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ADAMS: AIRLAB Data Management System USER'S GUIDE

C. L. Conrad
W. F. Ingogly
L. A. Lauterbach

Software Research and Development
Center for Digital Systems Research
Research Triangle Institute
Research Triangle Park, North Carolina 27709

NASA

National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23665

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16 Abstract

The AIRLAB Data Management System (ADAMS) is an online environment that supports research at NASA's AIRLAB. ADAMS provides an easy-to-use interactive interface that eases the task of documenting and managing information about experiments and improves communication among project members. Data managed by ADAMS includes information about experiments, data sets produced, software and hardware available in AIRLAB as well as that used in a particular experiment, and an on-line engineer's notebook. The User's Guide provides an overview of the ADAMS system as well as details of the operations available within ADAMS. A tutorial section takes the user step-by-step through a typical ADAMS session.

ADAMS runs under the VAX/VMS operating system and uses the ORACLE database management system and DEC/FMS (the Forms Management System). ADAMS can be run from any VAX connected via DECnet to the ORACLE host VAX. The ADAMS system is designed for simplicity, so interactions within the underlying data mangement system and communications network are hidden from the user.

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USER'S GUIDE

C. L. Conrad
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Chapter 1 — Introduction

WHAT IS ADAMS

The AIRLAB Data Management System (ADAMS) is an online environment that supports research at NASA's AIRLAB. ADAMS provides a number of custom functions that ease the task of documenting experiments and improve communication among project members. This User's Guide tells how ADAMS' shared data capability can be used to manage research information and resources. Its organization makes it effective as both a tutorial for the new user and a reference manual for the experienced user.

ADAMS was developed for NASA Langley Research Center under the direction of Linda A. Hunt. The original design and prototype were developed by Foundation Computer Systems Incorporated under subcontract to Research Triangle Institute. The final version was designed by Linda A. Hunt, Linda Lauterbach, John L. Pierce and Randy Buckland and coded by Randy Buckland of the Center for Digital Systems Research at RTI.

ADAMS resides on AIRLAB's Digital Equipment Corporation (DEC) VAX 11/780, known as *System 1* (DECnet node name AIR1). It runs under the VAX/VMS operating system and uses the ORACLE database management system. A supporting computer network allows ADAMS to be run from any AIR-LAB VAX. The ADAMS system is designed for simplicity, so interactions with the underlying data management system and communications network are hidden from the user. ADAMS runs on standard DEC terminals like the VT-52, VT-100 and VT-200 series, or any terminal that emulates a DEC terminal.

WHO SHOULD READ THE ADAMS USER'S GUIDE

ADAMS was designed as a support tool for AIRLAB research project managers and project members who need to keep track of personnel, software, hardware, experiments and other project-related information. It provides flexibility for documenting project resources and activities and security for restricting access to confidential or proprietary project data. Although ADAMS can be used to document personal activities, its real power lies in the ability to share information with other members of project groups. Any AIRLAB project personnel who need the increased control over a project's resources and activities which results from effective documentation should examine the ADAMS User's Guide to see how ADAMS can document and support their projects.

The ADAMS User's Guide provides a complete description of ADAMS functions and a tutorial and case study that show how ADAMS can be used to support research projects at AIRLAB. The new ADAMS user can begin to use ADAMS to support his or her research efforts efficiently by studying the material in the User's Guide in the order suggested in the next section. Numerous cross-references in the text, a Glossary, an Index and several Appendices provide quick access to information in the Guide for the more experienced user.

HOW TO USE THE ADAMS USER'S GUIDE

The new user should read the User's Guide sequentially. The early chapters present a high-level overview of ADAMS and a tutorial to help the novice build a conceptual model of how ADAMS works. An Appendix lists the meaning of all diagnostic messages along with the action to be taken in response to a message, so the novice can quickly recover from error conditions caused by an incomplete understanding of the system. The following reading order is suggested:

1. Examine the *Table Of Contents* to get a feeling for the overall structure of the User's Guide. All sections are one or two pages long and are explicitly entitled to make ADAMS topic location easy. Note the Appendices, Glossary and Index, which are useful for looking up additional information and definitions during an ADAMS session.

2. Read the first three chapters of the User's Guide through *Interacting With The ADAMS System*. These chapters explain what ADAMS does, how the ADAMS interface works and how ADAMS can be used to support research projects at AIRLAB.

3. Read *Chapter 4, Tutorial: A Tour Through The ADAMS System*. Once you are comfortable with the contents of the Tutorial, logon to VAX/VMS and work through the Tutorial to get a feeling for the ADAMS interface. The Tutorial provides a quick and easy introduction for the novice and illustrates ADAMS' major features. If you don't know how to logon, read the section in Chapter 2 entitled *ADAMS And The VAX/VMS Operating System*.

4. Now you're ready to study the functions performed by ADAMS in greater detail. Read *Chapters 5 and 6, ADAMS Database Operations* and *ADAMS Maintenance Operations*. They explain each function performed by ADAMS in detail and provide sample terminal screens that illustrate ADAMS usage. Note that the contents of Chapter 6 are of interest primarily to project and system managers.

5. Finally, go back through the User's Guide and reread any sections you may not have fully understood. If you still have questions, contact someone at AIRLAB who is already an experienced ADAMS user. Now you are ready to use ADAMS as a research support tool.

The experienced user will use the *Table Of Contents, Index* and *Appendices* to locate topics of interest. Pointers to supplementary information are scattered throughout the text to increase the Guide's usefulness as a reference tool. A *Quick Reference Card* also has been provided for quickly locating mnemonic names and meanings during an ADAMS session.

Online field help provides short descriptions of the data to be entered at a particular screen location. A help menu lists all keypad key functions and provides an overview of ADAMS menu structure.

CONVENTIONS USED IN THE ADAMS USER'S GUIDE

References to other documents and to sections and chapters in the ADAMS User's Guide are in italics. Section titles are presented in bold face; each section begins at the top of a new page and illustrations (if any) are on the right-hand side. Sections are short and self-contained to minimize the amount of flipping back and forth while using the Guide. Each chapter's pages and illustrations are numbered individually with a hyphen separating the chapter number and page or illustration number (e.g., page 2-10 is the tenth page in Chapter 2 of the User's Guide). The chapter title is printed at the bottom of each page.

In terminal screen examples and sample ADAMS terminal sessions, information entered by the user is in bold face. The cursor position is represented by a small square. Special terminal key names are enclosed in angle brackets; for example:

$$<RET> \quad = \text{Return key}$$
$$<BACK> \quad = \text{Back Space key}$$
$$<PF1>_{KEYPAD} \quad = \text{The gold key also referred to as } <G>$$
$$\text{(Programmable function key 1)}$$

Note: The KEYPAD subscript on the last example indicates the key is part of the numeric keypad at the right-hand side of the terminal keyboard.

ADDITIONAL SOURCES OF INFORMATION

An *ADAMS Quick Reference Card* has been provided to aid the experienced user during an ADAMS terminal session. Also, ADAMS provides online help which describes field contents and keypad key functions. See the sections on ADAMS menus and display screens in *Chapter 2* for a description of the help function. For additional help in solving problems with ADAMS, contact ADAMS maintenance personnel at AIRLAB. If possible, ADAMS trouble reports should be submitted using the software trouble report screen in the ADAMS *Software/Hardware Unit* submenu (see *Chapter 5* for a full description of this submenu).

There are several additional documents that may be of help to the ADAMS user:

- *ADAMS Programmer's Maintenance Manual* — Tells AIRLAB ADAMS maintenance personnel how to fix a problem in the ADAMS system. This manual is not required by the general ADAMS user.

- *ADAMS Quick Reference Card* — Provides lists of screen mnemonics and a diagram of the ADAMS menu system for quick reference during an ADAMS session.

- *ADAMS System Operator's Guide* — Tells AIRLAB ADAMS maintenance personnel how to install and maintain the system database files. This manual is not required by the general ADAMS user.

- *AIRLAB Research Support Capabilities* — An inventory and description of hardware and software resources that support AIRLAB research.

- *AIRLAB User's Guide* — Provides new users with an introduction to AIRLAB's hardware and software. Tells how to get things done and supplies pointers to other documents.

GETTING ONLINE HELP DURING AN ADAMS SESSION

Two kinds of online help are available in ADAMS — Field help and Main Menu help.

Field help gives a status message regarding valid inputs for the field that the cursor is positioned on. Field help is invoked by pressing <PF2>KEYPAD. The message appears in the bottom left-hand corner of the screen.

Main Menu help is dividied into two submenus — Menu Tree and Keypad Key.

- Menu Tree displays ADAMS (sub)menu relationship (see *Appendix B - The ADAMS Tree Structure* for a more detailed figure).

- Keypad Key defines all keypad and cursor movement functions.

Menu help is invoked on menu and action screens by pressing <PF2>KEYPAD twice. On report screens you need to press <PF2>KEYPAD only once.

All diagnostic messages other than help messages are defined in *Appendix A - Status and Error Messages*.

Chapter 2 — An Overview Of the ADAMS System

THE PROJECT DATABASE CONCEPT

The ADAMS shared database allows project groups to store shared information documenting project activity. Each person in a group can browse, add, update, and delete personal and shared information in several categories:

- Persons contributing to a project
- Status of experiments performed under a project
- Organizations involved in a project
- AIRLAB hardware and software contributing to a project
- Manuals, technical papers, and other documentation
- Active and archived project data
- Shared and private notebook entries

The ADAMS security validation system protects critical project data from accidental or intentional modification. Access to data depends on the user's security level and project group membership as determined by the project leaders and system managers.

