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MESSAGE TECHNOLOGY RESEARCH AND DEVELOPMENT

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1. INTRODUCTION

This report covers progress in message technology under the contract "Message Technology Research and Development" for the period 2 January 1978 through 2 April 1978.

This work is a continuation of work on message technology performed under the ARPA Contract MDA903-76-C-0212 "Distributed Computation and TENEX Related Activities" during 1975, 1976, and 1977.

During the first quarter of 1978, we consolidated and stored the results of our work during the previous quarter on the CINCPAC version of HERMES. If called upon to install HERMES at CINCPAC, we feel that, within a week, we could have a system running that would supply basic support to all CINCPAC message handling operations and provide lively responsiveness to a minimum of twenty-five simultaneous users. Within two months we could have users trained and our system upgraded to include all of the features above.

We then returned to the message technology tasks that were mandated in the new extension of this contract.

- A. Continued HERMES maintenance and improvement of the HERMES software. Continued support of the HERMES user community through documentation, consultation and training.

B. Next generation design. We planned to continue our work on the next generation design, including consultation with Navy participants and other message system developers. Our goal for the quarter was to lay out architectural framework and establish the principal element of system functionality, and the major aspects of the supporting software.

HERMES System Support

On January 4, 1978, we released HERMES 4.1.1 as the standard HERMES system on all host computers. We also completed the implementation of and, on March 1, 1978, the release of HERMES 4.1.3 as the provisional NEWHERMES system on eleven host computers.

HERMES 4.1.1 included improved functions for replying to and forwarding messages. These were reported in detail in Progress Report No. 8 for October - December 1977.

HERMES 4.1.3 included a proprietary feature for adjusting character counts in message-files which was developed with BBN funding during 1978.

We brought into standard HERMES all the new functionalities that had been developed for CINCPAC during 1977.

We continued work on the provision of shared sequences in the storage features of HERMES. Other work included preparation for the release of the DEC Systems-20 operating system, version 3.

We implemented the WE editor on the Tektronix 4025 terminal.

The H1 and H2 Systems

We implemented the two simplified versions of HERMES, H1 and H2, on a demonstration basis on System BBNA for HERMES 4.1.1 and then for HERMES 4.1.3.

Message System Architecture

We prepared a plan for consulting services to be provided by BBN to the Naval Research Laboratory for the next generation of message systems, with emphasis on secure message systems.

2. HERMES SYSTEM SUPPORT

2.1 HERMES 4.1.1

On January 4, 1978, HERMES 4.1.3 was released as regular HERMES at the BBNA, BBNB, BBN, BBND, and BBNE, ISI, ISIB, ISIC, SRI-KA, SRI-KL.

Two new installations were implemented in February 1978, at the request of DARCOM; host computer USC-ECL on February 11, 1978, and host computer OFFICE-1 on February 27, 1978, for the use of the ELITE group of DARCOM.

2.2 NEWHERMES 4.1.3

On March 1, 1978, we released HERMES 4.1.3 as the provisional NEWHERMES system on the five BBN hosts, the four ISI hosts and the two SRI hosts.

NEWHERMES 4.1.3 includes a number of new features.

A top-level COMMENT automatically refiles the message and does not change original fields.

Hermes repairs most damaged message-files. The action is controlled by the FIX-BROKEN-FILE switch.

It is now possible to SHOW "user" "current" or "fixed" objects separately.

The SORT and REMOVE commands for acting upon sequences now work at top command level, as well as in the SEQUENCE-EDITOR.

In specifying messages, in printing commands, and elsewhere, it is now possible to use "NOT" along with ",", "/" and ",". The "NOT" selects messages that do NOT fit the specification.

HERMES no longer places "-----" at the end of the Text: field when it sends a message. Messages can be printed with dashes, without dashes, or exactly as received.

The template item Text:+ now prints the word Text: at the beginning of the Text: field.

The command EDIT MESSAGE is a new synonym for EXPLODE.

New rules for multi-item template lines have been implemented to control whether and how fields are truncated.

