THE BEAM IS DIVIDED INTO SEGMENTS CONNECTED
    AT NODAL POINTS. THE RELATIONSHIP BETWEEN APPLIED LOADS AND
    MOMENTS WITH DISPLACEMENTS AND ROTATIONS IS DETERMINED USING
    MOMENT-AREA PRINCIPLES.

II. LIMITATIONS
    XOOO3 WILL HANDLE A BEAM THAT HAS BEEN DIVIDED INTO AS MANY AS
    51 SEGMENTS. DATA FOR EACH BEAM IS ENTERED EITHER FROM A DATA
    FILE OR IN RESPONSE TO CUEING AT RUN TIME.

(9) The computer is asking for a Functional Area Code which it can use to search the FACTS library for those subroutines within the area of concern. The ### ? prompt is printed at every instance where the LIST sublevel processor requires a user response. The * response by the user indicates that he wants a listing of the Functional Area Codes used in FACTS.

(10) In response to the ### ? prompt the user enters the letter X indicating he wants a listing of structural programs in the library.

(11) In response to the ### ? prompt the user enters the word END indicating he needs no additional listings.

(12) The computer indicates by the *** ? prompt that it awaits the next basic command. The user enters BR (for BRIEF) indicating he wants a brief description of one or more programs and sends the computer to the BRIEF sublevel.

(13) In response to the $$$? prompt (the prompt symbol at the BRIEF sublevel), the user enters the name of a program for which he wants a description.

III. DATA
   EACH BEAM IS DIVIDED INTO SEGMENTS. THE NODAL POINTS OF THE
   SEGMENTS ARE NUMBERED FROM LEFT TO RIGHT OF THE STRUCTURE
   WITH THE FIRST NODAL POINT BEING NUMBER 1. BEAM SEGMENTS
   ARE ALSO NUMBERED IN LIKE MANNER WITH THE FIRST SEGMENT BEING
   NUMBER 1. INPUT DATA FOR EACH STRUCTURE CONSISTS OF THE
   FOLLOWING:
      A. JOB IDENTIFICATION(3 LINES MAX 60 CHAR/LINE)
      B. NUMBER OF BEAM SEGMENTS.
      C. DATA FOR EACH NODAL POINT.
         1. NODAL POINT NUMBER.
         2. RESTRAINT TYPE.
            TYPE   X-DISP.   Y-DISP.
             1   FREE   FREE
             2   FREE   SPECIFIED
             3   SPECIFIED   FREE
             4   SPECIFIED   SPECIFIED
            NXX REPEAT TYPE N ELEMENT XX TIMES
         3. X-COORDINATE OF POINT(INCHES).
         4. DISPLACEMENT OR LOAD(INCHES OR POUNDS).
         5. ROTATION OR MOMENT(RADIANS OR INCH-POUNDS).
      D. BEAM SEGMENT DATA.
         1. BEAM SEGMENT NUMBER.
         2. MOMENT OF INTERIA END I(INCHES**4).
         3. MOMENT OF INTERIA END J (INCHES**4).
         4. YOUNG'S MODULUS (POUNDS/IN.**2).
         5. NUMBER OF TIMES BEAM SEGMENT IS REPEATED.

   EXAMPLE INPUT FOR A BEAM 24 INCHES LONG, FIXED AT THE ENDS AND
   SUBJECTED TO A 1000 POUND LOAD AT THE CENTER. I=10 INCHES**4 &
   YOUNG'S MODULUS=30,000,000 POUNDS/IN.**2. THE BEAM IS DIVIDED
   INTO 2 SEGMENTS.

20 THIS IS A TEST SET OF DATA
25 THE JOB IDENTIFICATION CAN CONTAIN
30 ANY CHARACTER.
40 2
50 1,4,0,0,0
60 2,1,12,1000,0
70 3,4,24,0,0
80 1,300,300,30000000,2
$$$? END ®(14)

*** ? CO ®(15)

YOU ARE NOW AT CONSTRUCT LEVEL(PROMPT SYMBOL +++)
ENTER DIRECTORY FILE NAME? IF YOU DON'T HAVE ONE,HIT A CARRIAGE RETURN.
   +++ .? ___ ®(16)

ENTER ONE PROGRAM NAME (E.G. H2010) IN RESPONSE TO
EACH PROMPT. AFTER ALL NAMES HAVE BEEN ENTERED, TYPE FINIS AFTER
SUBSEQUENT PROMPT.
   +++   ? X0003 ®(17)

   +++   ? FINIS ®

(14) In response to the $$$? prompt, the user enters the word END
indicating he needs no additional descriptions.