System managers, project leaders, and project group members access project data through the ADAMS user-friendly interface (*Figure 2-1*); before data records are accessed by the database manager software, the security validation software checks to make sure the person requesting the data has permission to access it. The validation and data retrieval processes are hidden from the user. All transactions are mediated by the menu-driven ADAMS interface. This makes the database browsing, adding, updating, and deleting functions easy to learn for the beginner and flexible for the expert.

Unused Page

System
Managers

Project
Leaders

Group
Members

The ADAMS
User Interface

Security
Validation

Database
Manager
(ORACLE)
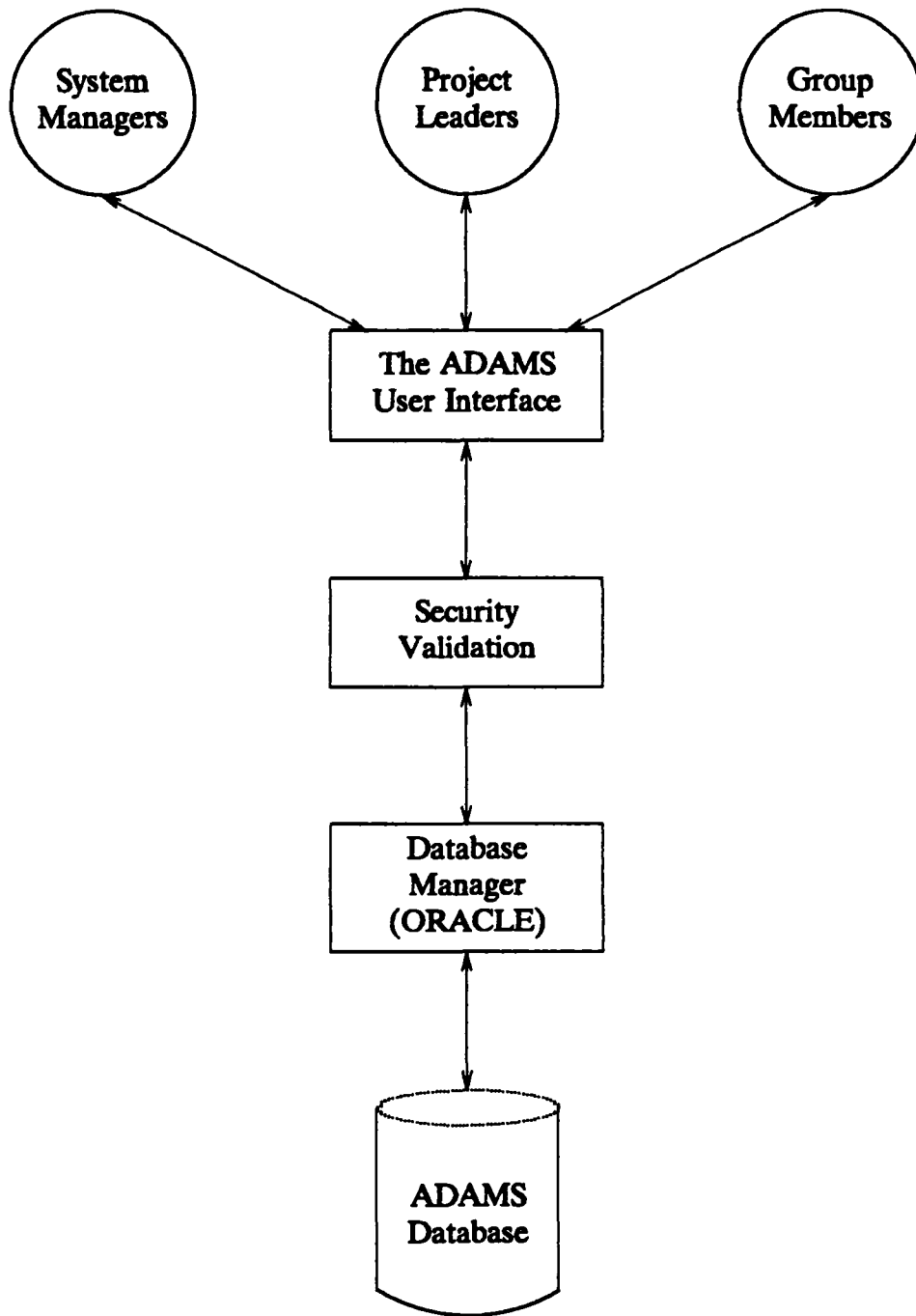
ADAMS
Database

Figure 2-1. The ADAMS System

HOW ADAMS SUPPORTS AIRLAB PROJECT MANAGEMENT

There are three kinds of ADAMS users: the system manager, who is responsible for maintaining the ADAMS system and system-wide data; the project leader, who is responsible for managing one or more groups of personnel working on a project; and group members, who are performing work under a project leader's guidance. The project leader defines groups under a project and associates group member accounts with the groups. A set of group *keywords* can be established to tag information for later retrieval. The ADAMS project/group security system establishes a data access hierarchy which a project leader can use to segregate project documentation by personnel group functions within a project.

ADAMS project data storage and retrieval capabilities allow project leaders and group members to:

- Keep track of all resources associated with a project, including software, hardware, people, institutions, and data.

- Make online notebook entries that describe experimental work and document project software bugs and fixes.

- Start ADAMS when logging in at the beginning of a terminal session, escape to VAX/VMS to do software development or other research support work under VMS, then return to ADAMS to document the work done.

ADAMS creates a research support environment that captures ongoing work on AIRLAB experiments with a small amount of effort on the part of project members and allows documentation of completed work to be examined throughout the project life cycle. Immediate benefits of using ADAMS include increased control over all phases of an experiment for a project's leader and increased visibility into ongoing work for a project's contract monitor. The improved project documentation that results from using ADAMS eases transitions when personnel change. This makes restarting complex suspended experiments or redoing data analyses easier in the long run since experiment data, analyses, and notebook entries can be easily retrieved.

The cost of using ADAMS is, of course, the effort and discipline involved in using a new system for documenting work. ADAMS replaces the traditional engineer's or experimenter's notebook with an online, keyword-oriented system. Notes can be quickly made as an experiment proceeds and tagged with single or multiple keywords for fast retrieval later in the project. The payoffs discussed in this section make the startup cost of learning to use ADAMS worthwhile.

ADAMS AND THE VAX/VMS OPERATING SYSTEM

The ADAMS system has been designed so minimal interaction with the VAX/VMS operating system is necessary. You need to know how to use your terminal, how to access AIRLAB computers, and how to logon and logoff VAX/VMS. The EDT editor can be invoked to edit notebook entries from ADAMS by pressing <9>KEYPAD, but knowledge of EDT is not really needed to use ADAMS productively. New AIRLAB users should refer to the *AIRLAB User's Guide* and the *AIRLAB Research Support Capabilities* document for information on obtaining an account on VAX/VMS and on learning to use the system.

There are a couple of VAX/VMS files that might appear under exceptional circumstances:

netserver.log   Appears on *AIR1* if ADAMS is invoked from another AIRLAB computer and there is a problem. This file can be deleted with the VAX/VMS *DELETE* command.

username.tmp   Appears under the current file directory if the EDT editor is invoked while making a notebook entry and a system failure occurs. This file can be deleted with the VAX/VMS *DELETE* command.

THE ADAMS SECURITY SYSTEM

ADAMS provides three security levels for the control of access to project data. User account security levels are identified by a single letter field in the Maintenance Operations/Security/Access Level submenu. These identifiers are listed in parentheses in the following descriptions:

System (S)   A user whose account has system level privileges can access any data in the ADAMS system and grant access to ADAMS to other users. The only AIRLAB personnel who have system level privileges are the persons responsible for maintaining ADAMS. System level data is typically information that rarely changes or that is critical to the functioning of the entire ADAMS system (e.g., data on personnel or institutions involved in AIRLAB research).

Project (P)   A user whose account has project level access can deactivate and reactivate projects, define and undefine group keywords, and assign and deassign users to project groups. AIRLAB personnel who have project level privileges are usually project managers or leaders who are responsible for one or more groups of experimenters, programmers, or other personnel working on research experiments. The only data associated specifically with the project level is the project name, which is defined by the system manager when a project is established from the Security submenu (described in *Chapter 6*).

Group (G)   A user whose account has group level access can create and access data that is sharable by all members of the group, use group keywords, and create and access personal data. AIRLAB personnel who have group level privileges are usually experimenters, programmers, contract monitors, or other personnel working in one or more groups under a project leader. Group level data is typically information that is of interest to all members of a group working on an experiment. Examples are software trouble reports and their resolution, and information on the location of raw and processed experimental data.

The access level associated with individual database records depends on the security level and group membership of the user who created the record, and on the nature of the data. The types of access that are permitted to specific ADAMS screens are discussed in greater detail in *Chapters 5* and *6*. Figure 2-2 illustrates the branching structure of the ADAMS security system. Note that the system manager typically works at the system and project levels when creating and

deleting database information, and the project leader works at the group and individual group member levels. Both groups in the illustration have sets of keywords associated with them which can be used by the group members or project leader for tagging database entries for later retrieval. Each user in the security system also has a number of private keywords associated with his account for tagging and retrieving personal research entries in the database.

