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Quarterly Progress Report No. 8
2 October 1977 to 2 January 1978

July 1978

Prepared for:
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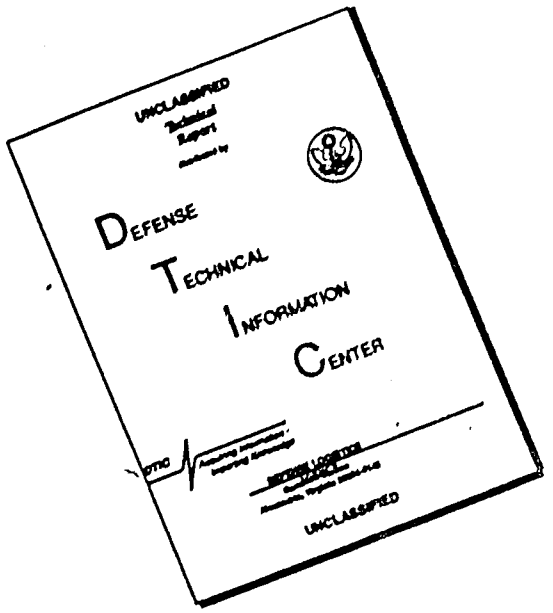

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This report describes BBN efforts in the continuing development of the HERMES message-processing system, with respect to system design, security requirements and preparations for the DARPA/NAVY/CINCPAC interactive test.

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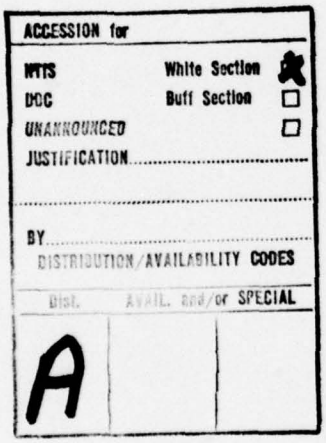

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1. INTRODUCTION

This report covers progress in message technology under the contract "Message Technology Research and Development" for the period 2 October 1977 through 2 January 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.

During the October through December quarter, we had planned to work on three aspects of message system technology, continuing the work of the preceding quarter.

1. Hermes Support on the Arpanet

   Continued maintenance and support of HERMES, including efficiency improvements, functional refinement, revisions to the documentation and handling user inquiries and problems.

2. Message System Architecture

   a. Continued study and design work for a next generation message system employing distributed architecture techniques.

   b. Continued work on the front end module. Our hope for the fourth quarter was to create and experiment with a split system with the front end command scanner and command processor isolated on separate machines.

3. Advanced Techniques

   Further development of the Message Technology Laboratory. We planned to extend the programming language, providing constructs and features not included in the preliminary version, and to explore further the potential of automation techniques.

Events in September 1977 caused a substantial revision to these plans as the final quarter unfolded.

In November 1977, ARPA noted that SIGMA had not reached its performance target of approximately 25 users. To provide for the contingency that SIGMA performance might not be adequate for the MME test to go operational in January 1978, ARPA requested that BBN resume the CINCPAC related work that had been suspended in March 1977, and that we prepare HERMES for possible use in the MME.

In addition, we were called on to help with a special HERMES installation that required training and application development.

In order to meet these needs, we shifted a major portion of our project resources into CINCPAC preparation, and reduced other efforts correspondingly.

CINCPAC Preparation

We reactivated and installed the CINCPAC version of HERMES in our research computer center. We obtained and reviewed documentation on the evaluation of HERMES from the preceding February. We performed a preliminary series of load tests to identify the efficiency improvements made to Hermes since the close of the MME competition. We formulated an initial transition plan for moving HERMES into CINCPAC. We spent a week in California working with MITRE and CINCPAC staff to modify and improve that plan. We spent a week in Hawaii trying the system out with prospective

CINCPAC users, and further refining the plan. In accordance with the plan, we undertook the following modification and extensions to our software:

1. We converted over to our H2 software as a basis for CINCPAC support. H2 features a greatly simplified command repertoire and improved performance.

2. We designed and implemented an entirely new security interface with improved security safeguards and substantially improved human factors.

3. We designed and partly implemented an extended shared file capability.

4. We modified the WE screen editor to better meet the needs of CINCPAC users.

5. We designed and partly implemented a scrolling mechanism for the CINCPAC terminals.

6. In collaboration with MITRE and CINCPAC we worked out procedures to support CINCPAC message processing and creation through HERMES/H2 features such as sequences, shared access files, message forwarding and annotation.

7. In collaboration with MITRE and CINCPAC we made plans to extend and modify our present user documentation to provide CINCPAC oriented documentation and on-line lessons.

This work has left us in the following position. If called on 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.

HERMES System Support

We released HERMES 4.0.22 as the standard HERMES system on all hosts computers and completed the implementation and release of HERMES 4.1.1 as the provisiona[illegible]HERMES system on eleven host computers.

The H1 and H2 Systems

We continued work on H1, a simplified version of Hermes, and developed the H2 system. The H2 system consists essentially of the H1 commands plus a facility for creating sequences and a message-composing facility which is closer to the facility in full-scale Hermes. Both H1 and H2 are upward compatible with full-scale Hermes.

2. CINCPAC PREPARATION

2.1 THE NEW SECURITY DESIGN FOR HERMES

An entirely new interface was designed and implemented for CINCPAC. The features of the new SECURE-HERMES provide a simpler system, with smoother transition between security levels, than the system demonstrated in February 1977. Our goal was to ensure that operations always take place at the appropriate security level, and that, as far as possible, changes in security level occur automatically. The only time that the user is required to supply security level commands is when he compares or reclassifies a message.

2.1.1 One Security Level per Message

Each message has only one security level. Fields that identify originators and recipients, dates associated with the message, the classification of the message, the message type, and the precedence, are required to be UNCLASSIFIED. All other fields receive the same classification within a single message.

Appendix A shows a sample message received from the LDMX and converted to a HERMES message. The CONFIDENTIAL fields have been replaced by a news story taken from the Associated Press wire service.

In this message, the Subject:, Reference: and Text: fields all carry the label [C], which indicates that they contain CONFIDENTIAL information. The unlabelled fields, such as From:, Precedence: and Class-Char:, are UNCLASSIFIED. Some fields which are derived from the LDMX header do not correspond to standard Hermes fixed fields. They are treated as Hermes user-fields, and are shown in upper-case letters. Examples of such fields are LDMX-ACTION:, GUARD1:, and PSN:.

2.1.2 Automatic Transitions Between Security Levels

Each user is logged in at his maximum security level, and then automatically transferred to UNCLASSIFIED. The user is at the UNCLASSIFIED level whenever he inputs commands. If the commands call for display of a message, the user is automatically transferred to his maximum security level so that all the information that the user is allowed to see is displayed.

If the user wishes to set a lower maximum security level for the current HERMES session, he can give the command

>MAXIMUM SECURITY LEVEL <classification><CR>

This security level will remain in effect until the user logs out.

2.1.3 Changing Security Levels

When the user gives a command for message composition, such as COMPOSE, the series of prompts presented to the user is controlled by a HERMES template. One template item automatically asks for the security level of the message. As the user responds to the series of COMPOSE prompts, the message is automatically created with fields like To:, Cc: and Date: at the required UNCLASSIFIED level, and fields such as Subject: and Text: at the classification level that has been specified by the user. When the user SHOWS the unsent draft message, HERMES also makes the transition between security levels, without effort on the user's part.

If the user desires to change the classification of the message, he may do so at the end of the COMPOSE command. The user is left in the draft-editor where he can use the RECLASSIFY command before sending the message. The user may also add more fields, edit or erase existing fields, show the draft message or SEND it, as in regular HERMES.