(15) In response to the *** ? prompt, indicating that the computer
is ready for the next basic command, the user enters CO (for
CONSTRUCT), indicating that he wants to have one or more
commands program developed and sending the computer to the
CONSTRUCT sublevel.

(16) The computer has asked for the user's directory file name where
his previously developed commands programs are stored. In
response to the +++ ? prompt (the prompt symbol for the CON-
STRUCT sublevel) the user types a carriage return indicating
that he does not have a file name (because he has no commands
programs stored on the system) or that he does not wish to use
his existing file for the new programs to be developed.

(17) The computer has asked for the names of FACTS programs for
which the user wants commands programs developed. In response
to the first +++ ? prompt the user enters the name of a FACTS
program. In response to the second prompt the user types
FINIS indicating that he had finished entering FACTS program
names. If more than one commands program had been desired,
the appropriate FACTS program names would have been entered,
in response to prompts, before FINIS was typed.

Sample FACTS Run (Continued)

ENTER 3 CHAPACTERS (E.G. YOUR INITIALS) TO PE USED AS A PREFIX
IN NAMING YOUR NEW DIRECTORY FILE.

+++   ? RLP Ⓡ(18)

THE FOLLOWING PPOGRAMS ARE ADDED TO YOUR DIPECTORY FILE RLR102
                    (MON   01/19/76)

COMMANDS PROGRAM NAME   FACTS PROGRAM USED   PUN OPTION
       PLR03   X0003   RUNNH

THESE PPOGRAMS WILL BE SAVED UNTIL YOU DELETE THEM. THEY CAN BE RUN AT
PAMUS LEVEL BY ENTERING RUN OPTION:COMMANDS PRCGRAM NAME (E.G. RUNNH:SPH00).

*** ? DI Ⓡ(19)

YOU ARE NOW AT DIRECTORY LEVEL (PROMPT SYMBOL ***).
 CURRENT DIPECTORY RLR102

COMMANDS PROGRAM NAMES   FACTS PROGRAM USED   RUN OPTION   DATE
        RLRC3   X0003   PUNNH   MON   01/19/76

*** ? DE Ⓡ(20)

YOU ARE NOW AT DELETE LEVEL (PROMPT SYMBOL %%%).
 CURRENT DIPECTORY PLR102

ENTEP NEXT COMMAND
  ENTER   TO GET
  -----   ------
  LOOK   -LIST YOUR DIPECTORY
  EPASE   -DELETE SOME DIRECTORY PROGRAMS
  ANOTHER -GO TO ANOTHER DIRECTORY
  END   -PETURN TO COMMAND LEVEL
%%% ? AN Ⓡ(21)

ENTEP YOUR DIRECTORY FILE NAME (E.G. SRH100).
%%% ? RLR100 Ⓡ(22)

%%% ? LOOK Ⓡ(23)

COMMANDS PROGRAM NAMES   FACTS PROGRAM USED   RUN OPTION   DATE
       RLRC0   LC001   PUNNH   TUE   12/16/75
%%% ? EPASE Ⓡ(24)

DELETE ALL? (YES OP NO)
%%% ? YES Ⓡ(25)

(18) The system has asked for a new directory prefix since the user
     in this example did not have an existing directory file. The
     computer uses this prefix to construct a directory file named
     RLR102 and a program named RLR03. The new commands program
     RLR03 and the directory file RLR102 are stored on the system's
     disc file. The system automatically exits from the CONSTRUCT
     sublevel after it has printed a list of all commands programs
     currently in the user's directory.

(19) In response to the *** ? prompt, indicating that the computer
     is ready for the next basic command, the user enters DI (for
     DIRECTORY) indicating that he wants to review his directory
     and sending the computer to the DIRECTORY sublevel. The com-
     puter responds by indicating the name of the directory file
     to which the user has just added a program; it then provides
     information on the programs in that file. If the user had
     not just added a program to the file, the computer would have
     asked for the user's directory file name before proceeding.
     The computer automatically exits from the CONSTRUCT sublevel
     after it has provided information on the programs in a direc-
     tory. If a user has more than one directory that he wants to
     review, he must use the DELETE sublevel to do so.