System (S)

Project (P)

System
Manager

Keywords —— Group (G)   Group (G) —— Keywords

Project
Leader

User   User   User   User   User

Keywords   Keywords   Keywords   Keywords   Keywords
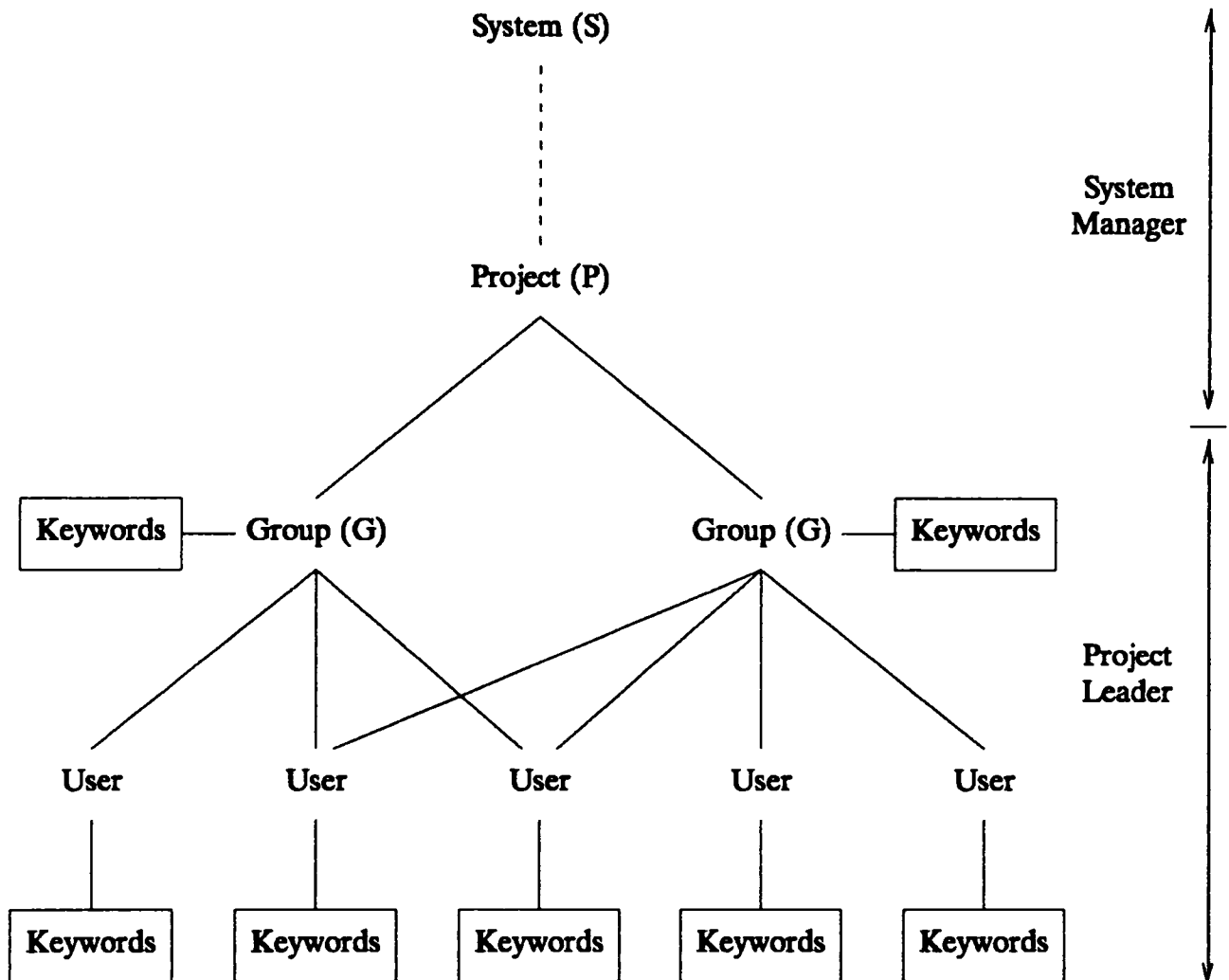
Figure 2-2. ADAMS Database Security Levels

MENU SCREEN FORMAT AND COMMANDS

Menu screens are used to maneuver through the tree-like ADAMS menu system to reach an action screen, where database records can be created or retrieved for browsing, updating or deleting. The structure of a menu screen is illustrated on the opposite page. The options on a menu screen are listed in the middle of the screen. To choose an option, type the option's number at the keypad or type the number at the regular keyboard followed by <RET>. The system responds by moving to an action screen or to another menu with a new set of options.

Every screen except the Logon screen has a mnemonic name. The mnemonic names for action screens begin with B, A, U, or D for Browse, Add, Update, or Delete and end with AS. The mnemonic names for menu screens end in MN. Screen mnemonics are listed alphabetically in *Appendix C*. You can jump to any menu or action screen from a menu by entering the mnemonic name of the destination screen at the prompt. For example, if the destination is the Browse Contributor screen, type B_CONT_AS <RET> or B_CONT_AS <Enter>keypad at the prompt. You can type hyphens (-) instead of underscores (_). The system responds by moving directly to the Browse Contributor screen. You cannot jump from an action screen to a menu screen. When you exit the screen you jumped to, ADAMS returns to the menu screen you were at when you executed the jump.

The commands for menus appear in the rectangular box at the bottom half of the screen; they must be entered from the keypad. These commands are:

Commands	Definitions
<Enter> = Do	Executes valid actions for menu screens (See below)
<PF2> = Help	One line help or help screens
<0> = Exit Screen	Move back one screen
<.> = Make Note	Move to notebook entry

The main menu has only <Enter>, <PF2>, and <.> commands. The <Enter> command on menu screens executes mnemonic names to jump directly from a menu to an action screen or another menu.

ADAMS
Title

```
┌─────────────────────────┐
│                         │
│                         │
│                         │
│         options         │
│                         │
│                         │
│                         │
└─────────────────────────┘
```

```
┌──────────────────────────────────────────────┐
│                    commands                    │
└──────────────────────────────────────────────┘
```

Enter choice: ☐   **(mnemonic)**
System messages

ACTION SCREEN FORMAT AND COMMANDS

Action screens are used to create and manipulate database records. Action screens are grouped by the four types of database functions:

- **Browse**   Browse currently existing records
- **Add**   Add a new record into the database
- **Update**   Update currently existing records
- **Delete**   Delete currently existing records

See *Chapter 3 — Interacting with the ADAMS System*, for detailed explanations regarding these functions.

The structure of an action screen is illustrated on the opposite page. Action screen commands appear in the rectangular box on the bottom half of the screen; they must be entered from the keypad. These commands are:

Commands	Definitions
\<Enter\> = Do	Executes valid actions for each action screen (See below)
\<PF2\> = Help	One line help or help screens
\<0\> = Exit Screen	Move back one screen
\<Up\> = Prev line	Move to previous line in a scrolling region Move to previous page in a paging region
\<Down\> = Next line	Move to next line in a scrolling page Move to next page in a paging region
\<7/8\> = Print	Print the record. 7 prints the record. 8 prints from current to last record in the working set.
\<G-0\> = Open line	Opens a line beneath the cursor in a scrolling region to insert a line of text
\<PF4\> = Kill line	Deletes the line the cursor is on

The action of \<Enter\>ᴋᴇʏᴘᴀᴅ depends on the current database function:

- **Browse**   Retrieves the record(s) requested
- **Add**   Adds the new record to the system
- **Update**   Retrieves the record(s) to be updated
                 Stores the updated version(s)
- **Delete**   Retrieves the record(s) to be deleted
                 Deletes the retrieved record(s)

Refer to *Appendix C — Mnemonics Names*, for a list of all action screen mnemonics.

ADAMS
Title

field$_1$: □
field$_2$:

field$_n$:

commands

System messages   (mnemonic)

REPORT SCREEN FORMAT AND COMMANDS

Report screens display records that are stored in the database. When you request a record at any action screen, the result is a report screen.

There are three types of report screens:

1) A report screen that displays all information after single or multi-line fields as shown in the first figure on the opposite page.

2) A report screen that has scrolling regions — either one or two rectangular boxes that scroll — and single or multi-line fields, as shown in the second figure on the opposite page. The field name for a scrolling region is located at the top left-hand corner of the rectangular box. When there are two scrolling regions (e.g., Software Trouble Report), the field name will be in reverse video to indicate which box the cursor movement keys are active in. Press the <2>KEYPAD to move the cursor to the previous scrolling region and the <1>KEYPAD to move the cursor to the next scrolling region. Use the arrow keys to scroll text in the current scrolling region.

ADAMS
Title

field$_1$: ▢
field$_2$:

.

.

.

field$_n$:

commands

System Messages   (mnemonic)

ADAMS
Title

field$_1$:
field$_2$:

.

.

field$_{n-1}$

scrolling region

field$_n$

scrolling region

commands

System Messages   (mnemonic)