When the classification is made more restrictive, only the RECLASSIFY command is necessary. If the draft has a classification higher than UNCLASSIFIED, and the RECLASSIFY command is used to downgrade, HERMES displays the entire draft for review and requires the user to confirm the reclassification.

The user is continually informed of the classification of each line displayed on the terminal by means of an inverse video "bar" displayed at the left hand edge of the scope screen. The first four character positions are used to display the classification character, U,C,S or T that applies to the line.

Whenever the classification at which the user operates is changed, the user is notified by an inverse video line, e.g.,

FROM UNCLASSIFIED TO SECRET

Similarly, any confirmation of change of classification required by the system is highlighted by inverse video.

2.2 RESTRICTED ACCESS TO THE TENEX EXECUTIVE SYSTEM

Security is enforced by restricting the access of HERMES users to the TENEX Executive System.

Users are placed directly in HERMES upon logging into the system, and must logout directly from HERMES. There is no provision for dropping into the Executive System in a lower fork through the EXEC command as there is in regular HERMES.

2.3 CINCPAC NAME CHANGES

The names of a few HERMES commands were changed in SECURE-HERMES at the request of CINCPAC users, to conform to CINCPAC usage and to take advantage of the opportunity for using function keys on the HP 2645 terminal used at CINCPAC.

<LF>	<NEXT>
<^>	<PREV>
PRINT	DISPLAY
LIST	PRINT
UNDELETE	RESTORE
EXPLODE	EDIT MESSAGE
REFILE	STORE
<CTRL-B>	<INCLUDE FILE>

2.3.1 Automatic Processing of LDMX Messages

Messages that arrive via the LDMX are passed through the LDMX-HERMES interface and transformed into HERMES-style messages. A Subject: field and a number of user-fields peculiar to the CINCPAC application are extracted from the information at the beginning and end of the LDMX messages. A sample LDMX message is shown in Appendix A.

2.3.2 CINCPAC DIRECTORIES AND FILES

We worked with CINCPAC and MITRE personnel to devise a setup for CINCPAC that would facilitate necessary message traffic, through the application of HERMES features, some standard and some extended for this application.

Each user identity is associated with a work and storage space on the computer which is called a "directory". HERMES files are identified by a name such as <J301>MESSAGE.TXT;1, where the the name inside the angle-brackets, < ... >, refers to the TENEX "directory" that contains the file, and MESSAGE.TXT;1 is the filename. When the user makes use of HERMES filename-input, only the part of the name before the "." is visible, e.g, <J301>MESSAGE. Each TENEX directory has a special file, MESSAGE.TXT;1 , which is the INBOX, the file for receiving new messages.

In the proposed CINCPAC setup, "official" directories would be created for J3, for the DDO, for each division and branch within J3, e.g., J31, J311, J312, and for clerks assigned at the division and branch levels, e.g., J31A, J311A. These directories would be the vehicles for all official message processing within CINCPAC J3. They can be though of as official "roles" which different people fill for performing CINCPAC operations.

Another, entirely separate set of "personal" directories would be created for the individual people who use the system. These directories will be named for the people who "own" them, e.g., the officer John Smith might be given a directory named JSMITH. Each personal directory will contain its own MESSAGE.TXT;1 file, which will be used only for messages that affect the user as an individual, not as a CINCPAC officer.

The mechanism for associating the personal directory with the official "role" directory is the HERMES command CONNECT. The details of a projected Hermes installation for CINCPAC is shown in Appendix B, and a sample working session in Appendix C.

2.3.3 SHARED FILES

A design for sharable message files was developed. Under the current design, only one user has full write access to a message file, while other users may be restricted from marking messages

seen or deleted or from creating, modifying, and erasing user sequences. Fully sharable files would allow all the users who access a file to change its contents. We believe this to be an important step towards being able to build a cache-based system.

Under the new plan a series of locks would be employed in order to control access to user sequences. The user sequences would be stored, as they are now, in the parseq file, which is the "up-arrow" file that acts as a companion to the message-file. However, the parseq file would have an expanded format which would allow far more sequences to be stored than can presently be done. In order to keep storage requirements down, the sequences will be stored in two formats. The first would allow for up to 16 sequences; the second up to about 1250. The new plan should not significantly affect access time of user sequences.

2.3.4 NEW FEATURES IN SECURE-HERMES

Several new commands and features were implemented for SECURE-HERMES and incorporated into that system.

2.3.4.1 Top-Level ASSIGN

The top-level ASSIGN command allows the user to add the field Action: and Info: to a message in a message-file without modifying any of the original fields. Copies of the messages are then distributed to the directories in ACTION: and INFO: fields and the original message is deleted from the message file.

The use of the ASSIGN command may be restricted to specified users.

2.3.4.2 Top-Level APPEND

The APPEND command allows the user to add a new or additional Key word:, Subject: or Reference: field to a message in a message-file, without modifying any of the original fields.

The use of APPEND for adding Subject and Reference fields may be restricted to specified users.

2.3.4.3 Top-Level COMMENT

The top-level COMMENT command allows the user to add a comment to a message in a message-file without modifying any of the original fields.

The COMMENT command places the user in the [TEXT] field. In SECURE-HERMES, the user would be automatically placed in the WE editor, which allows editing and formatting within the field.

2.3.4.4 Top-Level Commands for Sequences

The commands for modifying user-created sequences have been brought to top command level.

ADD allows users to add messages to a named sequence.

REMOVE allows users to erase messages from a named sequence.

SORT allows users to SORT the messages in a named sequence according to any message-field.

2.3.4.5 The NOT Operator

The ability of SECURE-HERMES to select messages in commands that accept message specifications has been improved through the addition of a "NOT" operator. "NOT" can be used in message specifications, along with ",", "/" and ";". "NOT" selects messages that do NOT fit the specifications.

2.3.4.6 Message Coordination and Release

Formal messages at CINCPAC are created in two categories, formal MEMOS, which are destined for users within CINCPAC, and LDMX messages, which are to be sent over the LDMX facilities.

The composition of these messages, as well as of informal messages, can be controlled through the use of HERMES composing templates.

The HERMES fixed fields To: and Cc: will be reserved for informal memos and for the users who take part in the coordination or chopping of the formal memos and LDMX messages.

A message intended to be a formal memo or LDMX message will be circulated for chop within CINCPAC. Users may use a special CHOP-YES or CHOP-NO template to reply to the message and convey their comments to the originator. Once the final version has been agreed upon, the user who has the authority to release messages will use the RELEASE MEMO or RELEASE LDMX command.

RELEASE MEMO activates a special set of addressee fields, Memo-to and Memo-cc, which contain names of users within CINCPAC.

RELEASE LDMX places a copy of the message in a special file where it will be picked up and distributed by the LDMX.

2.3.5 THE SECURE-H2 SYSTEM

To simplify the use of SECURE-HERMES by CINCPAC personnel and to assure control of the HERMES environment within CINCPAC, we have implemented a smaller version of SECURE-HERMES, SECURE-H2.

This system is a development of the experimental H1 system implemented in September 1977 and described in the previous progress report. The SECURE-H2 commands are essentially a proper subset of regular SECURE-HERMES and are completely compatible with the full-size system.

Unlike H1, SECURE-H2 contains a draft-editor. SECURE-H2 does not contain facilities for creating and editing objects such as templates, filters and user-fields, or for editing switch settings, but it does contain top-level commands for creating and modifying user-created sequences.

The command

>CREATE SEQUENCE <name><CR>

creates a named sequence that is empty. The user, who is left at top command level, can then use the ADD command to add messages to the sequences. Subsequent changes to the sequence can be made with the REMOVE and SORT commands.