(20) In response to the *** ? prompt, indicating that the computer
     is ready for the next basic command, the user enters DE (for
     DELETE) indicating that he wants to delete programs from his
     directory and sending the computer to the DELETE sublevel.
     The computer responds by indicating the name of the directory
     file to which the user has just added a program (which for
     most users will be the user's only directory file). Unless
     directed to work with another directory that the user may
     have, the computer will assume that the indicated current
     directory is the one with which it should work. The computer
     also indicates the options the user has at the DELETE sublevel.

(21) In response to the %%% ? prompt (the prompt symbol at the
     DELETE sublevel), the user enters AN (for ANOTHER) indicating
     that he wants to work with a directory other than the one he
     has been using.

(22) The user enters the name of the directory file he wishes to
     work with.

(23) By the response LOOK, the user indicates he wants to review
     his directory file. In this case, the computer will give the
     information in file RLR100, since the user had indicated in
     his previous response that he did not want to work with the
     current directory. Otherwise the computer would have given
     the information in the indicated current directory.

(24) By the response ERASE the user indicates he wants to delete
     programs from his directory file RLR100.

(25) By the response YES the user indicates he wants to delete the
     entire directory file. If the response NO had been given, the
     computer would have asked which programs to delete.

18

NEXT TIME YOU RUN FACTS, YOU WILL HAVE TO GET ANOTHER
DIRECTORY FILE NAME. RLR100 NO LONGER EXISTS.
SYSTEM WILL ACCEPT ONLY COMMANDS ANOTHER OR END AT THIS TIME.
XXX ? END (R) (26)

*** ? ME (R)(27)

YOU ARE NOW AT MESSAGE LEVEL(PROMPT SYMBOL ^^^).
ENTER YOUR NAME AND PHONE NUMBER ON ONE LINE
^^^ ? RENNEP 304 263-6756 (R) (28)

ENTER YOU MESSAGE A LINE AT A TIME IN RESPONSE TO ^^^? PROMPT FOR EACH LINE.
TERMINATE YOUR MESSAGE WITH THE WORD END AT THE BEGINNING OF THE LAST LINE.
^^^ ? I WOULD LIKE SEE ADDITIONAL PROGRAMS IN THE STRUCTURAL AREA (R) (29)

^^^ ? END (R) (30)

*** ? STOP (R) (31)

FOR ASSISTANCE AT ANY TIME, RECALL FACTS AND ASK FOR MESSAGE
STOP

RUNNING TIME: 56.9 SECS I/O TIME : 30.6 SECS

READY

OLD:RLRO3 (R) (32)

READY
RUNNH (R) (33)

ENTER DATA FILE NAME. IF NONE TYPE CARRIAGE RETURN.
? ___ (R) (34)

WANT SHORT CUES(YES OR NO).
? NO (R)(35)

ENTER DATA FOR ONE STRUCTURE AT A TIME IN RESPONSE TO CUES

(26) The response END returns the computer to the command level.

(27) In response to the *** ? prompt, indicating that the computer
is ready for the next basic command, the user enters ME (for
MESSAGE), indicating that he wants to leave a message and
sending the computer to the MESSAGE sublevel.

(28) In response to the ^^^ ? prompt (the prompt symbol for the
MESSAGE sublevel), the user enters his name and phone number,
which will be needed if the user is asking a question.

(29) The user types in his message.

(30) The user enters END to indicate the end of his message.

(31) In response to the *** ? prompt, indicating that the computer
is ready for the next basic command, the user enters STOP indi-
cating that he is through with FACTS and sending the computer
to the STOP sublevel. The computer responds by indicating the
computer time used and returning control to RAMUS.

(32) In response to READY, which indicates that RAMUS is awaiting
the next command, the user enters OLD:RLRO3 indicating that he
wants the computer to retrieve from storage the existing pro-
gram named RLRO3, which is the commands program that FACTS has
just developed for the user.

(33) In response to another READY, indicating that the desired
program has been retrieved, the user instructs the computer
to run the program without headings (RUNNH).

(34) By typing a carriage return, the user indicated that he does
not have data for the program already stored in the computer.

(35) The user indicates that he does not want short cues (abbrevi-
ated prompts)--this mode of operation would be appropriate
for a user very familiar with the program.