An Overview of ADAMS, p. 2-13
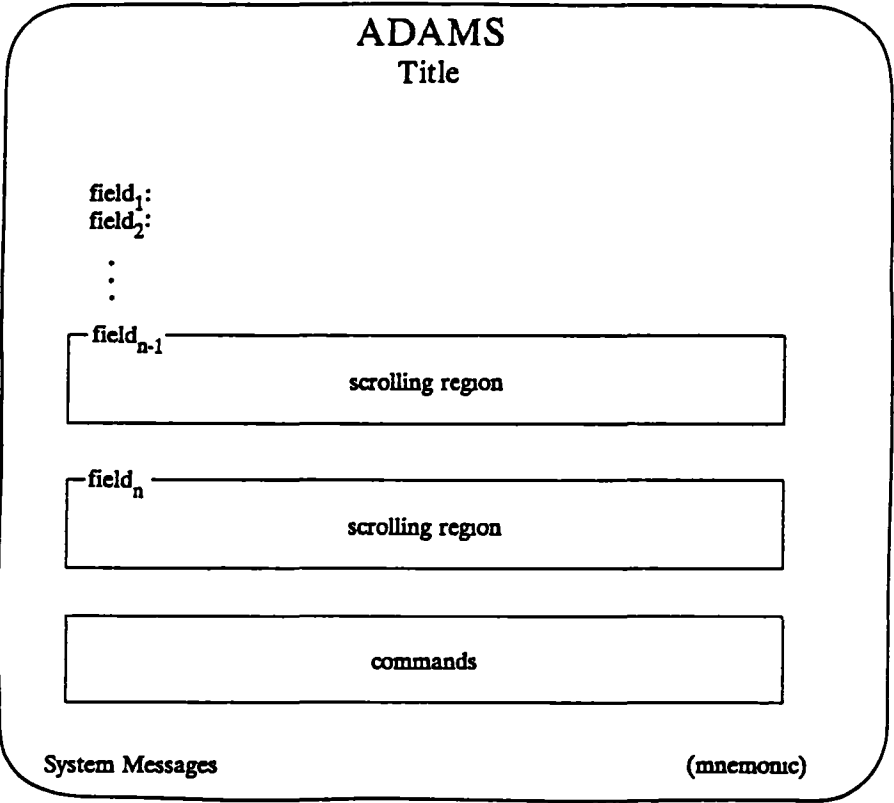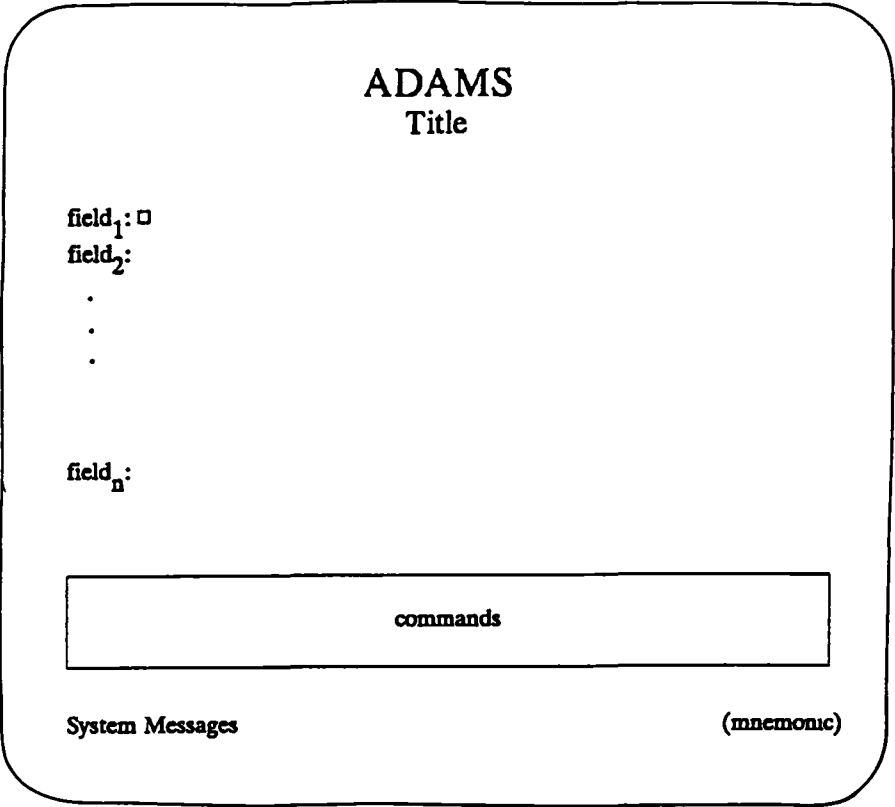
3) A report screen that has both scrolling regions and paging regions and single and/or multi-line fields, (e.g., Inhouse Software) or just paging regions along with single or multi-line fields (e.g., Hardware Unit). Paging regions are identified by brackets [ ] that surround the area. The figure on the opposite page includes a paging region. Press the <2>keypad to move the cursor to the previous scrolling or paging region and the <1>keypad to move the cursor to the next scrolling or paging region. Use the arrow keys to page or scroll in the current paging or scrolling region.

Report screen commands appear in the rectangular box on the bottom half of the screen; they must be entered from the keypad. These commands are:

Commands	Defintions
<Enter> = Do	Move back one screen
<PF2> = Help	One line help or help screens
<0> = Exit Screen	Move back one screen
<7/8> = Print	Print the record. 7 prints the record. 8 prints from current to last record in the working set.
<-> = Prev Record	Return to previous report screen
<Up> = Prev line	Move to previous line in a scrolling region Move to previous page in a paging region
<Down> = Next line	Move to next line in a scrolling region Move to next page in a paging region
<,> = Next Record	Move to next report screen

The following additional commands can be used on report screens.

Command	Definition
<PF1> <Up>	Move back in text one scrolling region
<PF1> <Down>	Move forward in text one scrolling region

ADAMS
Title

field$_1$:
field$_2$:
.
.
.
field$_{n-1}$:   [paging region   ]

field$_n$

scrolling region

commands

System Messages   (mnemonic)

Chapter 3 — Interacting With the ADAMS System

ENTERING AND LEAVING ADAMS

To log on to ADAMS, type **ADAMS <RET>** in upper or lower case after the VAX/VMS prompt (See *AIRLAB User's Guide* and *Research Support Capabilities* for instructions on using VMS). If you do not have permission to use ADAMS, you will receive the message 'Error accessing ORACLE database'. If you have permission, the ADAMS Logon screen will appear. The logon screen can be used to enter text describing the session's purpose. After optionally entering the purpose, press **<RET>** or **<Enter>**KEYPAD. The main menu automatically appears. Now you are ready to begin the ADAMS session.

System messages appear at the bottom left-hand corner of the screen. A typical system message is 'invalid key selection' — which means the key typed is not valid in this context. ADAMS status and error messages are listed alphabetically in *Appendix A*.

To log off, you can either go to the main menu and select option 4, Logoff, to get to the Logoff screen or you can go directly to the logoff screen by typing **LOGOFF <RET>** from any menu screen. The Logoff screen can be used to enter any final remarks about your ADAMS session. (After optionally entering final remarks, press **<RET>** or **<Enter>**KEYPAD. The screen will clear and the VMS prompt will appear at the bottom of the screen).

USING THE TERMINAL KEYBOARD AND KEYPAD

The entire keyboard is divided into a regular keyboard which looks like a type-writer keyboard and a keypad which contains the numerals and command keys (i.e., <PF1>KEYPAD, <PF2>KEYPAD, <Enter>KEYPAD). The keypad is at the right-hand side of the keyboard. The regular keyboard is used to enter input at field prompts on action screens. The regular keyboard can also be used to select options on menu screens. <RET> must be pressed to select a menu option from the regular keyboard.

The keypad is used to select options on menu screens. <RET> does not have to be pressed when a keypad key is selected. Commands are also entered from the keypad. For example, the command 'Make Note' is invoked by pressing <.>KEYPAD on the keypad. The figure on the opposite page lists all keypad key functions.

Help Keypad

∧ Prev Line + Page	∨ Next Line - Page	< Left	> Right

Keys

Enter = Enter form
Return = Next field
Backspace = Prev field
Linefeed = Erase field
Delete = Delete character

Zero = Back Up	
Enter = Exit Help	

Gold	Help *Field Help*	Overstk *Insert*	Kill Line
7 Print	8 Print All	9 Enter Edt	Prev Screen
4 Find Next *Search*	5	6	Next Screen
1 Prev Region	2 Next Region	3	Do
Back Up Menu *Open Line*		Note	Make Key-word

Keypad key function names in italics are gold functions. Gold functions are invoked by pressing <PF1>ᴋᴇʏᴘᴀᴅ (the gold key) before the function key.

Note: Some functions are only valid on certain screens.

HOW TO INPUT DATA ON ADAMS ACTION SCREENS

The previous section discusses use of the regular keyboard and the keypad for ADAMS input. To move through the fields on action screens, press <RET> except when entering a paging or scrolling region. Scrolling regions are indicated by rectangular boxes on screens. The field name for a scrolling region is located at the top left-hand corner of the rectangular box. Paging regions are indicated by left [and right] surrounding the paging region. To move to one of these regions, press <1>KEYPAD. Do not press <RET> after typing in the last entry in a paging or scrolling region or the system expects more data and will not write the record.

By default you are in overstrike mode, when typing text in ADAMS. This means you can type over any information you have previously typed. If an error is made when entering information, the left and right arrow keys move the cursor left and right within the field and <BACK> moves the cursor back to the previous field so the error can be corrected. <Delete> deletes the character to the left of the cursor only when the cursor is on the blank space at the end of the line. <Line Feed> deletes the contents of the field that the cursor is on.

By pressing <PF1>KEYPAD <PF3>KEYPAD, you can enter insert mode to enter text midway in a line (all characters to the right of the cursor will move to the right). <Delete> deletes the character to the left of the cursor anywhere in the line. <Line Feed> deletes the contents of the field the cursor is on. Pressing <PF3>KEYPAD takes you from insert mode back to overstrike mode.

The phone field for the categories Contributors and Institutions has the format ( ) − . The cursor jumps over the parentheses and the hyphens when a phone number is being entered.

The operators < (less than), > (greater than), and - (hyphen), can be used to specify ranges of dates on action screens. For example,

< 01/01/84	all records before January 1, 1984
> 01/01/84	all records on or after January 1, 1984
01/01/84 - 01/01/85	all records from and including January 1, 1984 through January 1, 1985

Since ADAMS does not have auto wrap on action screens, you must press <RET> when you come to the end of the line in a scrolling region to get to the next line.

When entering information in the Group field on action screens, you must enter the names of one or more groups. To view the list of existing groups, press <PF1>KEYPAD <PF2>KEYPAD.

SETTING UP TEMPLATES FOR DATA RECORD RETRIEVAL

The browse, update, and delete functions operate on a working set of database records that are retrieved using a search template containing field values that qualify the search. There are separate action screens for each function type. You can page through the working set once it has been retrieved to selectively examine, update, or delete records.