SECURE-H2 further differs from SECURE-HERMES in that the only way to enter the draft-editor is by giving one of the commands, COMPOSE, REPLY, FORWARD or EDIT MESSAGE. There is no EDIT CDRAFT command.

Similarly, the only way to leave the DRAFT-EDITOR is by giving the ABORT command (which is not present in full-size HERMES) or the SEND command.

For a summary of the commands and files used in the SECURE-H2 system, see Appendix D.

2.3.6 THE WE EDITOR

The WE Editor is available as the editor best suited for use on the HP 2645 terminals used at the CINCPAC MME.

In consultation with CINCPAC users, a scheme was developed for the assignment of SECURE-H2 and WE commands and functions to the function keys available on the HP 2645 terminal. A description of the arrangement and functional operation of these function keys is given in Appendix E.

2.3.6.1 The View Window

For the CINCPAC application, WE was modified to provide a view window. The scope screen can be split in two. One window can display the message-field that the user is in the process of editing; the other can display the current message.

2.3.6.2 Marking and Copying Text

A set of WE commands, implemented as function keys on the HP 2645, allow the user to mark the beginning and end of a section of text in either the message being edited or the current message displayed in the view window. The marked text can be copied and inserted at a third position in the message-field being edited. If the marked text occurs in the message-field being edited, it may also be erased.

2.3.7 SCROLLING ON THE HP-2645 TERMINAL

We have designed and partially implemented a mechanism to permit scrolling on CINCPAC terminals, using hardware local to the terminal. Since the scrolling takes place entirely within the HP-2645 terminal, the scrolling imposes no burden on the PDP-10 computer. The scrolling is universal, in that the entire interaction, commands and all, can be scrolled. The HP-2645 memory holds approximately 8 screensful.

The current WE editor allows scrolling during message composition.

2.3.8 USER DOCUMENTATION

We designed and produced examples of on-line lessons for CINCPAC users. These lessons would be implemented in the form of one or more files of HERMES messages. Messages containing lessons that

introduce the user to Hermes features would be interspersed with messages containing examples for the user to try. Where appropriate, the user would use the message-file itself as a test bed for exercises in using HERMES commands and functions.

We are also prepared to modify our current HERMES on-line documentation, which is accessed by the OUTLINE, DESCRIBE, EXAMPLE and DOCUMENT commands, to reflect CINCPAC nomenclature and functionalities.

2.3.9 CINCPAC LOAD TESTS

2.3.9.1 Preliminary Load Tests

In October 1977, we ran a series of load tests for the purpose of determining the extent of the improvements in efficiency that had been made in HERMES since the close of the MME competition in the preceding February.

These tests showed substantial improvement in performance, and enabled us to predict with confidence that we could provide a HERMES at CINCPAC which would easily handle twenty-five simultaneous users with lively responsiveness.

The results of the tests are given in Appendix F.

2.3.9.2 Projected Load Tests

In collaboration with MITRE, we prepared a set of scenarios for load tests that corresponded to a plan for CINCPAC load tests devised by Jonathan Mitchell of the MITRE Corporation. These scenarios make use of the CINCPAC set-up outlined in Appendix B. A skeleton set of scenarios is given in Appendix G.

3. HERMES SYSTEM SUPPORT

3.1 HERMES 4.0.22

HERMES 4.0.22 was released as regular HERMES at the BBNA, BBNB, BBN, BBND, BBNE, ISI, ISIB, ISIC, ISIE, SRI-KA and SRI-KL host computers on October 1, 1977. New features incorporated in 4.0.22 were described in the previous progress report. A number of bugs were found and fixed in the course of the quarter.

3.2 NEWHERMES 4.1.1

HERMES 4.1.1 was released as NEWHERMES on all host computers, and given extensive testing by members of the user community. New features in Hermes 4.1.1 were the long-awaited REPLY and FORWARD templates, and the provision that the default text editor can be entered by typing <CTRL-K> in any field that accepts ordinary text. The user can set the default editor with the new EDITOR-ESCAPE switch.

The SUGGESTION command was replace by the compose template named SUGGESTION.

3.2.1 The RTEMPLATE The REPLY command now defaults to

>REPLY <cmessage> RTEMPLATE <CR>

and the RTEMPLATE is initially set to the fixed template:

```
REPLY-FORM
  (1) "(Type text of reply, to ^Z)"
  (2) Text:
```

3.2.2 The FCTEMPLATE

The FORWARD command now defaults to

```
>FORWARD <cmessage> FCTEMPLATE FITEMPLATE <CR>
```

FCTEMPLATE corresponds to CTEMPLATE for COMPOSE and RTEMPLATE for REPLY. FTEMPLATE is the template through which the "included" message is printed.

The FCTEMPLATE is initially set to:

```
FORWARD-COMPOSE-FORM
  (1) Subject:+
```

The FITEMPLATE is initially set to:

```
INCLUDE
  (1) Standard:
  (2) "          --------------------"
```

3.2.3 The EDITOR-ESCAPE Switch

A new switch has been included:

```
EDITOR-ESCAPE        None       [X]Teco          Xed
                                    We
```

The EDITOR-ESCAPE switch specifies a text editor when you enter a field that normally accepts text, and then type <CTRL-K>.

If your default editor is Teco, then the set of commands:

```
>Subject<CR>
Now is the time <CTRL-K>
```

has the same effect as the set of commands

```
>Subject<CR>
Now is the time<CTRL-Z>
>>Teco Subject<CR>
```

3.2.4 The SUGGESTION Template

The SUGGESTION command has been replaced by the compose template named SUGGESTION.

```
>COMPOSE SUGGESTION<CR>
```

The SUGGESTION template has the form:

```
SUGGESTION
  (1) literal [To: MYER@BBNA,
To: MOOERS@BBNA]
  (2) literal [Cc: AIRPLANES@BBNA]
  (3) literal [Keywords: Suggestion on BBN HERMES 4.1.1]
  (4) Subject:+
  (5) Text:+
```

4. THE H1 and H2 SYSTEMS CORRESPONDING TO STANDARD HERMES

In parallel with the work on SECURE-H2, we developed and demonstrated corresponding "junior versions" of our standard "civilian" HERMES system. Both consist of subsets of HERMES commands, with a very few modifications, and both are fully upward compatible with full-scale HERMES.

4.1 H1: THE MINIMAL SYSTEM

The H1 system remains substantially as described in the preceding progress report. H1 lacks any facility for creating sequences. H1 also lacks a draft-editor; this has proved to be a considerable drawback to experienced users of message systems, and plan to restore the draft-editor in the next version of H1.

4.2 H2: THE EVERYDAY SYSTEM

We have produced an H2 system which bears the same relation to standard HERMES as SECURE-H2 bears to SECURE-HERMES. H2 contains facilities for creating sequences and a draft-editor. H2 has been used experimentally by a number of users within BBN, and seems to represent a subset of HERMES that experienced users find comfortable for their everyday use.

We plan to seek applications for introducing H2 to groups of naive users to test the effect of the reduced set of commands on the ease of using the system.