19

ENTER JOB IDENTIFICATION (3 LINES WITH 60 CHAR. PER LINE.
ENTER CARRIAGE RETURN ONLY TO BLANK OUT A LINE.
*   1   ? THIS IS A TEST SET OF DATA (36)

*   2   ? TO TEST THE PROGRAM USE

*   3   ? AND SEE HOW IT WORKS

ENTER NUMBER OF BEAM SEGMENTS(MAX 51).
=   4   ? 2 (R)(36)

ENTER NODAL POINT DATA (SEPARATE BY COMMAS).
NUMBER LEFT TO RIGHT BEGINNING WITH NUMBER 1.
   1.NODAL POINT NUMBER.
   2.RESTRAINT TYPE.
     TYPE   X-DISP.   Y-DISP.
      1   FREE   FREE.
      2   FREE   SPECIFIED.
      3   SPECIFIED   FREE.
      4   SPECIFIED   SPECIFIED.
     NXY REPEAT TYPE N ELEMENT XX TIMES.
   3.X-COORDINATE OF POINT (INCHES).
   4.DISPLACEMENT OR LOAD (INCHES OR POUNDS).
   5.ROTATION OR MOMENT (RADIANS OR INCH-POUNDS).
a   5   ? 1,4,0,0,0 (R)(36)

a   6   ? 2,1,12,1000,0 (R) (36)

a   7   ? 3,4,24,0,0 (R)(36)

ENTER BEAM SEGMENT DATA (SEPARATE BY COMMAS).
NUMBER LEFT TO RIGHT BEGINNING WITH NUMBER 1.
   1.BEAM SEGMENT NUMBER.
   2.MOMENT OF INERTIA END I (INCHES**4).
   3.MOMENT OF INERTIA END J (INCHES**4).
   4.YOUNG'S MODULUS (POUNDS/IN**2).
   5.NUMBER OF TIMES BEAM SEGMENT IS REPEATED.
$ 8   ? 1,300,300,30000000,2 (R) (36)

WANT TO CORRECT ANY DATA BEFORE SOLVING PROBLEM (YES OR NO).
!   ? NO (R) (36)

THIS IS A TEST SET OF DATA
TO TEST THE PROGRAM USE
AND SEE HOW IT WORKS

20

NUMBER OF NODES= 3   NUMBER OF BEAM SEGMENTS= 2

NODE	RESTRAINT	X	U	V
1	4	0.00	0.00	0.00
2	1	12.00	1000.00	0.00
3	4	24.00	0.00	0.00

SEGMENT	I	J	MOMENT OF INTERIA	YOUNG'S MODULUS
1	1	2	300.00	30000000.00
2	2	3	300.00	30000000.00

```
.VERTICAL DISPL OF(INCHES)  1 =    0.00000
 ROTATION OF       (RAD)    1 =    0.00000
 VERTICAL DISPL OF(INCHES)  2 =    0.00001
 ROTATION OF       (RAD)    2 =    0.00000
 VERTICAL DISPL OF(INCHES)  3 =    0.00000
 ROTATION OF       (RAD)    3 =    0.00000
```

SEGMENT	V AT I (POUNDS)	M AT I (INCH-POUNDS)	V AT J (POUNDS)	M AT J (INCH-POUNDS)
1	-500.	-3000.	500.	-3000.
2	500.	3000.	-500.	3000.

MODIFY INPUT (YES OR NO).
    ? NO Ⓡ (37)

RERUN, STOP, NEXT, DELETE OR OTHER
    ? STOP Ⓡ (37)

RUNNING TIME: 12.3 SECS   I/O TIME :   11.6 SECS

READY
BYE Ⓡ (38)

OFF AT 13:34

(37) After receiving the solution to the problem, the user indicates that he does not wish to modify this data or rerun the program.

(38) In response to READY, indicating that the computer is ready for the next command, the user enters BYE indicating that he wishes to sign off.

21

Remote Access Multi-User System *

WHAT IS RAMUS?

Remote Access Multi-User System, or RAMUS, is a nationwide interactive time-sharing computer and telecommunications network developed and operated by GSA. Available to all Federal agencies and their authorized contractors, the RAMUS system allows for the simultaneous use by many users to compute and retrieve information from their files within a matter of seconds.

HOW IS RAMUS DIFFERENT FROM THE NATIONAL TELE-PROCESSING SERVICE?

The fundamental difference between RAMUS and the National Teleprocessing Service (NTS) is that while the NTS is a general purpose network with both batch processing and interactive capability, RAMUS specializes in interactive. Also, while both services perform basically a time-sharing function, the NTS is a more sophisticated and flexible system. RAMUS, on the other hand, is much less restrictive in its user requirements and is available to any Federal agency when its needs can be fulfilled by the system.

WHAT DOES INTERACTIVE TIME-SHARING MEAN?

Interactive time-sharing is a mode of automated data processing wherein the user can control the computer system via messages generated at a keyboard terminal location in the user facility. The user can cause the computer to run, compile, list, etc., at his command from the user terminal.