A template specifies which record(s) will be retrieved. Only records with information matching the information you enter in template fields are retrieved. Enter information in template fields on an action screen, then press <Enter>KEYPAD to cause the record(s) to be retrieved. Fields can include:

- numerical idents assigned when record was created by ADAMS
- username of person who created the record
- creation date(s), either explicit or qualified by operators
- other fields specific to the type of record

The result is a set of report screens to browse, update or delete, depending on the context.

THE BROWSE FUNCTION: EXAMINING ENTRIES

Database records in ten subcategories under Database Operations and the three subcategories under Maintenance Operations can be examined with the browse function (See *Appendix B — The ADAMS Menu Tree Structure* for a description of ADAM's menu structure). Records cannot be added, updated, or deleted while browsing.

All existing records under a subcategory of Database Operations or Maintenance Operations or a subset of specific records can be retrieved for browsing by setting up a template to qualify the search (see the previous section on how to set up a template). To browse all records, press <Enter>KEYPAD on an empty template. To browse a specific set of records, set up a template[1] and press <Enter>KEYPAD. The system reponds 'Reading records'. If no records match the search criteria, the system responds with 'No records found'. If records do exist, a report screen containing the first record will appear and a system message that contains the number of records placed in the working set will be displayed.

Access to individual records depends on your account's security level and the type of record. For a discussion of security levels, see *Chapters 5* and *6*.

---

[1] Set up the template by entering values in the field(s) that will restrict the database search to the records of interest.

THE ADD FUNCTION: CREATING ENTRIES

The add function creates database records for all Database Operations except Notebook. Notebook entries are created with the command <.>KEYPAD. The add function also creates database records for all Maintenance Operations except Logon and Logoff. Logon records are created when ADAMS is invoked, and Logoff records when ADAMS is exited.

To add a new record, type data at the appropriate field prompts, then enter the information into the system by pressing <Enter>KEYPAD. The system replies 'Writing record'. Remember, there are scrolling and paging regions as well as single and multi-line input fields. To move to scrolling and paging regions, press <1>KEYPAD.

By default you are in overstrike mode when typing text in ADAMS. To enter insert mode, press <PF1>KEYPAD<PF3>KEYPAD (see *How to Input Data on ADAMS Action Screens* in this chapter for a detailed explanation of each mode).

Access to individual records depends on your account's security level and the type of record. For a discussion of security levels, see *Chapters 5* and *6*.

THE UPDATE FUNCTION: MODIFYING ENTRIES

The update function is valid for all ten Database Operations subcategories and three Maintenance Operations subcategories. Logon and Logoff information can be deleted but not updated.

To update a record(s), one or more records must first be retrieved by setting up a template to qualify the database search. Once the records to be updated have been retrieved, the updated information is typed directly over the existing data if a field is full.

By default you are in overstrike mode when typing text in ADAMS. To enter insert mode, press <PF1>ᴋᴇʏᴘᴀᴅ<PF3>ᴋᴇʏᴘᴀᴅ (see *How to Input Data on ADAMS Action Screens* in this chapter for a detailed explanation of each mode).

Access to individual records depends on your account's security level and the type of record. For a discussion of security levels, see *Chapters 5* and *6*.

THE DELETE FUNCTION: DELETING ENTRIES

To delete a specific set of records, set up a template to qualify the search. After the records have been retrieved, press <Enter>ᴋᴇʏᴘᴀᴅ to delete the records. The system responds with 'X records to be deleted. Do you want to do this?'. Enter Y <RET> to delete records, and the system responds with 'Deleting records'. Enter N <RET> to terminate the deletion request (i.e., if an error has been made in setting up the search template). The system responds with 'No records deleted'. To delete all of the records in a subcategory, press <Enter>ᴋᴇʏᴘᴀᴅ without setting up a template to retrieve the records and then press <Enter>ᴋᴇʏᴘᴀᴅ again to delete the records. The system responds with the same system message as given above. This is a safety measure to reduce the chances of accidentally deleting all records in the database.

Access to individual records depends on your account's security level and the type of record. For a discussion of security levels, see *Chapters 5* and *6*.

Chapter 4 — Tutorial: A Tour Through the ADAMS System

A TUTORIAL:
LOGGING ON AND INVOKING THE ADAMS SYSTEM

To work through this tutorial, enter the information that appears in boldface on the sample screens. Sample screens are presented opposite the pages of text that describe them. Certain repetitive screens are not illustrated in the tutorial. These screens are flagged with a statement in the text. See the *AIRLAB User's Guide* for more information on using VAX/VMS and terminals. *Note:* You should work through the tutorial from start to finish in a single terminal session.

Logging on to VMS

1. You begin the logon procedure by communicating with 'the Bridge.' Press <RET>. The operating system will respond with User Name>. In response, enter **GO Sn** where n is the number of the computer you wish to use (i.e., S1 = AIR1). The bridge will connect you to the specified computer.

2. Now, log on to the VAX/VMS operating system by executing these two steps:

    a. Type your **username** <RET> after the Username: prompt. After accepting your username, the system displays a password prompt.

    b. Type your **password** <RET>. Notice that the system does not display the password; this is a security measure. If an improper username or password is entered, the system will respond with the message, 'User authorization failure'. If this message appears, you must begin the logon procedure again. If the operating system recognizes the username and password, the VMS prompt '$' appears. Contact your AIRLAB VAX/VMS system personnel if you can't get your username and password to work.

Logging on to ADAMS

1. Now log on to ADAMS by typing (in either upper or lower case) **ADAMS** after the VMS prompt. If you can't get into ADAMS, contact the ADAMS system manager to become a validated ADAMS user.

2. The ADAMS Logon screen appears. Type in the Purpose that is in boldface on the example screen on the opposite page. Press <Enter>ᴋᴇʏᴘᴀᴅ or <RET> to get to the next screen.

3. The Main Menu appears next. Choose option 1, Database Operations, as shown on the sample screen. A <RET> is needed if you type 1 on the keyboard; no <RET> is needed if you type 1 on the numeric keypad.

4. The next menu screen displayed is Database operations. Choose option 5, Documentation. This screen is not shown.

Unused Page

ADAMS
Add Logon Info

Username: JAS
Machine: 1
Time: 06/14/85:12:30:01
Purpose: **To work through the tutorial**▯

PF2 = Help   Enter = Do

(LOGON)

ADAMS
Main Menu

1. Database operations
2. Maintenance operations
3. Enter VMS
4. Logoff

<Enter> = Do   <PF2> = Help   <.> = Make Note

Enter choice: 1 ▯   (MAIN_MN)

A TUTORIAL:
ADDING AN ENTRY TO THE DATABASE

In this section you will add a Documentation record to the ADAMS database.

Adding a Documentation Entry

1. The Documentation menu screen is now on the terminal. Choose option 2, Add.

2. The Add Documentation action screen is next. After completing all indicated fields on the screen, enter the information into the system by pressing <Enter>ᴋᴇʏᴘᴀᴅ. The system will respond with the message 'Writing record' and a fresh add screen will appear. *Note:* You will not be entering information at every field on the Documentation screen.

3. To exit the add screen, press <0>ᴋᴇʏᴘᴀᴅ. Now choose option 1 on the Documentation Menu screen. The second occurrence of the Documentation Menu screen is not shown.

ADAMS
Documentation Menu

```
1. Browse
2. Add
3  Update
4  Delete
```

<Enter> = Do   <PF2> = Help   <0> = Exit Screen   <.> = Make Note

Enter choice: 2 ▫   (DOC_MN)

ADAMS
Add Documentation

```
    Doc Id:  CT-001
    Vendor:  COMPUTER TIMES
   Subject:  AI DEMO
  Part Num:
    Hw/Sw:   S
     Title:  The Need for AI in Today's World▫

   Remarks:

  Keywords:  [AI                    ]
```

<Enter> = Do   <PF2> = Help   <0> = Exit Screen

                                                        (A_DOC_AS)

A TUTORIAL:
BROWSING THROUGH THE DATABASE

In this section you will examine the Documentation record created in the previous tutorial section by invoking the browse function.

Browsing a Documentation Entry

1. The Documentation Selection action screen is now on the terminal. Enter **AI DEMO** for Subject to qualify the search. Then press <Enter>ᴋᴇʏᴘᴀᴅ to begin the search . The system responds with the message 'Reading records'.

2. The requested documentation report screen is displayed. The system responds with the message '1 record found'.

3. To exit the report screen, press <0>ᴋᴇʏᴘᴀᴅ. You are now back to Documentation Selection. Press <0>ᴋᴇʏᴘᴀᴅ again to return to the Documentation Menu screen. Now choose option 3, Update, on the Documentation Menu screen. This screen is not shown.

```
                  ADAMS
            Documentation Selection



          Doc Id:
          Vendor:
          Subject:   AI DEMO▢
         Part Num:
           Hw/Sw:


            Title:
          Remarks:

          Keywords:



     ┌─────────────────────────────────────────────┐
     │ <Enter> = Do      <PF2> = Help    <0> = Exit Screen │
     └─────────────────────────────────────────────┘


                                          (B_DOC_AS)
```

```
                  ADAMS
            Browse Documentation



          Ident:   CT-001
          Vendor:  COMPUTER TIMES
          Subject: AI DEMO
         Part Num·
           Hw/Sw:  S
            Title: The Need for AI in Today's World


          Remarks:

          Keywords:  [AI                    ]
     ┌──────────────────────────────────────────────────┐
     │ <Enter> = Do        <PF2> = Help   <-> = Prev Record │
     │ <0>     = Exit Screen <7/8> = Print  <,> = Next Record │
     └──────────────────────────────────────────────────┘

     1 record found                          (B_DOC_AS)
```

A TUTORIAL:
UPDATING AN EXISTING DATABASE ENTRY

In this section you will update the Documentation record created previously by invoking the update function.