APPENDIX A

SAMPLE LDMX MESSAGE SHOWING SIMULATED SECURITY

The classified material in the CONFIDENTIAL message has been replaced with a news story from the Associated Press wire service.

```
Message   9;  2208 chars UNSEEN RECENT
Date: JAN 14, 1976 04:21-GMT
From: COMUSK SEOUL KOREA//SJ-OF//
Subject[C]: DALEY'S SUCCESSOR
Reference[C]: A.  CTG SEVEN SEVEN PT FOUR 262250Z SEP 76
Precedence: PRIORITY
Sender: LDMX-OPERATOR
Class-Char: C
UFL2: PTTCZYUW RUAGAAA1570 2821549-CCCC--RUHQHQA
FL4: ZNY CCCCC
DTG: 140421Z JAN 76
LDMX-ACTION: COMSEVENFLT{RUHGOAA}
               CTG SEVEN SEVEN PT FOUR {RUHGSFF}
LDMX-INFO: COMUSJAPAN YOKOTA AB JAPAN {RUMMJNA}
             CINCPAC HONOLULU HI {RUHQHQA}
             CINCPACFLT MAKALAPA HI  {RHHMBRA}
             COMNAVFORJAPAN YOKOSUKA JAPAN {RUYNSAA}
             ZEN/ COMAFKOREA YONGSAN KOREA
             USS MIDWAY  {RUHGIIW}
             314ADIV OSAN AB KOREA {RUAKKRA}
CLASSIFICATION: C O N F I D E N T I A L
GUARD: J3(7)...INFO FOR CINCPAC HONOLULU HI(41)
RTG: 00703/ 3/0035
GUARD1:    TENEX(1) 00-01-02(6) J003(1) IG(1) DDO(7) J2(15) JRC(2) AROP(1)
OSSN: 1570
CID: MME
CSN: 0009
PSN: 000009
MESSAGE-TYPE: NARRATIVE
HAN: 00000002690

Text:
          C O N F I D E N T I A L
C O N F I D E N T I A L
SUBJ: DALEY'S SUCCESSOR
A.  CTG SEVEN SEVEN PT FOUR 262250Z SEP 76
   CHICAGO (AP) - Michael Bilandic, a little-known lawyer but one with
considerable clout at City Hall, edged to within a single step today
of becoming temporary mayor to succeed Richard J. Daley....
```

APPENDIX B

SUMMARY: SECURE-H2 MESSAGE SYSTEM With "CINCPAC" Command Names

1. TOP-LEVEL COMMANDS

* Access to these commands may be restricted.
& CINCPAC names differ from regular HERMES/H2/H1.
! Commands used only in CINCPAC HERMES/H2.

1.1 COMMANDS FOR READING MESSAGES

<NEXT>&	Displays NEXT message in CSEQUENCE. No <CR>.
<PREV>&	Displays PREVIOUS message in CSEQUENCE. No <CR>.
SURVEY	Displays summary of messages.
DISPLAY&	Displays messages. Resets CMESSAGE.
PRINT&	Prints messages on Line-printer.

1.2 COMMANDS FOR USING SEQUENCES

ADD	Adds messages to sequence.
CONSIDER	Changes the contents of CSEQUENCE.
CREATE SEQUENCE	(Differs from HERMES; no SEQUENCE-EDITOR.) Creates a sequence that contains no messages.
ERASE	Erases a sequence.
REMOVE	Removes messages from sequence.
SORT	Sorts a sequence according to any field.
WHEREIS	Shows the sequences that contain messages.

1.3 COMMANDS FOR CHANGING MESSAGE-FILES

DELETE	Deletes messages.
FILE	Copies messages into another message-file.
GET	Changes current message-file.
RESTORE&	Restores DELETED messages.

1.4 COMMANDS FOR ASSIGNING AND COMMENTING ON MESSAGES

APPEND!	Allows you to add keywords, references* or a subject* to messages.
ASSIGN*!	Allows J301 to distribute messages for Action and Info. (Deletes messages from the message-file.)
COMMENT	Adds a comment on a field to messages.

1.5 COMMANDS FOR COMPOSING, EDITING AND DISTRIBUTING MESSAGES

COMPOSE	Prompts you to compose a new message.
DISTRIBUTE	Asks you for addressees, distributes copies of messages to them.
EDIT MESSAGE&	Turns a message into a draft that can be edited.
FORWARD	Places messages inside the text of a new message.
REPLY	Creates a reply to a message.
RELEASE MEMO*!	Distributes copies to addressees on the computer; prints extras for distribution to other addressees.
RELEASE LDMX*!	Distributes draft to the LDMX! for release.

1.6 OTHER COMMANDS

LOGIN	Gives you access to H2. Requires you to type a user-name and a password.
CONNECT	Gives you access to the identity and files of another directory. Does not change your H2 profile (which is supplied by your System Control Officer).
LOGOUT	Stops H2; asks permission to remove DELETED messages permanently and renumber the message file.
MAXIMUM-SECURITY-LEVEL!	Sets maximum security level for the rest of this H2 session.
HELP	Helps you get started. Describes documentation available on the computer.
NEWS	News of latest changes.
DESCRIBE	Information about a large number of H2 topics.
EXAMPLE	Displays example of H2 topic.
SHOW	Shows sequences and the names of filters, templates and files.
STATUS	Displays summary of directories, the current message-file, and security-level.

2. COMPOSING AND SENDING A MESSAGE -- THE DRAFT

The current draft message, also called CDRAFT, is an unsent message, consisting of a collection of FIELDS. A draft can be created with the COMPOSE, REPLY, FORWARD or EDIT MESSAGE commands. These commands give you access to a set of commands that differ from the commands used to read messages. The prompt for these second-level commands is >>.

2.1 SECOND-LEVEL COMMANDS THAT ACT ON THE DRAFT"

ABORT	Returns you to top-level commands. Erases the draft.
<INCLUDE FILE>&	Inside a field, prompts you to insert contents of a file. File must be supplied by your System Control Officer.
ERASE	Erases contents of a field, all headers or the entire draft.
FORMAT	Adjusts ragged lines. Neatens contents of a field.
INCLUDE	Copies messages into the text of the draft.
STORE&	Turns the draft into a message in the message-file, either as a specified message-no. or a new message. Defaults to the message-no. last EDITED. Erases the draft. Returns to top level.
SEND	Distributes the draft as a message to addressees on the computer. Erases the draft. Returns to top level.
SHOW	Displays a field, all headers or the entire draft.

2.2 SECOND-LEVEL COMMANDS THAT FILL IN FIELDS

Header-Fields

From:	Accepts a line of text. (Automatically filled in by H2, if you do not fill it in.)
To:	Primary address field. Checks names. Automatically filled in by REPLY.
Cc:	"Carbon copy" address field. Checks names. Automatically filled in by REPLY.
Subject:	Accepts a line of text. Automatically filled in by REPLY and FORWARD.
In-Reply-To:	Filled in by REPLY. Accepts a line of text.
Reference:	Accepts a line of text.
Keywords:	" " " " "
Precedence:	" " " " "
Fcc:	"File-carbon-copy" field. Checks file-names. SEND copies the message into these files.

Text of Message
Text: Body of message. Lets you type <CR>s in text; ends with <DONE>.

Any number of "User-Fields", created by your System Control Officer, may be used as second-level commands. All user-fields are headers.

2.3 FIELDS THAT ARE CREATED AUTOMATICALLY

Fields Created When Message is Sent

Date:	Date message was sent.
From:	Connected Directory of Sender of message.
Sender:	Login Directory of Sender of message.
Message-ID:	Unique identifier, combining Date and Sender.

Fields Created When Message is Received

Message-No:	Position of message in message-file
Char-Count:	Total no. of characters in message.
Rcvd-Date:	Date message was received.
Filed-Date:	Date message was filed with FILE command.

---

3. SECURE-H2 DIRECTORIES AND FILES

A directory is a work and storage space on the computer, identified by a user-name. When you use the LOGIN command to access the computer and enter H2, you must supply a user-name and password. After logging in, you may CONNECT to another directory. Storage in a directory consists of files, identified by file-names.

MESSAGE-FILES are files that contain messages. DRAFT-FILES are files that contain text or address-lists which can be inserted into draft messages with the <INCLUDE FILE> function key.

