(2)

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On-Line Magnetic Tape Library Inventory Tracking and Reporting (LITAR) System

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ADMINISTRATIVE INFORMATION

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Centers Division

RBT

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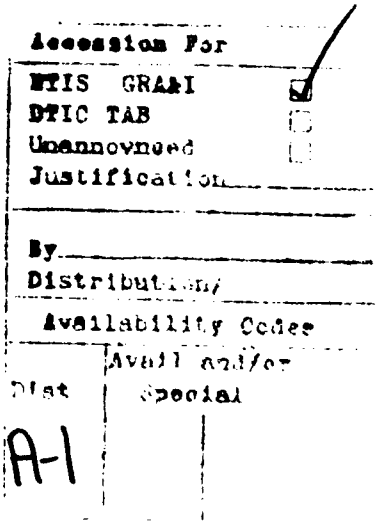
FIGURE

TABLE



INTRODUCTION

The NOSC Information Management Engineering (IME) Laboratory of Code 423 is involved in a variety of database development efforts, all of which require data input, preferably in electronic form. The medium most frequently used to receive input information and to send finished database products is nine-track, magnetic tape. NOSC Code 423 is on the automatic distribution list for data updates from several information sources within the Department of Defense, including, but not limited to, the Defense Mapping Agency and the Naval Intelligence Activity. In addition, on an infrequent basis, the IME lab requires data and software from operational commands such as CINCPACFLT, CINCLANTFLT, and HQ PACAF. These data also are commonly received on magnetic tapes. Internally generated tapes, such as those used for software backup, contribute to the total tape inventory archived and/or used by IME-lab database developers. These factors have resulted in storing approximately 750 tapes in lab 263.

Many tapes used in the IME lab are classified SECRET and, some, CONFIDENTIAL and UNCLASSIFIED. The NOSC Secret Document Control Center requires that document custodians be responsible for safeguarding SECRET material so that each document can be located during periodic reporting of individual document holdings. All SECRET tapes are bar coded and tracked as documents and are subject to inventory. The procedure in the IME lab includes manually logging SECRET tapes into and out of the SCIF space in lab 263 where they are stored.

An on-line computer system for tracking tapes clearly was needed to manage the information about each tape and to assist custodians in performing the required SECRET document inventory using the bar-code numbers. This was the motivation for developing the On-Line Magnetic Tape Library Inventory Tracking and Reporting (LITAR) system.

SYSTEM DESCRIPTION

The hardware comprising the LITAR system consists of a VAX 8550 and VT-220 terminals, with a Centronix 6080 line printer and a Digital Print Server 40 laser printer.

The software consists of VMS and ORACLE, including custom software written in VMS Digital Command Language (DCL) (reference 1) and ORACLE Structured Query Language (SQL) (references 2 and 3). An ORACLE table called IME_TAPES was created to contain the tape demographic data, including the tape title, bar code, custodian, tape status, user, tape physical location, etc. Table 1 lists a printout description of IME_TAPES, and Appendix A presents the DCL code containing the SQL code that generates the menus and executes user-generated commands.

SYSTEM OPERATION

MENUS

Access to the LITAR system is obtained from a utility program called IME, which has been used for several years in the IME lab. The program that produces the IME Facility Management Directory menu is executed by the VMS operating system by typing IME after the DCL prompt:

```
$ IME <RETURN>
```