Updating a Documentation Entry

1. The Documentation Selection action screen is now on the terminal. First, qualify the search by entering **COMPUTER TIMES** for Vendor. Then press <Enter>keypad to begin the search. The system responds with the message 'Reading records'. This screen is not shown.

2. The update screen that has been requested is displayed. The system responds with the message '1 record found'.

3. Now input the information that appears in boldface on the second sample screen. After completing the update, enter the updated record into the system by pressing <Enter>keypad. The system responds with the message 'updating record'.

4. To exit this update screen, press <0>keypad. Now choose option **4**, delete, on the Documentation Menu screen. This screen is not shown.

ADAMS
Update Documentation

```
Doc Id:    CT-001
Vendor:    COMPUTER TIMES
Subject:   AI DEMO
Part Num:
Hw/Sw:     S
Title:     The Need for AI in Todays' World
Remarks:

Keywords:  [AI                    ]
```

<Enter> = Do	<PF2> = Help	<-> = Prev Record
<0> = Exit Screen	<7/8> = Print	<,> = Next Record

1 record found.   (U_DOC_AS)

ADAMS
Update Documentation

```
Doc Id:    CT-001
Vendor:    COMPUTER TIMES
Subject:   AI DEMO
Part Num:  DEMO-732CT
Hw/Sw:     S
Title:     The Need for AI in Todays' World
Remarks:   Anywhere, USA□

Keywords:  [AI                    ]
```

<Enter> = Do	<PF2> = Help	<-> = Prev Record
<0> = Exit Screen	<7/8> = Print	<,> = Next Record

1 record found   (U_DOC_AS)

A TUTORIAL:
DELETING AN EXISTING DATABASE ENTRY

In this section you will delete the Documentation record you just updated.

Deleting a Documentation Entry

1. The Documentation Selection action screen is now on the terminal. Enter **AI DEMO** for the Subject field to qualify the search. Now press <Enter>KEYPAD to begin the search. The system responds with the message 'Reading records'.

2. The report screen that has been requested is displayed. The system responds with the message '1 record found'.

3. To delete this record, press <Enter>KEYPAD. The system responds with '1 record will be deleted. Do you want to do this?'. Enter y to delete the record. The system responds with the message 'Deleting records'.

4. To exit Documentation Selection, press <0>KEYPAD. Now choose the command make note by pressing <.>KEYPAD. This screen is not shown.

ADAMS
Documentation Selection

Doc Id:
Vendor:
Subject: **AI DEMO**◻
Part Num:
Hw/Sw:

Title:
Remarks:

Keywords:

<Enter> = Do	<PF2> = Help	<0> = Exit Screen

(D_DOC_AS)

ADAMS
Delete Documentation

Ident: 1
Vendor: COMPUTER TIMES
Subject: AI DEMO
Part Num: DEMO-732CT
Hw/Sw: S
Title: The Need for AI in Today's World
Remarks: Anywhere, USA

Keywords: [AI   ]   •

<Enter> = Do	<PF2> = Help	<-> = Prev Record
<0> = Exit Screen	<7/8> = Print	<,> = Next Record

1 record found   (D_DOC_AS)

A TUTORIAL:
ENTERING A NOTE IN THE ADAMS NOTEBOOK

Entering a Note

1. The Add Notebook Entry action screen is now on the terminal. The Username, Group, Ident and Date fields are automatically generated by the system. Username is the account you used to log on to VAX/VMS. The default value of Group is PERSONAL but can be changed to any group you're a member of. To delete PERSONAL, press <Linefeed>. To look at groups that can be entered in this field (besides PERSONAL), press <PF1>ĸᴇʏᴘᴀᴅ<PF2>ĸᴇʏᴘᴀᴅ. Ident is an integer that is automatically generated when a new note is entered. Date is assigned the current date and time.

2. The prompt is on Group. To move to the keyword field, press <RET>. Press <PF1>ĸᴇʏᴘᴀᴅ (the Gold Key) <Enter>ĸᴇʏᴘᴀᴅ after entering the keyword, Flight. The PF1 and Enter keys are used only when entering new keywords.

3. To add the note that is on the sample screen, press <1>ĸᴇʏᴘᴀᴅ to enter the Text field. Now type from the regular keyboard to make your entry.

4. To write the entry, press <Enter>ĸᴇʏᴘᴀᴅ. The system responds with 'Writing note'. You can write the entry while the cursor is still in the Text field.

5. To exit Add Notebook Entry, press <0>ĸᴇʏᴘᴀᴅ.

ADAMS
Add Notebook Entry

Username: JAS   Keyword: [FLIGHT   ]
   Group: PERSONAL
   Ident: 1
   Date: 06/17/85:15:24:31

For application section, need to develop a complete example showing process
of generating an interpreter:
1. Grammar: extend BEXP to include functions on boolean expressions
2. Rewrite rules: general OR, binary AND
3. Consistency: check rewrite rules, identifying intersections of LHS□

\<Up\> = Prev line	\<Enter\> = Do	\<7/8\> = Print	\<-\> = Prev Screen
\<Down\> = Next line	\<0\> = Exit Screen	\<PF2\> = Help	\<,\> = Next Screen

(A_NOTE_AS)

A TUTORIAL:
LEAVING THE ADAMS SYSTEM AND LOGGING OFF

Logging off of ADAMS

1. The Documentation Menu menu screen is now on the terminal. This screen is not shown.

2. Type **LOGOFF** or the abbreviation **LO** at the Enter choice prompt.

3. The Logoff Screen appears on the terminal. Note that 'Remarks' is an optional field. Press **<RET>** to leave the ADAMS system.

4. The ADAMS session is now complete, and you are now back to VMS. A '$' prompt is displayed. Type **lo** to logoff VMS, or **ADAMS** to execute ADAMS again.

Note: Now that you've worked through the tutorial, you may want to read *Appendix D* which describes how ADAMS was used to support a software reliability program at AIRLAB.

ADAMS
Add Logoff

Username: JAS
Machine: 1
Time: 06/14/85:13:28:10
Remarks: **Tutorial complete□**

```
PF2 = Help          Enter = Do
```

(LOGOFF)

Chapter 5 — ADAMS Database Operations

WHAT ARE THE DATABASE OPERATIONS

The Database Operations menu contains several action screens and the following three submenus.

1. Software/Hardware Units
2. Archives
3. Data

The Database Operations actions screens are:

Contributors	AIRLAB personnel who use the ADAMS system or contribute to a project in some way.
Experiments	Research experiments under an AIRLAB project.
Institutions	Names of organizations or institutions that are conducting experiments at AIRLAB.
Software Trouble Report	Selected from a submenu under Software/Hardware Units. Descriptions of inhouse or vendor software bugs and fixes to them.
Inhouse Software	Selected from a submenu under Software/Hardware Units. Software written at AIRLAB to support experiments.
Vendor Software	Selected from a submenu under Software/Hardware Units. Software purchased from vendors to support AIRLAB experiments.
Hardware	Selected from a submenu under Software/Hardware Units. Hardware that supports AIRLAB experiments that is either owned by AIRLAB or brought in by other institutions for research projects.
Documentation	User manuals, guides, etc. All types of documentation for software or hardware, either written at AIRLAB or vendor-supplied.
Personal Keywords	List of keywords developed by the user for retrieving personal database entries. Group keywords are created and changed by the project leader.
Archive Medium	Selected from a submenu under Archives. Information about tapes, discs, and other storage media on which project files either are archived or can be archived.
Data Archive	Selected from a submenu under Archives. Tells what data has been archived by which project members. Users may archive their own data; see the

Software Archive	Selected from a submenu under Archives. Shows when and to which device project support software was archived.
Processed Data	Selected from a submenu under Data. Describes processed experimental data and the analyses that were performed during processing.
Raw Data	Selected from a submenu under Data. Describes unprocessed experimental data.
Technical Papers	Contains bibliographic entries for technical papers of interest to a project's members, including papers published by contributors, papers used as references during an experiment, and papers written as a result of an experiment.
Notebook	Experimenter's or engineer's notebook; personal and shared group notes written during an AIRLAB experiment.

The Database Operations menu structure is illustrated as an inverted tree in *Appendix B*, which shows the first few levels of the branching system labeled with screen mnemonics. *Appendix C* provides a list of screen mnemonics and their definitions arranged alphabetically for reference.

The general format and contents of menu, action, and report screens are discussed in *Chapter 2*. Database record manipulation is discussed in *Chapter 3*. The manipulation of single line fields, multi-line fields, paging regions, and scrolling regions is discussed in the section *How to Input Data on ADAMS Action Screens* in *Chapter 3*.

Unused Page

SECURITY LEVELS AND DATABASE MANIPULATION

The access permitted to ADAMS users with system (S), project (P), and group (G) privileges for the various Database Operations screens is described in the table on the opposite page. Each account permission column in the table is divided into Read and Write subcolumns. Read permission means a user can browse an entry in the screen, but not add new entries or change or delete existing entries; Write permission means a user can browse, add, update, or delete entries in the screen.

Four character codes indicate the amount of access permitted to a screen:

X	No access is permitted to this category.
O	Owner: only the username that created the data in this category may access it.
G	Group: in this category, a user may access data created by anyone in the groups the user belongs to.
A	All: in this category, a user may access any data on the system.