HOW MANY USERS CAN RA-MUS ACCOMMODATE AT ONE TIME?

RAMUS has the capacity to handle up to sixty users simultaneously. Because each user receives rapid responses, the system gives the illusion of complete ownership by a single user.

CAN ONE AGENCY OBTAIN A HIGHER PRIORITY OVER OTHER USERS?

No; the RAMUS system has no capacity for such priority assignments. RAMUS treats all users equally, apportioning equal computer time to each user actively engaged in the system.

HOW DOES A USER ACCESS THE RAMUS SYSTEM?

Users may access the computer using various types of office terminals which communicate over voice grade circuits to established communication networks (e.g., FTS, WATS, leased lines). Once accessed, the customer communicates with the computer using English language statements and may elect to develop programs

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*This discussion of RAMUS was taken from a General Services Administration brochure.

using simple programming languages, utilize programs from his library, or general library programs provided by GSA at no cost to the customer.

WHAT DATA TRANSMISSION LINES ARE PROVIDED BY GSA FOR ACCESS TO RAMUS?

Presently, GSA provides leased lines and multiplexed equipment for access to RAMUS in Boston, New York City, Washington, D.C., Atlanta, Chicago, Detroit, and Vicksburg, Mississippi. Dedicated service is available at the Atomic Energy Commission facility in Oak Ridge, Tennessee, and Aberdeen Proving Ground in Maryland. Wide Area Telephone Service (WATS) lines are available for customers located in southeastern states outside the State of Georgia. Users located in these areas may directly access RAMUS simply by dialing a local WATS number.

WHAT ACCESS ARRANGE-MENTS CAN AGENCIES LO-CATED OUTSIDE THOSE CI-TIES MAKE?

Agencies located outside the multiplexed network cities, but within an approximate 100 air mile radius, may obtain permission to dial the multiplexed system through the Federal Telecommunications System (FTS) without charge to the user. The charge for this service is borne by RAMUS. Thus, for example, an agency on FTS located within approximately 100 air miles of Chicago may use FTS to dial the Chicago multiplex number, without charge. However, agencies located outside the 100 air mile radius may be eligible, under certain circumstances, to utilize the FTS network to access the RAMUS system. Eligibility depends upon agency location and the GSA determination of the 100 air mile radius. Authority will be granted on a case-by-case basis and for certification it is suggested that you contact your GSA Agency Services Coordination Division (list on the back cover of this brochure).

WHAT IS THE ALTERNATIVE FOR AGENCIES WITHOUT ACCESS TO THE MULTI-PLEXED NETWORK AND OUT-SIDE THE WATS AREA?

If an agency does not have access to the multiplexed network or WATS, he may access the computer through the regular FTS network or other comparable commercial services with cost borne by the user. If FTS service is to be used prior approval by GSA is required before the inception of service.

WHAT TYPE OF AN OFFICE TERMINAL DOES RAMUS REQUIRE?

The RAMUS specification for terminal requirement is the Automatic Send/Receive Model 33 or 35 Teletypewriter, or any fully compatible equivalent.

WHAT IS THE COST OF FTS DATA TRANSMISSION?

Transmission of data over FTS, during daytime hours (7 a.m. to 7 p.m. EST on Monday through Friday, except holidays), is currently charged at the rate of 14 cents per minute from any part of the country. Night, holidays, and weekend service will be provided without charge.

WHAT IS THE TIME-SHARING SERVICE COST?

Cost is based on actual usage and is reimbursable to GSA on the basis of terminal connect time, central processor time, input/output time and file storage. The rates vary for use during prime and non-prime time and are available from the Agency Services Coordination Division in the Regional office.

DO RAMUS USERS INCUR ANY OTHER DATA TRANSMISSION AND COMMUNICATIONS COSTS?

Yes. All costs associated with the teletype terminal equipment, data sets, installation charges, special electrical circuits, consumable supplies, etc, are the responsibility of the user.

IS ANY GUIDANCE REGARDING COMMUNICATIONS PROBLEMS AVAILABLE?

Certainly. A user requiring data communications facilities or aid may obtain guidance from GSA by contacting the Agency Services Coordination Division (list on the back cover of this brochure) serving its particular geographic location.

WHAT PROCEDURE MUST AN AGENCY FOLLOW TO OBTAIN SERVICE?