Table 1. ORACLE CREATE TABLE file for the LITAR IME_TAPES table.

```
DROP TABLE IME_TAPES;
CREATE TABLE IME_TAPES (
  TAPE_TITLE     CHAR(28),          /* ACTUAL TITLE ON OUTSIDE OF THIS TAPE */
  NOSC_BAR_CODE  CHAR(7),           /* RED NOSC BAR CODE NUMBER             */
  SECURITY_CLASS CHAR(9),           /* SECURITY CLASSIFICATION              */
  CONTENT        CHAR(13),          /* CONTENTS OF THE TAPE                 */
  EXTERNAL_NBR   CHAR(10),          /* TAPE NUMBER ON OUTSIDE OF TAPE.      */
  CREATED_BY     CHAR(20),          /* WHO CREATED THIS TAPE ?              */
  STATUS         CHAR(1),           /* A=ACTIVE, I=INACTIVE, S=SCRATCH      */
  DATE_CREATED   DATE,              /* DATE TAPE WAS CREATED                */
  CUSTODIAN      CHAR(10),          /* WHO IS RESPONSIBLE FOR THE TAPE      */
  DATE_IN        DATE,              /* DATE ENTERED INTO THIS DATABASE      */
  DATE_OUT       DATE,              /* DATE SENT TO SOME OTHER FACILITY     */
  DESTINATION    CHAR(15),          /* WHERE THE TAPE IS TO RESIDE          */
  USER_LAST_NAME CHAR(15),          /* PERSON USING THE TAPE                */
  LAB_263_RACK   CHAR(1),           /* CABINET IN 263 WHERE TAPE LOCATED    */
  REMARKS        CHAR(80)           /* REMARKS                              */
)
SPACE MEDIUM
;
INSERT INTO IME_TAPES
        VALUES ('', '', '', '', '', '', '', '', '', '', '', '', '', '', '');
```

This displays the highest-level menu in the menu hierarchy; it is called the IME Facility Management Directory. To access the LITAR system, the user selects the Tape Management option from this menu by typing:

```
ENTER SELECTION #: 6 <RETURN>
```

This command displays the Tape Menu screen from which the user selects the Tape Inventory Reports (LITAR) option by typing:

```
ENTER SELECTION #: 2 <RETURN>
```

This places the user at the LITAR menu level, identified by the banner, LAB 263 INVENTORY REPORTS. The options in this menu are as follows:

```
1. LIST TAPES BY TITLE

2. LIST TAPES BY BAR_CODE

3. LIST TAPES BY CUSTODIAN

4. LIST TAPES BY CONTENT

5. LIST TAPES BY LAB 263 RACK NUMBER

5. Exit to VAX

Press <RETURN> to exit.
```

QUERIES

Each option executes a query from a set of predefined queries. For example, suppose the user types the following to obtain a report of tapes assigned to a custodian named SMITH:

```
ENTER SELECTION #: 3 <RETURN>
```

This displays a description of the IME_TAPES table, including attribute name, type, and length, that appears under the screen followed by another prompt:

```
DO YOU WANT TO QUALIFY THE REPORT WITH A WHERE CLAUSE? (Y/N):
```

This option allows the user to enter "where" conditions to qualify the query and limit the results. To use this feature, the user must have some knowledge of SQL (reference 2). The user would type:

```
Y <RETURN>
```

The default for no qualifiers is N or anything else except Y. The system responds by displaying the following test:

```
SQL>
Disconnect from ORACLE V5.1.22 - Production
 USE APPROPRIATE FIELD NAMES FROM THE ABOVE DESCRIPTION TO
 DETERMINE YOUR WHERE CONDITION. EXAMPLE: LAB_263_RACK = '4' AND STATUS = 'A'.

NOW, CONTINUE THE QUALIFYING WHERE CONDITION BELOW
```

The user answers with:

```
CUSTODIAN = 'SMITH'
```

Here the user must type in the exact attribute name from the displayed table description. All kinds of valid SQL "where" clauses are allowed, including clauses with "like", "in", "having", and "%". The user is expected to be familiar with the ranges and domains of each attribute. In the above example of screen text, the STATUS attribute can have two values, A for active and I for inactive. Here, the A case was selected.

REPORTS

The LITAR system reports the results of the query to the user's terminal and creates an ASCII file containing the results in the user's default directory. An option is available to print the file on the laser printer. Various reports are available with data displayed in the order of the main attribute selected. For example, if the user selected 2. LIST TAPES BY BAR_CODE, the records would appear in sequence with the consecutive bar code number. An example of a report generated by the LITAR system is shown in Appendix B. To obtain a report, respond with Y <RETURN> after the following prompt:

```
DO YOU WANT TO PRINT THIS REPORT ON THE LASER PRINTER? (Y/N):
```

This will display the following on the screen:

```
JOB "JOB NAME" (Queue ANSI_LPS40, ENTRY #) started on LPS40$LPS40
```

Then, upon pressing <RETURN>, the LAB 263 TAPE INVENTORY REPORTS menu will appear. At this point, another report can be started, or the user may exit.