DATABASE OPERATIONS SCREEN ACCESS

	Group		Project		System	
	Read	Write	Read	Write	Read	Write
Contributors	A	X	A	X	A	A
Experiments	G	G	G	G	G	G
Institution	A	X	A	X	A	A
Software Trouble Report	G	G	G	G	G	G
Inhouse Software	G	G	G	G	G	G
Vendor Software	A	A	A	A	A	A
Hardware Unit	G	G	G	G	G	G
Documentation	A	A	A	A	A	A
Personal Keywords	O	O	O	O	O	O
Archive Medium	A	A	A	A	A	A
Data Archive	G	O	G	O	G	O
Software Archive	G	O	G	O	G	O
Processed Data	G	O	G	O	G	O
Raw Data	G	O	G	O	G	O
Technical Papers	A	A	A	A	A	A
Notebook	G	O	G	O	G	O

CONTRIBUTOR DATABASE OPERATION

Contributors are AIRLAB personnel who use the ADAMS system to support their work. Only system managers can add, update or delete a contributor database record. Project leaders and group members can browse all contributor records on the system but cannot add, update or delete contributor records.

Data in the Contributor screen is manipulated using the browse, add, update, and delete functions described in *Chapter 3 — Manipulating the ADAMS Database*.

A sample Contributor screen is presented in the figure on the opposite page. Contributor screen fields are described in the table below.

CONTRIBUTOR SCREEN FIELDS

Field Name	Mandatory?	Description
Username:	Yes	Single line input
Name:	Yes	Single line input
Address:	No	Multi-line input
Phone:	No	Single line input
Job Title:	No	Single line input
Job Desc:	No	Multi-line input

ADAMS
Browse Contributor

Username: JAS
Name: John Smith
Address: Anywhere
   U.S.A.

Phone: (555)-111-0000

Job Title: Computer scientist
Job Desc.:   Conduct research on phase one of AIRLAB
   experiment - flight control system prototype

<7/8>	= Print	<0>	= Exit Screen	<->	= Prev Screen
<PF2>	= Help	<Enter>	= Do	<,>	= Next Screen

(B_CONT_AS)

EXPERIMENT DATABASE OPERATION

Experiments are the AIRLAB experiments that a group is working on under a project. System managers, project leaders and group members can add new records and browse, update, and delete any experiment records that were created by someone in the group(s) they belong to.

Data in the Experiment screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 - Manipulating the ADAMS Database*.

A sample Experiment screen is presented in the figure on the opposite page. Experiment screen fields are described in the table below.

EXPERIMENT SCREEN FIELDS

Field Name	Mandatory?	Description
Ident:	Automatically generated	Integer record identifier
Group:	Yes	Must enter group that already exists
Name:	Yes	Single line input
Desc:	No	Multi-line input
Username:	No	Paging region
Inst:	No	Paging region
Keyword:	No	Paging region
Sw Name:	No	Paging region
Ver:	No	Paging region

ADAMS
Browse Experiment

Ident: 3   Group: CONTROL
Name: SW RELATED HW ERRORS
Desc: Investigates flight control software errors
        which result from hardware malfunctions

Username: [JAS   ]

Inst: [Contract Research Inc   ]

Keyword: [SOFTWARE   ]
          HARDWARE

Sw Name: [FLIGHT I   Ver: 1.0   ]

<0> = Exit Scr	<7/8> = Print	<-> = Prev Scr
<Enter> = Do	<PF2> = Help	<,> = Next Scr

(B_EXP_AS)

INSTITUTION DATABASE OPERATION

Institutions are organizations that are conducting experiments at AIRLAB. Only system managers can add, update or delete an institution database record. Project leaders and users can browse all institution records on the system but cannot add, update or delete any institution records.

Data in the Institution screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 - Manipulating the ADAMS Database*.

A sample Institution screen is presented in the figure on the opposite page. Institution screen fields are described in the table below.

INSTITUTION SCREEN FIELDS

Field Name	Mandatory?	Description
Inst. Id:	Yes	Single line input
Name:	Yes	Multi-line input
Dept:	No	Multi-line input
Address:	No	Multi-line input
Phone:	No	Single line input
Purpose:	No	Multi-line input
Keyword:	No	Paging region

ADAMS
Browse Institution

Inst Id: CRI
Name: Contract Research Inc

Dept: Software Development

Address: Anywhere
U.S.A.

Phone: (111)-555-0000
Purpose: To coordinate research on phase one of AIRLAB
experiment - flight control software

Keyword: [SOFTWARE
FLIGHT]

<7/8> = Print	<,> = Next Screen	<-> = Prev Screen
<PF2> = Help	<Enter> = Do	<0> = Exit Screen

(B_INST_AS)

SOFTWARE/HARDWARE DATABASE OPERATION
SOFTWARE TROUBLE REPORT SCREEN

Software Trouble Report describes software bugs and fixes to them. System managers, project leaders, and group members can add new records and browse, update, and delete any software trouble reports that were created by someone in the group(s) they belong to.

Data in the Software Trouble Report screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 - Manipulating the ADAMS Database*.

A sample Software Trouble Report screen is presented in the figure on the opposite page. Software Trouble Report screen fields are described in the table below.

SOFTWARE TROUBLE REPORT FIELDS

Field Name	Mandatory?	Description
Name:	Yes	Single line input
Version:	Yes	Single line input
Status:	Yes	Single line input
Ident:	Automatically generated	Integer record identifier
Group:	Yes	Must enter existing groups(s)
Username:	Automatically generated	Who is making report
Machine:	Automatically generated	What machine logged on to
Rpt Date:	Automatically generated	Date reported
Fix Date:	No	Single line input
Rpt Text	Yes	Scrolling region (1st box)
Fix Text	No	Scrolling region (2nd box)

ADAMS
Browse Software Trouble Report

Name:	FLIGHT I				
Version:	1.0	Group:	AXIS	Rpt Date:	06/02/85
Status:	FIXED	Username:	JAS	Fix Date:	06/03/85
Ident:	3	Machine:	1		

Fatal error in Pilot Interface I screen. Blows up in "dologon" and
"dologoff" if user types more than one line of information. Error
messages are "error during get" (pascal) and "terminator not seen".

Fixed. Changed to screen.

\<Up\>	= Prev line	\<Enter\>	= Do	\<7/8\>	= Print \<-\> = Prev Scr.
\<Down\>	= Next line	\<0\>	= Exit Scr.	\<PF2\>	= Help \<,\> = Next Scr.

(B_SW_TR_AS)

SOFTWARE/HARDWARE DATABASE OPERATION
INHOUSE SOFTWARE

Inhouse Software describes software written at AIRLAB to support AIRLAB experiments. System managers, project leaders, and group members can add new records and browse, update, and delete any inhouse software record that has been created by someone in the group(s) they belong to.

Data in the Inhouse Software screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 - Manipulating the ADAMS Database*.

A sample Inhouse Software screen is presented in the figure on the opposite page. Inhouse Software screens fields are described in the table below.

INHOUSE SOFTWARE REPORT FIELDS

Field Name	Mandatory?	Description
Name:	Yes	Single line input
Version:	Yes	Single line input
Online?	No	Yes or no answer
Group:	Yes	Must enter existing group(s)
Date:	No	Single line input
Author:	No	Single line input Person who wrote software.
Expert:	No	Single line input. Someone who knows a lot about using software.
Desc:	No	Multi-line input
Add. Info:	No	Multi-line input
Keywords:	No	Paging region
Location	No	Scrolling region

ADAMS
Browse Inhouse Software

Name: Flight Interface   Group: AXIS
Version: 1.2   Online? Y   Date: 06/01/85
Author: JAS   John A. Smith
Expert: JSD   Jane S. Doe
Desc: Provides an easy method for creating an input
         file to be used with FLIGHT I

Add Info: A user's guide is available
           Ask JSD

Keywords: [FLIGHT   ]

VAX/VMS operating system

| `<Up>`   = Prev Line | `<Enter>` = Do | `<7/8>` = Print | `<->` = Prev Scr. |
| `<Down>` = Next Line | `<0>`   = Exit Scr.| `<PF2>` = Help | `<,>` = Next Scr. |

(B_IN_SW_AS)

SOFTWARE/HARDWARE DATABASE OPERATION
VENDOR SOFTWARE SCREEN

Vendor Software describes software purchased from non-AIRLAB vendors to support AIRLAB experiments. System managers, project leaders, and group members can add a new record and browse, update, and delete any vendor software record that was created by someone in the group(s) they belong to.

Data in the Vendor Software screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 - Manipulating the ADAMS Database*.

A sample Vendor Software screen is presented in the figure on the opposite page. Vendor Software screen fields are described in the table below.

VENDOR SOFTWARE FIELDS

Field Name	Mandatory?	Description
Name:	Yes	Single line input
Vendor:	Yes	Multi-line input
Version:	Yes	Single line input
Date:	No	Single line input
Expert:	No	Single line input. Someone who knows a lot about using software.
Desc:	No	Multi-line input
Add Info:	No	Multi-line input
Keywords:	No	Paging region
Location:	No	Scrolling region

ADAMS
Browse Vendor Software

Name: MASS11   Version: 4-B
Vendor: DEC   Date: 06/01/85

Expert: JSD   Jane S. Doe
Desc: Word processing package

Add Info: Call by M11

Keywords: [MASS11   ]

AIR5

`<Up>`	= Prev Line	`<Enter>`	= Do	`<7/8>`	= Print	`<->`	= Prev Scr.
`<Down>`	= Next Line	`<0>`	= Exit Scr.	`<PF2>`	= Help	`<,>`	= Next Scr.

(B_VEND_SW_AS)

SOFTWARE/HARDWARE UNIT DATABASE OPERATION
HARDWARE UNIT SCREEN

Hardware Units describes hardware that supports AIRLAB experiments. The hardware may be owned by AIRLAB or brought in by other companies for research projects. Any ADAMS user may add a Hardware Unit record to the database, and browse, update, or delete records created by anyone in the groups he belongs to.