An agency wishing to subscribe to RAMUS service should initiate the administrative procedure by writing to Agency Services Coordination Division, ADTS, GSA, 1776 Peachtree Street, NW., Atlanta, Ga 30309. This letter should state the following information:

1. Date the agency wishes to begin RAMUS service;
2. Number and type of terminals which will be used;
3. Estimated hours per day of terminal connect time;
4. Estimated programming storage requirements;
5. Name, address, and telephone number of the agency, the person to be contacted for information pertaining to RAMUS usage; and
6. Billing address and appropriate fund citation.

IS IT POSSIBLE TO PERFORM A TEST OPERATION BEFORE AN AGENCY DECIDES TO BECOME A USER?

Yes. GSA provides a free 22-day test period to all potential users. This test can be initiated by simply calling Agency Services Coordination Division in Atlanta (404-526-3456) and requesting a user number. The test can begin before any paper work is submitted and normally a customer can start testing within one to five days. The

interested agency has complete control and flexibility over this time period to monitor the system as he chooses. In this way a user can assure itself that RAMUS will satisfy its requirements. However, if the test indicates that RAMUS does not satisfy agency requirements, other alternatives can be discussed.

WHAT OTHER INFORMATION SERVICES ARE INCLUDED FOR RAMUS SUBSCRIBERS?

The Atlanta Federal Data Processing Division maintains an information file (INFORM***) on RAMUS. This file is available to all users and contains both general and technical information of benefit to customer agencies. To facilitate maintenance of user logs, all entries are dated and inserted last in, first out.

WHAT PROGRAMMING LANGUAGES ARE AVAILABLE TO RAMUS USERS?

RAMUS provides users with three programming languages:

1. BASIC - Beginner's All-Purpose Symbolic Instruction Course;
2. X BASIC - EXtended Beginner's All-Purpose Symbolic Instruction Course; and
3. FORTRAN - FORmula TRANslation.

IF A USER HAS NO EXPERIENCED PROGRAMMING PERSONNEL, IS TRAINING AVAILABLE?

Yes; training is available by qualified GSA instructors in both BASIC and FORTRAN. Since BASIC is a language developed explicitly for the beginning programmer, prior experience is not required. FORTRAN, on the other hand, is a more complex and sophisticated language, but reasonably qualified personnel can nevertheless be trained with relative ease.

WHAT COSTS ARE INVOLVED IN TRAINING PERSONNEL?

RAMUS provides one free day of training within a fifty (50) mile radius of Atlanta. All other travel will be reimbursable at the actual cost incurred by GSA. All training after the first day will be reimbursable to GSA at $200 per day. Training can be conducted in Atlanta GSA offices or at a location selected by the customer. If the customer is in the 22-day test period, computer time will be provided at no cost. Otherwise, all time will be reimbursable at normal rates.

WHAT MUST THE CUSTOMERS PROVIDE IF ON-SITE TRAINING IS CONDUCTED?

The user will be responsible for supplying terminal (s), paper, communication linkage to RAMUS, and a classroom area equipped with related supplies.

IS THERE ANOTHER METHOD OF PERSONNEL TRAINING AVAILABLE?

Yes; a Programmed Instruction Course permits a user to utilize the TUTOR program, a series of 22 sessions that teaches the BASIC language through a question and answer routine. Each session requires approximately 20 minutes of terminal connect time.

ONCE OPERATIONAL, CAN RAMUS PROVIDE TECHNICAL ASSISTANCE?

Yes. Trained application and software specialists are available to provide technical assistance from 8 a.m. through 4:30 p.m. EST, Monday through Friday. Normally, problems can be resolved within minutes. FTS and AUTOVON trouble numbers are available. On-line communications are also available.

HOW IS THE HIGH PERFORMANCE OF THE RAMUS SYSTEM MAINTAINED?

Periodic evaluation by users will be requested in order to determine the quality of the time-sharing service. Agencies are encouraged to inform GSA at anytime concerning suggested improvements that will be useful, particularly regarding additional programs needed, communications and other related functions.

WHAT HAS BEEN THE RESPONSE TO THE RAMUS SYSTEM?

Due to the excellent response to RAMUS, the system, including communications, has been augmented several times to expand services. As demand for services increases, the system will be expanded or other sources developed to provide an acceptable level of service.

WHO SHOULD BE CONTACTED FOR ADDITIONAL INFORMATION REGARDING RAMUS?

For additional information, an agency should contact the Agency Services Coordination Division in its region. The back cover of this brochure displays the address and phone number of each regional office. Remember, RAMUS is your entrance to time-sharing services; *investigate* it, *evaluate* it, and *utilize* it.