If the N option is chosen after the prompt, DO YOU WANT TO PRINT THIS REPORT ON THE LASER PRINTER?, a <RETURN> will automatically transfer the user to the LAB 263 TAPE INVENTORY REPORTS menu.

DATA ENTRY SCREEN

The ORACLE SQL*FORMS (reference 3) data input screen can be used to query specific records and to perform updates, deletes, and inserts. To access the system, press <RETURN> until the TAPE MENU screen appears on the terminal. Select the Tape Screens option:

```
ENTER SELECTION #: 1 <RETURN>
```

A screen will appear like the one shown in figure 1. Help messages appear in the lower banner to assist the user with entering the correct data and with formulating queries. To access the ORACLE SQL*FORMS help facility from a VT 220, press the HELP key. After data are entered into the screen, the user can commit the transaction, causing ORACLE to execute the appropriate SQL query.

```
                              *  TAPES  *

TAPE TITLE _____________________________     NOSC BAR CODE _____________

SEC. CLASS. _____________ CONTENT _____________     EXTERNAL TAPE # _________

CREATED BY _____________________ STATUS ____     DATE CREATED _____________

                              *  LOCAL  *

CUSTODIAN _____________ DATE IN _________________ DATE OUT _____________

DESTINATION ____________________ LOCAL USER LAST NAME ____________________

LAB 263 STORAGE RACK NUMBER (0 - 5) ___

REMARKS ____________________________________________________________________
```

Figure 1. ORACLE SQL*FORMS tape screen for data entry.

EXIT

To exit from the LITAR system, simply type <RETURN> successively. Each <RETURN> exits to the next higher-level menu until the DCL prompt, $, appears.

DISCUSSION

Configuration management personnel are considering the LITAR system for use with the Operations Support System program. The system can be adapted to include hard copy documents, optical storage media, floppy disks, or any other document form. Plans for the system include automatically updating the database table whenever a system backup is performed on the VAX 8550.