SECURE-H2 provides one message-file, named MESSAGE, in each directory. This is the place where messages are received. Other message-files and draft-files may be supplied by your System Control Officer.

In SECURE-H2, the name of a file in your connected directory is a single word, which may contain letters, numbers or the hyphen "-".

```
SAVED-MSGS
ADDR-LIST-1
```

The name of a file in any other directory consists of the name of the directory, enclosed in angle brackets, followed by the name of the file:

```
<J31>MESSAGE
<SMITH>DRAFTS
```

3.1 THE CURRENT MESSAGE-FILE

H2 acts upon one message-file at a time. You can change the current message-file with the GET command.

APPENDIX C

SUMMARY: WE EDITOR FOR THE HP-2645 TERMINAL

For Use with the SECURE-H2 Message System
With "CINCPAC" Command Names

1. MAIN-KEYBOARD FUNCTION KEYS USED IN H2 AND WE

Six function-keys are located on the main keyboard:

ESC
a) At the end of a command name or a part of a command <ESC> displays "noise words" (in parentheses) that tell you what part of the command to type next.
b) At the beginning of a part of a command, <ESC> enters the default word.
c) When no more parts can be entered, <ESC> rings a bell.

CTRL
Hold down CTRL and press a function-key to obtain the "CTRL" function for that key.

ABORT
Aborts the action of an H2 command BEFORE you type the final <CR> or <DONE>.

NEXT
Changes CMESSAGE to the NEXT message in CSEQUENCE, and then DISPLAYS the message.

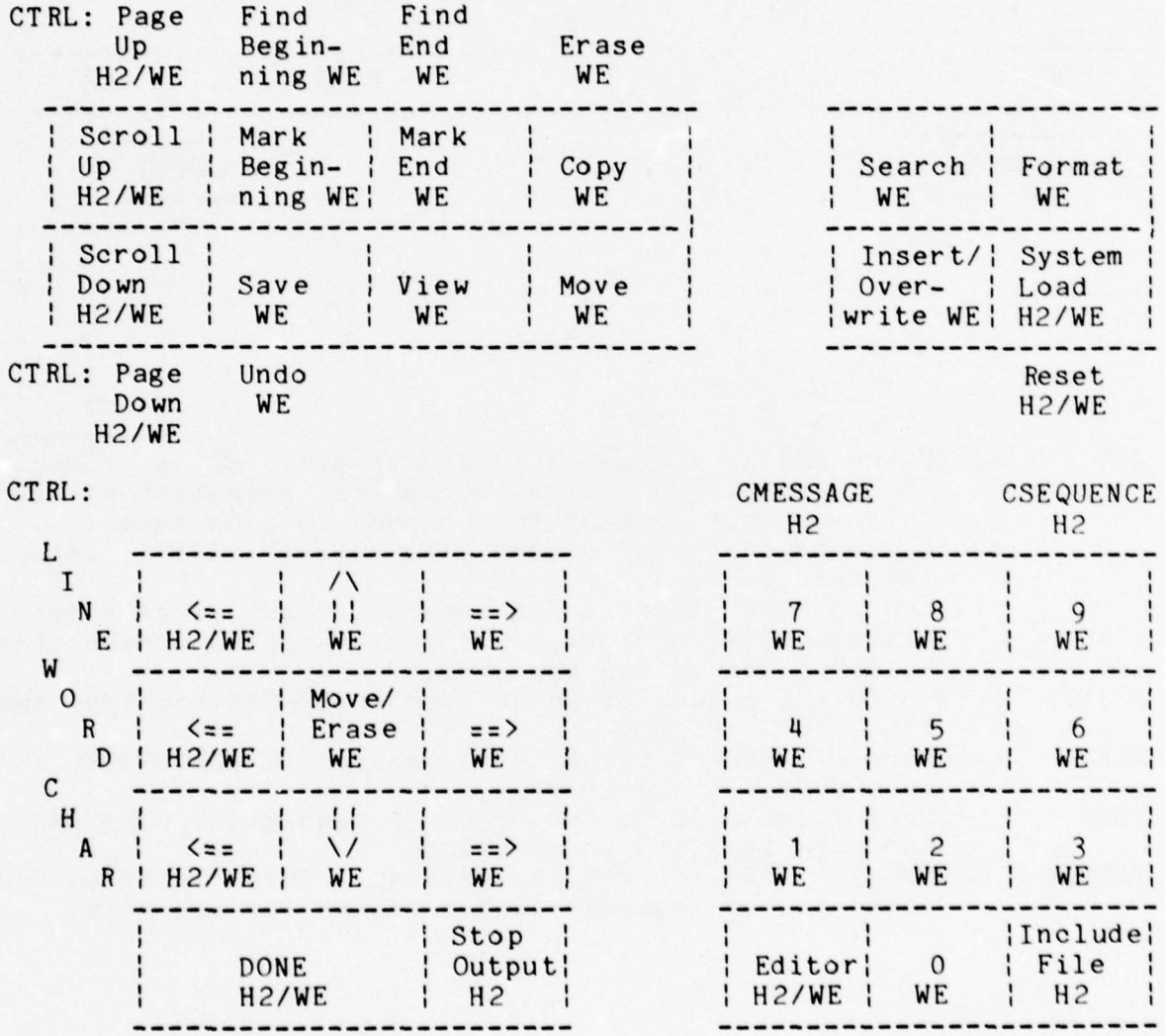
PREV
Changes CMESSAGE to the PREVIOUS message in CSEQUENCE, and then DISPLAYS the message.

RETURN
Symbol: <CR>. Carriage return. Ends typed-in H2 commands, and message fields except for the text.

2. OTHER FUNCTION KEYS

SECURE-H2 and the WE editor use 12 function-keys at the upper right side of the panel and 23 keys arranged in two "pads" at the right of the main keyboard.

NOTE: The "CTRL:" labels show alternative functions for some function-keys. Hold down the main-keyboard key marked "CTRL" and hit the function-key at the same time.



2.1 SECURE-H2 FUNCTION KEYS

SCROLL UP — Moves display up (towards beginning), one line at a time.

Ctrl: PAGE UP — Moves display up, one screenful at a time.

SCROLL DOWN — Moves display down (towards end), one line at a time.

Ctrl: PAGE DOWN — Moves display down, one screenful at a time.

LINE <== — Erases line left of cursor.

WORD <== — Erases word left of cursor.

CHAR <== — Erases character left of cursor.

DONE — Ends the Text:-field in H2.

STOP OUTPUT — Stops the output of text on your terminal that results from any H2 command.

SYSTEM-LOAD — Displays information about the operating system.

Ctrl: RESET — Aborts H2 command. Returns you to > prompt.

Ctrl: CMESSAGE — Inserts message-no. of the current message, CMESSAGE, in an H2 command.

Ctrl: CSEQUENCE — Inserts the current sequence, CSEQUENCE, in an H2 command. The CSEQUENCE is initially set to ALLMESSAGES, but can be restricted with the *CONSIDER command.*

EDITOR — "Toggle" Switch: Inside a message-field in H2, the EDITOR key drops the field into the WE Editor. In WE, the Editor key terminates WE, asks whether to replace the message-field with the contents of the WE buffer, and returns you to the > prompt.

INCLUDE FILE — When you compose a message-field, hitting the INCLUDE FILE key causes H2 to prompt for a file-name, and then to place the contents of the file in the message-field.

2.2 WE FUNCTION KEYS

SCROLL UP — Moves display up (towards beginning), one line at a time.

Ctrl: PAGE UP — Moves display up, one screenful at a time.

SCROLL DOWN — Moves display down (towards end), one line at a time.