The name of the EDITOR-ESCAPE switch is changed to EDITOR-DEFAULT. The new EDITORFORTEXT lets the user choose to be placed directly in the default editor when composing the Text: or any TEXT-type field.

The TRANSCRIBE and SUMMARIZE commands have been removed. TRANSCRIBE was identical to the PRINT command, except that PRINT resets the current message and TRANSCRIBE did not. SUMMARIZE was identical to SURVEY except that SUMMARIZE defaulted to RECENT messages instead to ALLMESSAGES.

The NETED editor has been temporarily removed. A few users requested that it be retained: it could be reinstalled in Hermes 4.1.3, for technical reasons, so we left a copy of Hermes 4.1.1 on systems BBN and BBNB, under the name of <AIRPLANES>OLDHERMES, until NETED could be re-installed in the next version of Hermes.

2.2.1 COMMENT

The top-level COMMENT command allows the user to comment on a message in your message-file without first placing it in the draft-editor and thus losing the original Date and Sender fields.

```
>COMMENT 5<CR>
```

This command places the user in the [Text] field for typing a comment on Message 5. As soon as <CTRL-Z> is typed, the [Text] field is appended to Message 5, and the draft is refiled in the message-file in place of the original message.

NOTE: The user does not have a chance to edit or format the [Text] field, or modify any of the original fields. No original fields are changed.

2.2.2 FIXING DAMAGED MESSAGE-FILES

HERMES now includes a FIXER feature which automatically fixes most of the message-files that are damaged in network crashes and similar disasters. This feature warns the user if the character count of a message in the file is not correct and requests permission to repair the damage. The user is reminded to check stored sequences and especially to check the message whose number was reported. There may be some text missing, or two messages may be combined.

The question about fixing up the message-file may be controlled by a new ASK-YES-NO switch, FIX-BROKEN-FILE.

2.2.3 SORT AND REMOVE

It is now possible to SORT named sequences at top command level.

Syntax: >SORT <sequence> <field> <CR>
 Default: CSEQUENCE Text

The new REMOVE command erases messages from a named sequence at top command level.

Syntax: >REMOVE <messages> <sequence> <CR>
 Defaults: --- CSEQUENCE

2.2.4 THE "NOT" OPERATOR

"NOT" can be used in message specifications, along with ",", "/", and ";". The "NOT" selects messages that do NOT fit the specifications. The action of "NOT" does not extend right past a comma.

Suppose you have 20 messages in your message-file, and 4,9,14 and 19 are from Jones.

```
>SURVEY NOT FROM JONES      surveys 1:3,5:9,11:13,15:18,20
>LIST 1:10/NOT FROM JONES   lists 1:3,5:8,10
>CONSIDER 5:15              sets CSEQUENCE = 5:15
>PRINT /NOT FROM JONES     prints 5:8,10:13,15
```

Exception: Between two "/" or "NOT" operators, "," acts like ";" . Assume sequence EIGHT-TEN contains nos. 8:10.

```
>LIST 1:5/FROM JONES,5:15/EIGHT-TEN lists 4,8:10
>LIST 1:5/FROM JONES,5:15/NOT 8:10 lists 4:7,11:15
>LIST 1:5/FROM JONES,NOT EIGHT-TEN lists 4,1:3,5:7,11:20
```

You can use a single message-no. or range of message-nos. after "NOT", but the action of "NOT" does not extend right past a comma.

2.2.5 OVERFLOW RULES FOR TEMPLATES

If a message field appears alone on a template line, the output of the field is carried over to any many lines as are needed. If more than one item appears on a line, the output may be restricted to just one line, and the item that overflows the line may be truncated, according to the following revised rules:

- 1) A field is not truncated if there is only one item on the template line.
- 2) A field is not truncated if the other items on the template line are all quoted strings.
- 3) To cause truncation under conditions (1) or (2), begin the line with the special symbol "'".
- 4) When two or more items are placed in a single template line, the second item is printed at the end of the first line of the first item.