REFERENCES

1. Digital Equipment Corporation. 1985. "VAX/VMS DCL Dictionary," order number AA-ZZ200B-TE. July 1985. Maynard, MA.

2. Oracle Corporation. 1987. "ORACLE SQL*PLUS User's Guide," version 2.0, part number 3201-V2.0. July 1987. Belmont, CA.

3. Oracle Corporation. 1987. "ORACLE SQL*FORMS Operator's Guide," version 2.0, part number 3301-V2.0. Belmont, CA.

APPENDIX A

MENU-GENERATION AND COMMAND-EXECUTION CODES

```
$!-------------------------------------------------------------------------
$!                                                                        *
$!                        TAPE LIBRARY REPORTING SYSTEM                   *
$!                                                                        *
$!     This command file provides a user-friendly interface for access    *
$!     to data contained in the LAB 263 TAPE LIBRARY DATABASE.            *
$!     Several options are provided for sending selected DATABASE info    *
$!     to the LAB 263 laser printer.                                      *
$!                                                                        *
$!     To use this command file, type .... @TAPE_REPORTS                  *
$!                                                                        *
$!     Developed by Dick Auclair, NOSC, San Diego, CA    FEB 1991         *
$!                                                                        *
$!-------------------------------------------------------------------------
$!     Establish logical for use in this command file                     -
$!-------------------------------------------------------------------------
$!
$   WS    := WRITE SYS$OUTPUT
$!
$!-------------------------------------------------------------------------
$     ON WARNING THEN GOTO ERROR_MESSAGE  ! SEE ERROR_MESSAGE: AT END OF LISTING
$!
$     ON CONTROL_Y THEN GOTO MAIN_EXIT
$     SET CONTROL_Y
$!
$!-------------------------------------------------------------------------
$!
$    ORACLE_LOG_IN ="USERNAME/PASSWORD"  ! CHANGE HERE ONLY TO AFFECT WHOLE PROG
RAM
$!
$!-------------------------------------------------------------------------
$!-------------------------------------------------------------------------
$!                           TAPE LIBRARY REPORTS MENU
$!-------------------------------------------------------------------------
$!-------------------------------------------------------------------------
$!*************************************************************************
$!
$MENU:
$   WS "" ! CLEAR SCREEN
$   SET TERM/WIDTH=80
$   WS ""    !Reverse Video, next lines are double height
$   WS "                                                "
$   WS "                                                "
$   WS "     LAB 263 TAPE INVENTORY REPORTS             "
$   WS "     LAB 263 TAPE INVENTORY REPORTS             "
$   WS "
      "
$   WS "
      "
$   WS "                          1.  LIST TAPES BY TITLE
      "
$   WS "
      "
$   WS "                          2.  LIST TAPES BY BAR_CODE
      "
$   WS "
      "
$   WS "                          3.  LIST TAPES BY CUSTODIAN
      "
$   WS "
      "
$   WS "                          4.  LIST TAPES BY CONTENT
      "
$   WS "
      "
$   WS "                          5.  LIST TAPES BY LAB 263 RACK NUMBER
```

```
        "
$   WS "
        "
$   WS "                          Press <RETURN> to exit
        "
$   WS "
        "
$   WS ""   !Turns off reverse video
$!
$!-------------------------------------------------------------------------
$!  Determine selection, then branch accordingly, redisplay main menu    -
$!  if entry is not valid.                                                -
$!-------------------------------------------------------------------------
$!
$   INQUIRE WHICH_MENU "                          ENTER SELECTION #"
$!
$   IF WHICH_MENU .EQS. ""  THEN GOTO MAIN_EXIT
$   IF WHICH_MENU .EQS. "1" THEN GOTO LIST_BY_TITLE
$   IF WHICH_MENU .EQS. "2" THEN GOTO LIST_BY_BAR_CODE
$   IF WHICH_MENU .EQS. "3" THEN GOTO LIST_BY_CUSTODIAN
$   IF WHICH_MENU .EQS. "4" THEN GOTO LIST_BY_CONTENT
$   IF WHICH_MENU .EQS. "5" THEN GOTO LIST_BY_RACK_NUMBER
$!
$   GOTO MENU               ! RETURN TO MENU
$!
$! ------------------------------------------------------------------------------
-------------------------------------------------
$LIST_BY_TITLE:
$   WS "
        "
$   WS "
        "
$   FIELD_NAMES := "TAPE_TITLE,CUSTODIAN,LAB_263_RACK,NOSC_BAR_CODE,EXTERNAL_NBR
,SECURITY_CLASS,REMARKS"
$   SPOOL_FILE_NAME := "LAB263_TAPES_REPORT_BY_TITLE.SPOOL"
$!
$   GOSUB SET_UP_AND_EXECUTE_SQL_COMMANDS
$!
$!   INQUIRE WAIT "             PRESS RETURN TO CONTINUE"
$        GOTO MENU
$!
$! ------------------------------------------------------------------------------
-------------------------------------------------
$LIST_BY_BAR_CODE:
$   WS "
        "
$   WS "
        "
$   FIELD_NAMES := "NOSC_BAR_CODE,EXTERNAL_NBR,TAPE_TITLE,CUSTODIAN,LAB_263_RACK
,SECURITY_CLASS,REMARKS"
$   SPOOL_FILE_NAME := "LAB263_TAPES_REPT_BY_BARCODE.SPOOL"
$!
$   GOSUB SET_UP_AND_EXECUTE_SQL_COMMANDS
$!
$!   INQUIRE WAIT "             PRESS RETURN TO CONTINUE"
$        GOTO MENU
$!
$! ------------------------------------------------------------------------------
-------------------------------------------------
$LIST_BY_CUSTODIAN:
$   WS "
        "
$   WS "
        "
$   FIELD_NAMES := "CUSTODIAN,TAPE_TITLE,LAB_263_RACK,NOSC_BAR_CODE,EXTERNAL_NBR
,SECURITY_CLASS,REMARKS"
```

```
$    SPOOL_FILE_NAME := "LAB263_TAPES_REPT_BY_CUSTODIAN.SPOOL"
$!
$    GOSUB SET_UP_AND_EXECUTE_SQL_COMMANDS
$!
$!    INQUIRE WAIT "             PRESS RETURN TO CONTINUE"
$         GOTO MENU
$!
$! ------------------------------------------------------------------------------
-------------------------------------------------
$LIST_BY_CONTENT:
$    WS "
          "
$    WS "
          "
$    FIELD_NAMES := "CONTENT,TAPE_TITLE,LAB_263_RACK,NOSC_BAR_CODE,EXTERNAL_NBR,S
ECURITY_CLASS,REMARKS"
$    SPOOL_FILE_NAME := "LAB263_TAPES_REPT_BY_CONTENT.SPOOL"
$!
$    GOSUB SET_UP_AND_EXECUTE_SQL_COMMANDS
$!
$!    INQUIRE WAIT "             PRESS RETURN TO CONTINUE"
$         GOTO MENU
$!
$! ------------------------------------------------------------------------------
-------------------------------------------------
$ LIST_BY_RACK_NUMBER:
$    WS "
          "
$    WS "
          "
$    FIELD_NAMES := "LAB_263_RACK,TAPE_TITLE,CUSTODIAN,NOSC_BAR_CODE,EXTERNAL_NBR
,SECURITY_CLASS,REMARKS"
$    SPOOL_FILE_NAME := "LAB263_TAPES_REPT_BY_RACK.SPOOL"
$!
$    GOSUB SET_UP_AND_EXECUTE_SQL_COMMANDS
$!
$!    INQUIRE WAIT "             PRESS RETURN TO CONTINUE"
$         GOTO MENU
$!
$! ------------------------------------------------------------------------------
-------------------------------------------------
$!
$ERROR_MESSAGE:
$     WS " "
$     WS "    An error has been detected."
$     WS " "
$     ws "    Analyze the problem, try to fix it, then"
$     WS " "
$!
$     INQUIRE HOLD_SCREEN "      Press <RTN> to continue at MAIN MENU"
$!
$     GOTO MENU
$!
$MAIN_EXIT:
$      WS ""  !Turns off reverse video
$!
$    EXIT
$!*********************************
$!****** SUBROUTINE FOLLOWS ******
$!*********************************
$!
$SET_UP_AND_EXECUTE_SQL_COMMANDS:
$!
$    INQUIRE YES_NO "DO YOU WANT TO QUALIFY THE REPORT WITH A WHERE CLAUSE ? (Y/N)
)"
$    IF YES_NO .NES. "Y" .AND. YES_NO .NES. "y" THEN GOTO SET_UP_SQL
```

```
$
$       SQL "''ORACLE_LOG_IN'"
DESCRIBE IME_TAPES
$   WS "  USE APPROPRIATE FIELD NAME FROM THE ABOVE TABLE DESCRIPTION TO DETERMI
NE"
$   WS "  YOUR WHERE CONDITION.  EXAMPLE:   LAB_263_RACK = '4' AND STATUS != 'A'
$   WS "
      "
$   WS "  NOW, CONTINUE THE QUALIFYING WHERE CONDITION BELOW"
$    READ SYS$COMMAND WHERE_CONDITION/PROMPT=" WHERE "
$!
$ SET_UP_SQL:
$       OPEN/WRITE TMP1 TT_SQL_COMMANDS.TEMP
$       WRITE TMP1 "SPOOL ''SPOOL_FILE_NAME'"
$       WRITE TMP1 "SELECT ''FIELD_NAMES' from IME_TAPES"
$       IF YES_NO .NES. "Y" .AND. YES_NO .NES. "y" THEN GOTO BYPASS_WHERE_CLAUSE
$       WRITE TMP1 "WHERE ''WHERE_CONDITION'"
$ BYPASS_WHERE_CLAUSE:
$       WRITE TMP1 "ORDER BY ''FIELD_NAMES'"
$       WRITE TMP1 ";"
$       CLOSE TMP1
$!
$   WS "" ! CLEAR SCREEN
$!
$!  ************************************************************************
$!  ** LOG IN TO SQL - SQL COMMANDS IN TT_SQL_COM... ...3.TEMP WILL BE EXECUTED **
$!  ************************************************************************
$!
$       SQL "''ORACLE_LOG_IN'"

TTITLE 'IME TAPE INVENTORY REPORT'
BTITLE ' ' -
SKIP CENTER 'IME TAPE INVENTORY REPORT'
SET PAGESIZE 60
COLUMN TAPE_TITLE FORMAT A26 HEADING 'TAPE_TITLE' WORD_WRAPPED
COLUMN CUSTODIAN FORMAT A11 HEADING 'CUSTODIAN'
COLUMN LAB_263_RACK FORMAT A4 HEADING 'RACK'
COLUMN NOSC_BAR_CODE FORMAT A8 HEADING 'BARCODE'
COLUMN EXTERNAL_NBR FORMAT A10 HEADING 'EXT_TAPE_#'
COLUMN SECURITY_CLASS FORMAT A9 HEADING 'CLASSIF'
COLUMN REMARKS FORMAT A76 HEADING 'REMARKS'
SET ECHO ON
SET NEWPAGE 0

       START TT_SQL_COMMANDS.TEMP

EXIT
$!
$       DELETE TT_SQL_COMMANDS.TEMP.*    ! NOTE THE TT WAS ADDED TO FILE NAME
$!                                         TO MAKE IT MORE UNIQUE SO THAT THE
$!                                         ODDS ARE GREATER THAT A FILE OF SAME
$!                                         NAME WILL NOT PREVIOUSLY EXIST AND
$!                                         ACCIDENTALLY GET DELETED HERE.
$!
$   WS "
      "
$   INQUIRE YES_NO "DO YOU WANT TO PRINT THIS REPORT ON THE LASER PRINTER ? (Y/N):
)"
$   IF YES_NO .NES. "Y" .AND. YES_NO .NES. "y" THEN GOTO CONTINUE
$!
$   LASER '''SPOOL_FILE_NAME''
$!
$ CONTINUE:
$   WS "
      "
$ RETURN                  ! RETURN FROM SUBROUTINE
```