Ctrl: PAGE DOWN — Moves display down, one screenful at a time.

MARK BEGINNING — Places an (invisible) marker at the current position of the cursor, to mark the beginning of a section of text to be copied, moved or erased. The text may be in either the draft message, or in the VIEW window containing the Text:-field of the CMESSAGE.

Ctrl: FIND BEGINNING — Moves the cursor to the first MARKED BEGINNING in the text that follows the cursor.

MARK END — Places an invisible marker at the current position of the cursor, to mark the end of a section of text to be copied, moved or erased.

Ctrl: FIND END — Moves the cursor to the first MARKED END in the text that follows the cursor.

SAVE — Saves the text in the WE buffer in a special temporary file. You can recover this text by hitting the UNDO key. The temporary file disappears when you leave the WE Editor by hitting the Editor key

Ctrl: UNDO — Restores the text from the temporary file. This is useful for undoing the effects of a FORMAT that didn't turn out as you expected.

COPY — Inserts a copy of the section of MARKED text into your text at the current cursor position.

Ctrl: ERASE — Erases the section of MARKED text. Erasure occurs only if the marked text is in the draft message you are composing.

VIEW — "Toggle" Switch: When you are in WE, you have two view windows: one displays the message-field you are creating, and the other displays the current message, CMESSAGE. VIEW switches your terminal display between the two windows.

MOVE — Combines COPY and ERASE.

SEARCH <string><CR> — Searches for the first occurrence of a string of characters; the search ignores CAPS and lower case and spaces.

INSERT/OVERWRITE — "Toggle" Switch. In LETTER mode, switches between INSERT, in which characters you type are inserted

	to the right of the cursor, and OVERWRITE, in which characters you type replace characters to the right of the cursor.
FORMAT	Fills lines to a width of 65 characters within paragraphs. A copy of the text before formatting is automatically SAVED in the temporary file, and can be restored with the UNDO function-key.
SYSTEM-LOAD	Displays information about the operating system.
Ctrl: RESET	Aborts WE; destroys text in WE buffer. Returns you to the > prompt in H2.
LINE <==	Moves/Erases line left of cursor.
WORD <==	Moves/Erases word left of cursor.
CHAR <==	Moves/Erases character left of cursor.
/\	
| |	Moves/Erases line which contains cursor.
MOVE/ERASE	"Toggle" Switch. Changes action of line/word/char directional keys to Erase mode. Mode switches back to Move whenever (a) the MOVE/ERASE key is pressed, or (b) a directional key is pressed that changes direction, e.g., from right to left.
| |	Moves/Erases line below the cursor.
\/	
LINE ==>	Moves/Erases line right of cursor.
WORD ==>	Moves/Erases word right of cursor.
CHAR ==>	Moves/Erases character right of cursor.
DONE	Used only in KEYBOARD MODE (commands given from main keyboard rather than function keys). Ends LETTER mode in WE. Returns to COMMAND mode.
EDITOR	"Toggle" Switch: Inside a message-field in H2, the EDITOR key drops the field into the WE Editor. In WE, the Editor key terminates WE, asks whether to replace the message-field with the contents of the WE buffer, and returns you to the > prompt.
0 through 9	Multipliers for Move/Erase function-keys.

3. WE KEYBOARD MODE

The commands assigned to function keys can also be typed on the main keyboard when the WE Editor is set to KEYBOARD MODE.

APPENDIX D

SECURE-HERMES LOAD TESTS

On the morning of Friday, October 28, 1977, a series of load tests was run in order to determine the extent of the efficiency improvements made to Hermes since the close of the MME competition. The same message files were used as had been used last winter, and the script files were identical with the exception that the names of the directories used were different.

The live user scenario was similar to the one used last winter. It was modified so that it was started with "<secure-hermes>hermes" instead of "log sles steve". This may have biased the results somewhat in Hermes' favor because of the overhead involved in executing the login procedure which in the earlier tests both created the job and performed the Hermes startup. However, the fact that all output was run on a printing terminal may have added a bias against HERMES. The tests were run on BBN System C (BBN-TENEX), which is a KA-10 running with 256K of core.

One live user. Messages injected at 25 messages/hour.

Results are given as time to execute command (mins:secs)
load average at end of command

background jobs	10	10	15	15	19	22
<secure-hermes>	0:31	0:26	0:35	0:25	0:30	0:37
hermes	3.65	3.25	6.75	6.90	8.73	12.36
get	0:21	0:17	0:24	0:22	0:50	0:45
exercise	3.30	2.96	6.21	6.39	9.30	12.08
survey	0:18	0:22	0:20	0:27	0:23	0:19
from dia	2.92	2.85	6.54	6.96	9.80	11.35
print 7	0:21	0:21	0:19	0:20	0:18	0:20
	2.96	2.59	6.83	6.98	8.93	10.10
file 21	0:24	0:24	0:30	0:31	0:17	0:20
airplanes	2.69	2.70	8.60	5.97	8.43	10.16
get	0:23	0:29	0:30	0:22	0:29	0:31
airplanes	2.76	3.37	8.73	6.01	8.5	11.84
delete 1	0:14	0:09	0:12	0:20	0:07	0:10
	2.99	3.14	8.33	5.93	8.35	12.07

quit	0:20	0:17	0:17	0:16	0:17	0:17
	2.40	2.80	7.32	6.10	8.21	11.91
total run time	2:21	2:35	3:07	3:03	3:11	3:19
total cpu time	0:18.7	0:18.6	0:17.4	0:18.7	0:18.6	0:19.1

comparable results last winter (totals only):

One live user. Messages injected at 25 messages/hour.

background jobs	5	5	5	10	10	19	24
run time	3:05	2:34	2:47	4:34	4:59	16:03	30:24
cpu time	0:31	0:27	0:28	0:30	0:28	0:26	0:28

APPENDIX E

A PROJECTED HERMES INSTALLATION AT CINCPAC
Directories, Files, Sequences, Filters, Templates, and Switches

The J3 Directorate is one of the major directorates at CINCPAC Headquarters on Oahu, Hawaii. Within J3, there are six divisions, numbered J31 through J36. This appendix describes an arrangement that could be used in a Hermes system for processing messages in J3.

In the proposed CINCPAC setup, "official" directories would be created for J3, for the DDO and for each division and branch within J3, e.g., J31, J311, J312, and for clerks assigned at the division and branch levels, e.g., J31A, J311A. These directories would be the vehicles for all official message processing within CINCPAC J3. They can be though of as official "roles" someone must fill for performing CINCPAC operations.

Each user identity is associated with a work and storage space on the computer which is called a "directory". HERMES files are identified by a name such as <J301>MESSAGE.TXT;1, where the the name inside the angle-brackets, < ... >, refers to the TENEX "directory" that contains the file, and MESSAGE.TXT;1 is the filename. When the user makes use of HERMES filename-input, only the part of the name before the "." is visible, e.g, <J301>MESSAGE. Each TENEX directory has a special file MESSAGE.TXT;1 , which is the INBOX, the file for receiving new messages.

Messages that arrive on the LDMX are passed through the LDMX-HERMES interface and transformed into HERMES-style messages (see Appendix A).

The LDMX-Hermes interface program places those messages that have Action or Info for the J3 Directorate in two duplicate message-files, <J301>MESSAGE.TXT;1 and <DDO>MESSAGE.TXT;1. Within the DDO organization are the AIR-DESK and the SURFACE-DESK, which are on duty 24 hours a day, on three shifts. These AIR-DESK and SURFACE-DESK officers scan all messages as they are received. Their job is to detect emergency situations and alert the organization to them as they develop.

The J301 organization is on on duty eight hours a day and is charged with taking care of all messages on a routine basis. Different people assume these official user identies at different times.