Thus, if the template line contains To:, followed by Subject:, a multi-line To: field no longer necessarily blocks the printing of the Subject field.

- 5) If the template line contains two or more fields, or similar items such as Message-No, Status, Char-count or Source, the output line is automatically truncated.

This is why the Subject: often appears chopped-off in messages surveyed through SURVEY-FORM. To guarantee full output, Subject: could be placed on a separate line:

- (1) Status Message-No. " : " Char-Count Rcvd-Date Source
- (2) Subject:

It is now possible to indent the Subject: field without truncating it.

- (1) Status Message-No. " : " Char-Count Rcvd-Date Source
- (2) " " Subject:

However, the second line of a multi line Subject field is not indented.

2.2.6 NEW SWITCHES

The EDITOR-DEFAULT switch specifies a text editor (initial setting "Teco"). This is the editor used when the user enters a field that normally accepts text, and types <CTRL-K>. If your EDITORFORTEXT-SWITCH is set to YES, the user is placed in the default text editor upon entering the text-type field. The initial setting is "No".

EDITOR-DEFAULT	None	<input checked="" type="checkbox"/> Teco	Xed
		We	
EDITORFORTEXT	Yes	<input checked="" type="checkbox"/> No	

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3. THE H1 AND H2 SYSTEMS CORRESPONDING TO STANDARD HERMES

Our facilities for producing new versions of HERMES enable us to create installations with and without security features, and the corresponding "junior version" known as H1 and H2.

We implemented H1 and H2 systems corresponding to Hermes 4.1.1 on an experimental basis and had them tested by a small group of knowledgeable users. Some minor modifications were suggested and incorporated in Hermes 4.1.3.

4. SHARED SEQUENCES

During this quarter, we developed a preliminary design for improved storage of messages in message-files through the use of shared sequences.

In the current versions of HERMES, more than one user may access a message-file at the same time, but the first user to GET the message-file is the only user with the power to mark messages DELETE or SEEN, to EXPUNGE the deleted messages and to modify permanently the named sequences that are stored in the companion "parseq" file.

Sequences are lists of message-nos. that are given names and are stored from session to session. Under the new design, all users would have equal rights to modify any stored sequences. The work during this quarter was upon the internal changes to HERMES required to support shared sequences. The detailed design of the user interface and the interlocks required between users are not completed.

5. PREPARATION FOR RELEASE 3 OF THE TOPS-20 MONITOR.

The current operating system used by BBNA, BBND, ISIE and SRI-KL is Digital Equipment Corporation's TOPS-1B0 monitor, Release 2.

In preparation for Release 3 of the TOPS-20 Monitor, we have begun to implement the modification of HERMES. During this quarter, we investigated changes that would be required, prepared a plan and implemented the minor changes. Next quarter, we will implement changes required to handle the new forms of login names, directory names, and the new parts of the computer storage system known as "structures".

6. MESSAGE SYSTEM ARCHITECTURE

During this quarter, we suspended work on the front end command module and focussed our efforts on the study aspects of the next generation system architecture.

We prepared a working paper on key aspects of the security problem as a follow-on to the meeting held at the National Bureau of Standards September 13-16, 1977. This paper is summarized in QPR8. We consulted further with attendees of the NBS meeting.

We worked on a plan for BBN to design and construct a new family of next-generation message systems featuring distributed architecture and secure message systems. We prepared for a conference on this subject to be held early in April at the Naval Research Laboratory.

7. THE USE OF HERMES IN DATA MANAGEMENT

During this quarter, we began consulting with DARCOM personnel about the use of Hermes for data management problems within DARCOM, drawing upon our experience with Hermes data management systems at BBN.

In the preparation of text for the HERMES on-line documentation facility, we have used a TECO program to modify a data base stored as a single large text file and turn it into a file of HERMES messages.

Bolt Beranek and Newman Inc.

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As part of our use of HERMES within BBN, we have used HERMES in conjunction with MRUNOFF, in a experimental project to produce "hard copy" typed letters, envelopes and addressee labels.

Some examples of work of this type will be reported in the next quarterly progress report.