APPENDIX B

EXAMPLE OF LITAR SYSTEM-GENERATED IME TAPE INVENTORY REPORT

```
SQL> SELECT NOSC_BAR_CODE,EXTERNAL_NBRTAPE_TITLE,CUSTODIAN,LAB_263_RACK,
SECURITY_CLASS,REMARKS from IME_TAPES
  2  WHERE NOSC_BAR_CODE LIKE 'S9607%'
  3  ORDER BY NOSC_BAR_CODE,EXTERNAL_NBRTAPE_TITLE,CUSTODIAN,LAB_263_RACK,
SECURITY_CLASS,REMARKS;

February 4, 1991
                              IME TAPE INVENTORY REPORT

BARCODE  EXT_TAPE_# TAPE_TITLE                  CUSTODIAN   RACK CLASSIF
-------- ---------- --------------------------- ----------- ---- ---------
REMARKS
--------------------------------------------------------------------------------

S960710  1203       NXPR1.NOSC.NBO              JOHN        4    S
DATA LOADED 1 FEB 91

S960711  A034       NCPR1.NOSC.MBO              JANE        4    S/NF
TRANSFERRED TO NEW CUSTODIAN

S960714  90SD9      CIDSS DB/SITE               JILL        2    S

S960727  WY882      ALL FLAG NAVAL SHIP ID      JACK        2    U
ORACLE 6 EXPORTS ONLY

S960777  SD008      DMAAC/MCBS                  JANE        1    C
ORACLE 5 EXPORTS

S960787  N433       LANTFLT WWMCCS DATA         JANE        1    S
FLAT FILES

S960788  23J5       LANTFLT XXZ                 JANE        1    S/NF
FLAT FILES, NEW FORMAT
```

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13. ABSTRACT *(Maximum 200 words)*

The design and operation of the On-Line Magnetic Tape Library Inventory Tracking and Reporting (LITAR) system is summarized. The system was developed by NOSC personnel to access efficiently administrative and content information about the magnetic tapes used for supporting database development in the NOSC Information Management Engineering (IME) Laboratory. This user interface was originally developed for tapes classified SECRET or below, using ORACLE Relational Database Management System's SQL*FORMS on a VAX 8550. However, the interface has more general applications outside of this environment. Examples of user-input screens are also presented.

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