To implement this, another entirely separate set of "personal" directories would be created for the individual people who use the system. These directories would be named for the people who

"own" them, e.g., officer John Smith might be given a directory named JSMITH. Each personal directory would contain its own MESSAGE.TXT;1 file, which would be used only for messages that affect the user as an individual, not as a CINCPAC officer.

The mechanism for associating the personal directory with the official "role" directory is the HERMES command CONNECT.

1. ASSIGNMENT OF MESSAGES FOR ACTION

Directories: <USER-301> connected to <J301>

Files:
<J301>MESSAGE.TXT
All messages that are Action and Info for J3 are placed in <J301>MESSAGE.TXT;1 by the LDMX-HERMES interface. J301 uses the ASSIGN command to place messages in the <J31>LOG.TXT, <J32>LOG.TXT files for J31, J32, etc. ASSIGN also places a copy of each message in a single back-up file for J3.

2. THE J3 DEPUTY DUTY OFFICERS (DDO)

Directories: <USER-A> connected to <DDO> (AIR-DESK)
Directories: <USER-S> connected to <DDO> (SURFACE-DESK)

Files:
<DDO>MESSAGE.TXT
This File duplicates messages in <J301>MESSAGE.TXT;1. The AIR-DESK and SURFACE-DESK deputy duty officers each scan all RECENT messages that are either high priority or Action to J3. Sequences created by the DDO officers are AIR, SURFACE, MSG-TODAY, FBIS.

<DDO>TESTREAD.TXT
Readboard for the DDO. Created by the AIR-DESK and SURFACE-DESK DDO officers.

3. THE J3 DIRECTORATE CHIEF

Directories: <USER-3> connected to <J3>

Files:
<J3>READBOARD.TXT;1
Messages are placed in <J3>READBOARD.TXT by J301, who uses the FILE command.

4. THE DIVISION CHIEFS

Directories: <USER-31> connected to <J31>
Duplicate set-ups for <J-32> through <J-36>.

Files:
<J31>LOG.TXT
Messages are placed in <J31>LOG.TXT by J301, using the ASSIGN command. This command automatically creates the following sequences in <J31>LOG.TXT: ACTION-J31, ACTION-DIVISION, ACTION-J311, (ACTION-J312, etc.), INFO-J311, (INFO-J312, etc.).

<J31>READBOARD.TXT
Messages are placed in <J31>READBOARD.TXT by the branch action officers, e.g., J310, J311.

<J31>MESSAGE.TXT
This file contains messages for chop, i.e., messages that originate within CINCPAC and are undergoing coordination (chopping) before being sent as official messages.

5. THE ACTION OFFICERS

Directories: <USER-311> connected to <J311>
Duplicate setups for <J312>, etc.

Files:
<J31>LOG.TXT
<J311> works with incoming LDMX messages in the <J31>LOG.TXT file.

<J311>MESSAGE.TXT
Messages for chop.

6. THE CLERKS

Directories: <USER-31A> connected to <J31A>
Duplicate set-ups for <J32A>, <J311A>, etc.

Files:
<J31>MESSAGE.TXT
<J31>LOG.TXT
Clerks work with the same files as their superiors.

7. EXCEPTS FROM A TYPICAL USER PROFILE

```
Filters:
 User-created:
  HIGH-PRIORITY
    Require Precedence: "HIGH"

Templates:
 User-created:
  CHOP-NO
    (1) literal [Text: CHOP NO.  Message NOT approved for release.]
    (2) "Type comments:" [TEXT]:
  CHOP-YES
    (1) literal [Text: CHOP YES.  Message approved for release.]
    (2) "Type comments:" [TEXT]:
  FREEFORM
    (1) AskLevel
  INFORMAL
    (1) AskLevel
    (2) To:+
    (3) Cc:+
    (4) Subject +:
    (5) Text: +
  LDMX
    (1) From: +
    (2) To:
    (3) Cc:
    (4) Subject: +
    (5) Reference: +
    (6) UFL2: +
    (7) FL4: +
    (8) LDMX-ACTION: +
    (9) LDMX-INFO: +
    (10) GUARD: +
    (11) RTG: +
    (12) Text: +
  MEMO
    (1) AskLevel
    (2) To: +
    (3) Cc: +
    (4) Subject: +
    (5) Text: +

User-created fields:
  [TEXT]                GUARD       MESSAGE-TYPE
  UFL2                  RTG         NAN
  FL4                   GUARD1      DLVR
  DTG                   OSSN
  LDMX-ACTION           CID
  LDMX-INFO             CSN
  CLASSIFICATION        PSN
```

APPENDIX F

A SAMPLE WORKING SESSION AT A HERMES INSTALLATION AT CINCPAC

John Smith, reporting for work at CINCPAC, logs into TENEX and enters HERMES:

```
@LOG JSMITH <password><CR>
>CINCPAC-HERMES.  4.X.X 1 January 1979
Good morning.
>
```

At this point, Smith may or may not check the file <JSMITH>MESSAGE.TXT for unofficial messages.

Smith assumes his official role by CONNECTing to the directory J312.

```
>CONNECT J312 <password><CR>
```

In the CINCPAC organization, the primary processing of incoming messages is done in the division level files named LOG.TXT. Smith accesses the appropriate file with a GET command.

```
>GET <J31>LOG.TXT<CR>
```

To see which messages have been assigned to J312, Smith gives the command

```
>SURVEY ACTION-J312<CR>
```

ACTION-J312 is a HERMES sequence -- a list of message-nos which has been given a name, ACTION-J312, and which contains all message with the field Action: J312. Although it is possible for Smith, or any other person accessing the <J31>LOG.TXT file to create sequences with the HERMES command CREATE SEQUENCE and ADD, this particular system was created automatically when the day's messages were placed in the LOG.TXT file by J301 with the ASIGN command.

The file contains a number of other automatically created sequences, such as INFO-J312, ACTION-J315, etc. Since sequences are merely lists of numbers, one message may be place in any number of overlapping sequences.

Smith also has available a number of "filters" for selecting messages on the basis of content. RECENT selects all messages that have arrive since the last time JSMITH accessed this file, and HIGH-PRIORITY selects all messages that contain the field Precedence: High.

If Smith wishes to see only the messages that are Info for J312 and that are RECENT, he types

>SURVEY INFO-J312/RECENT<CR>

Smith now responds to one of the messages in the <J31>LOG.TXT file and creates a reply which is intended to be sent out over the LDMX. He wishes to coordinate this reply with J315 and JJ316, and then to send the message to J31 for final approval and release.

Message composition is controlled by HERMES templates. Smith selects a template named LDMX, and give the command:

>COMPOSE LDMX<CR>

The template presents Smith with a series of prompts for the fields required by LDMX messages, and then allows him to create a Text field.

Smith fills in the To: field with J315 and J316 and the Cc field with his own official user-identity J312, and gives a SEND command. (Note: It is possible to set up individual versions of the templates JSMITH users so that they send automatic Cc's.)

The HERMES system delivers the message to <J315>MESSAGE.TXT;1, <J316>MESSAGE.TXT;1, and <J312>MESSAGE.TXT;1, receives his copy of the message as Message No. 5, J315 as Message No. 5, J316 as Message No. 14, and J312 as Message-No. 8. J315 and J316 respond by using the REPLY command. J315 approves of the message as composed, but wants minor changes. J316 does not approve, and wants to rewrite the message.

J315 gives the command:

>REPLY 5 CHOP-YES<CR>

Text:
COPY YES. Message approved for release.
Type comments:
[Text]:
Note by Jones (Connected to J315) 1 Jan 78 1439-EST
Please change CERTAINLY to PROBABLY.

J316 gives the command:

REPLY 14 CHOP-NO<CR>
Text:
CHOP NO. Message NOT approved for release.
Type comments:
[Text:]
Am sending revised version to you.

```
>>EDIT MESSAGE 14<CR>
>>SHOW<CR>
```

HERMES prints out the full message as composed by J312. J316 proceeds to edit the draft, then returns the message to J312 by erasing the To and Cc fields and typing them in again.

```
>>ERASE TO<CR>
>>ERASE Cc<CR>
>>TO J312<CR>
>>Cc: J316
>>SEND<CR>[CONFIRM]<CR>
>
```

J312 prepares a final version of the draft, by editing his copy, with changes based on the CHOP replies, and sends it to J31 for Release.

```
>EDIT MESSAGE 8 <CR>
[Editing session.]
>>ERASE TO<CR>
>>TO: J31<CR>
>>SEND<CR>
>
```

The message is places in <J31>MESSAGE-TXT;1 as Message-No. 25. J31 releases the message for transmission by the LDMX by using the RELEASE command.

```
>RELEASE 25<CR>
```

The RELEASE command strips the message of its To and Cc fields and places it in a special file where the LDMX will pick it up and transmit it.

APPENDIX G

SKELETON SCENARIOS FOR PROJECTED LOAD TESTS

These scripts correspond to the load test scenarios developed by Jonathan Mitchell of MITRE Corporation for use in the MME performance tests, and distributed as a message with Message-ID: <[USC-ISI]17-OCT-77 13:40:41.MITCHELL>

Mitchell planned to run five, ten and fifteen user sessions using these scenarios in appropriate combinations, with each session lasting about one hour. The numbers of the messages would be chosen to equal the expected workload for that interval.

Studied in conjunction with Appendix E, these scenarios show the expected manner of use of the Hermes installation at CINCPAC.

1. J301 (1 Job)

A. Action Messages

1. @Login
2. >Connect J301
3. >Get
4. >Consider Action: J3
5. >Survey
6. >Assign 2,4
   Action: J311
   Info: J31, J32, J33, J34
   Files:

7. >Display 6 (after 1st paragraph)
8. >Assign
   Action: J312
   Info: J31, J32, J33, J34
   Files: <J3>READBOARD (Repeat 5-9 three times)

B. Information Messages

1. >Consider All/Info: J3
2. >Survey
3. >Assign 1,3,5
   Action:
   Info: J31, J32, J33, J34
   Files:
4. >Display 7 (^E after 1st paragraph)
5. >Assign
   Action:
   Info: J31, J32, J33, J34

Files: <J3>READBOARD (Repeat 2-5 three times)

C. FBIS Messages

1. >consider All/From: FBIS
2. >Survey
3. ><LF> (^E after 1st paragraph) (Repeat seven times)
4. >File . <J3>READBOARD
5. ><LF> (^E after 1st paragraph) (Repeat three times)
6. >File . <J3>READBOARD>
7. >Delete CSEQUENCE
8. >Logout

2. AIR and SURFACE DDOs (1 job each)

A. High Precedence Messages

1. @Login
2. >Connect DDO
3. >Get
4. >Add FRECENT MSG-TODAY
5. >Consider MSG-TODAY/HIGH-PRIORITY
6. >Survey
7. ><LF> (Repeat three times)
8. >Add . AIR (Surface)
9. >Remove CSEQUENCE MSG-TODAY

B. J3 Messages

1. >Consider FRECENT/Action J3
2. >Survey
3. ><LF> (^E after 1st paragraph) (Repeat three times)
4. Add . AIR (Surface)
5. >Remove CSEQUENCE MSG-TODAY

C. READBOARD Preparation

1. >Get TESTREAD
2. ><LF>
3. >Comment
   [Text]: Note by ...
   <Insert a piece of text here.>
4. ><LF>
5. ><LF>
6. ><LF>

```
 7. ><LF>
 8. >Comment
     [Text]: Note by ...
             <Insert a piece of text here.>
 9. ><LF>
10. ><LF>
11. ><LF>
```

D. Completing Task

```
 1. >Get
 2. >Add MSG-TODAY/From FBIS  FBIS
 3. >Remove FBIS  MSG-TODAY
 4. >Consider MSG-TODAY
 5. ><LF> (^E after 1st paragraph)
 6. ><LF> (^E after 1st paragraph)
 7. ><LF> (^E after 1st paragraph)
 8. ><LF> (^E after 1st paragraph)
10. >Add . AIR (Surface)     (Repeat 5-10 three times)
11. >Remove ALL MSG-TODAY
12. >Logout
```

3. Action Officers (J311, for example, 6 jobs)

A. Action Message Handling

```
 1. @Login
 2. >Connect J311
 3. >Get <J31>LOG
 4. >Consider FRECENT/ACTION-J311
 5. >Survey
 6. ><LF>
 7. >Add . OFFICE     (Repeat 6-7 eleven times)
```

B. Info Message Handling

```
 1. >Consider FRECENT/INFO-J311
 2. >Survey
 3. >Display 254
 4. >Add . OFFICE     (Repeat 3-4 nine times
                       for messages 254,258 etc.)
```

C. Outgoing Message Handling

```
 1. >Get
 2. >Consider FRECENT/For Chop
```

```
 3. >Survey
 4. ><LF>
 5. >Reply . CHOP-YES
     <Insert text of reply.>
 6. >Send     (Repeat 4-6 twice)
 7. >Print CSEQUENCE
 8. >Print NEW
 9. >Delete CSEQUENCE, NEW
10. >Logout
```

4. Division Chief (J31; 3 jobs)

A. Review and Assign Action

```
 1. @Login
 2. >Connect J31
 3. >Get LOG
 4. >Consider FRECENT/ACTION-J31
 5. >Survey
 6. ><LF>
 7. >Comment
 8. >Add . ACTION-J312
 9. >Compose REASSIGNMENT
      DTG:     110377Z27OCT
      Sender:  JCS
      New-Action:  J312     (Repeat 6-9 twice)
```

B. Review Branch Actions

```
 1. >Consider FRECENT/ACTION-DIVISION
 2. >Survey
 3. ><LF> ( after first paragraph)     (Repeat fifteen times)
```

C. Review Info Messages

```
 1. >Get READBOARD
 2. >Survey
 3. >Display 5     (Repeat seven times for messages 10,15 etc.)
```

D. Handling Outgoing Messages

```
 1. >Get
 2. >Consider for chop
 3. ><LF>
 4. >Print
 5. >Reply . CHOP-YES
     Include self in CC? NO
     <Insert text of reply.>
 6. >Send
```

7. >Delete (Repeat 3-7 twice)

E. Check Old Action Items

1. >Get LOG
2. >Survey 1:50
3. >Display 5 (Repeat 2-3 ten times for messages 10,14 etc.)

5. Clerks' Scenario (J311A, for example, 3 jobs)

A. Review Branch File

1. @Login
2. >Connect J311
3. >Get
4. >Survey FRECENT
5. >Display 4
6. >Survey FRECENT
7. >Display 8

B. Review Pending Action

1. >Get <J31>LOG
2. >Consider ACTION-J311
3. >Survey
4. >Survey CSEQUENCE STEMPLATE Line-Printer
5. >Display 254 (Repeat seven times for 258,262 etc.)

C. Message Creation

1. >Get
2. >Display 3 (^E after 1st paragraph)
3. >Compose INFORMAL
   <Look at WE view window>
4. >Send
5. >Display 5 (^E after 1st paragraph)
6. >Compose Memo
   <Look at WE view window>
7. >Send
8. >Reply 7 LDMX
   <Look at WE view window>
9. >Send
10. >Logout