Data in the Hardware Unit screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database.*

A sample Hardware Unit screen is presented in the figure on the opposite page. Hardware Unit screen fields are described in the table below.

HARDWARE UNIT SCREEN FIELDS

Field Name	Mandatory?	Description
Inven No:	Yes	Single line input. Integers only.
Machine:	No	Single line input
Room:	Yes	Single line input
Building:	Yes	Single line input
Group:	Yes	Must enter existing group(s)
Hw Name:	Yes	Single line input
Serial No:	No	Single line input
Manufact.:	No	Single line input
Model No:	No	Single line input
Status:	No	Single line input
Cost:	No	Single line input
Comments:	No	Multi-line input
Keywords:	No	Paging region

ADAMS
Browse Hardware Unit

Inventory No: 71850   Hw Name: VAX
Machine: 1   Serial No: A543210ZB9
Room/Building: 123/1220   Manfact.:   DEC
Group: AXIS   Model No: 11/780

Status: Installed
Cost: $40000.00
Comments:

Keywords: [VAX   ]

<7/8> = Print <0>	= Exit Scr <->	= Prev Scr <Up>	= Prev Entry
<PF2> = Help <Enter>	= Do	<,> = Next Scr <Down>	= Next Entry

(B_HW_AS)

DOCUMENTATION DATABASE OPERATION

Documentation consists of all user manuals, guides, and other media used during an AIRLAB project. This includes inhouse and vendor-supplied documentation. System managers, project leaders, and group members can add a new record and browse, update, and delete any documentation record that was created by any ADAMS user.

Data in the Documentation screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database.*

A sample Documentation screen is presented in the figure on the opposite page. Documentation screen fields are described in the table below.

DOCUMENTATION SCREEN FIELDS

Field Name	Mandatory?	Description
Doc Id:	Yes	Formatted input. 2 characters - 3 numerals.
Vendor:	Yes	Single line input
Subject:	No	Single line input
Part Num:	No	Single line input
Hw/Sw:	No	Single line input Valid inputs - H or S
Title:	No	Multi-line input
Remarks:	No	Multi-line input
Keywords:	Yes	Paging region

ADAMS
Browse Documentation

Doc Id: AA-111
Vendor: DEC
Subject: VAX/VMS
Part Num: AA-Z502A-TE
Hw/Sw: S
Title: VAX/VMS Run-Time Library Routines Reference Manual

Remarks: Maynard, MA

Keywords: VAX
    SOFTWARE

\<Enter\> = Do	\<PF2\> = Help	\<-\> = Prev Record
\<0\> = Exit Screen	\<7/8\> = Print	\<,\> = Next Record

(B_DOC_AS)

PERSONAL KEYWORDS DATABASE OPERATION

Personal Keywords are identifiers defined by the individual ADAMS user to tag and later retrieve database records. All ADAMS users can access only those personal keywords they've defined. Group keywords are defined by the project leader and can be used by anyone in the group.

Data in the Personal Keywords screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample Personal Keywords screen is presented in the figure on the opposite page. Personal Keywords screen fields are described in the table below.

PERSONAL KEYWORDS SCREEN FIELDS

Field Name	Mandatory?	Description
Username:	Automatically generated	Single line field
Keyword:	Yes	Single line input

ADAMS
Browse Personal Keyword

Username	Keyword
→ JAS	MASS11
JAS	SOFTWARE
JAS	FLIGHT

\<Enter\>	= Do	\<PF2\>	= Help	\<Up\>	= Prev Record
\<0\>	= Exit Screen	\<7/8\>	= Print	\<Down\>	= Next Record

(B_PERS_KEY_AS)

ARCHIVE DATABASE OPERATION
ARCHIVE MEDIUM SCREEN

The Archive Medium screen contains information about tapes, disks, and so on which are available at AIRLAB for archiving files. All ADAMS users can add a new record and browse, update, and delete any existing archive medium record.

Data in the Archive Medium screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample Archive Medium screen is presented in the figure on the opposite page. Archive Medium screen fields are described in the table below.

ARCHIVE MEDIUM SCREEN FIELDS

Field Name	Mandatory?	Description
Archive ID:	Yes	Storage identifier. Single line input.
Archive Type:	Yes	Type of storage medium. Single-line input.
Room/Building:	Yes	Building/Room (integers). Single line input.
Comments:	No	Multi-line input

ADAMS
Browse Archive Medium

Archive ID: T123A
Archive Type: 1600 BPI TAPE

Room/Building: 123/1220
Comments: Software Failure Data

\<Enter\> = Do	\<PF2\> = Help	\<-\> = Prev Record
\<0\> = Exit Screen	\<7/8\> = Print	\<,\> = Next Record

(B_ARC_MED_AS)

ARCHIVE DATABASE OPERATION
DATA ARCHIVE SCREEN

The Data Archive screen tells what data has been archived by which AIRLAB contributors. Users may archive their own data (see the *AIRLAB User Guide* for more information). ADAMS users may browse any Data Archive records created by members of their group and add new records to the database, but can only delete and update records they've personally created.

Data in the Data Archive screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample Data Archive screen is presented in the figure on the opposite page. Data Archive screen fields are described in the table below.

DATA ARCHIVE SCREEN FIELDS

Field Name	Mandatory?	Description
Date:	Automatically generated	Single line field
Username:	Automatically generated	Single line field
Group:	Yes	Must be existing group(s)
Table?	Yes	Yes if Oracle table, no otherwise
Data Name:	Yes	Single line input
Archive ID:	Yes	Storage identifier. Single line input
Archive Type:	Yes	Type of storage medium. Single line input
Comments:	No	Multi-line input
Keywords:	No	Paging region

ADAMS
Browse Data Archive

Date:	06/01/85:17:05:03	Keywords:	[FLIGHT]
Username:	JSD		
Group:	AXIS		

Table: N

Data Name: SOFTWARE FAILURE DATA

Archive ID: T123A

Archive Type: 1600 BPI TAPE

Comments: There is an estimated 20 megabytes of
software failure time for experiment A of
Flight I.

\<Enter\> = Do	\<PF2\> = Help	\<-\> = Prev Record
\<0\> = Exit Screen	\<7/8\> = Print	\<,\> = Next Record

(B_DATA_AR_AS)

ARCHIVE DATABASE OPERATION
SOFTWARE ARCHIVE SCREEN

The Software Data Archive screen tells what AIRLAB software has been archived and on which devices. ADAMS users may browse any Software Archive records created by members of their group and add new records to the database, but can only delete and update records they've personally created.

Data in the Software Archive screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample Software Archive screen is presented in the figure on the opposite page. Software Archive screen fields are described in the table below.

SOFTWARE ARCHIVE SCREEN FIELDS

Field Name	Mandatory?	Description
Date:	Automatically generated	Single line field
Username:	Automatically generated	Single line field
Group:	Yes	Must enter existing group(s)
Sw Name:	Yes	Single line input
Sw Version:	Yes	Single line input
Archive Id:	Yes	Single line input
Archive Type:	Yes	Single line input
Comments:	No	Multi-line input

ADAMS
Browse Software Archive

Date: 06/01/85:17:05:03
Username: JAS
Group: AXIS

Sw Name: Flight Interface
Sw Version: 1.0
Archive ID: T123B
Archive Type: 1600 BPI Tape

Comments:

<Enter> = Do	<PF2> = Help	<-> = Prev Record
<0> = Exit Screen	<7/8> = Print	<,> = Next Record

(B_SW_ARC_AS)

DATA DATABASE OPERATION
PROCESSED DATA SCREEN

The Processed Data screen provides information about processed AIRLAB experimental data and the analyses applied to the data. ADAMS users may read any Processed Data records created by members of their group and add new records to the database, but can only delete and update records they've personally created.

Data in the Processed Data screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample Processed Data screen is presented in the figure on the opposite page. Processed Data screen fields are described in the table below.

PROCESSED DATA SCREEN FIELDS

Field Name	Mandatory?	Description
Data Name:	Yes	Single line input
Format:	No	Physical structure of data. Single line input.
Location:	No	Single line input
Username:	Automatically generated	Single line field
Time:	Automatically Generated	Single line field
Group:	Yes	Must be existing group(s)
Rec Count:	No	Single line input
Table?	Yes	Yes if Oracle table, no otherwise.
Archived?	Yes	Yes or no response
Desc:	No	Multi-line input
Analysis:	No	Analysis performed on data. Single line input.
Keywords:	No	Paging region
Software:	Yes	Scrolling region. Tab between name and version.

ADAMS

Browse Processed Data

Data Name: SOFTWARE ERROR RATES Username: JSD
  Format: Matrix of Error Rates   Time: 06/15/85:14:23:59
 Location: RATES.FOR   Group: AXIS
Rec Count: 5M   Table? N Archived? N
   Desc: Matrix contains error rates
      Rows indicate modules, Columns are Fault IDs
 Analysis: Run Flight Interface

Keywords: $\begin{bmatrix} \text{SOFTWARE} \\ \text{ERROR RATES} \end{bmatrix}$

1::DISK$SHEMP:[JSD.EXP]RATES.FOR	1.5

<Up>	= Prev line <Enter>	= Do	<7/8>	= Print <->	= Prev Scr.
<Down>	= Next line <0>	= Exit Scr.	<PF2>	= Help <,>	= Next Scr.

(B_P_DATA_AS)

DATA DATABASE OPERATION
RAW DATA SCREEN

The Raw Data screen provides information about unprocessed AIRLAB experimental data. ADAMS users may read any Raw Data records created by members of their group and add new records to the database, but can only delete and update records they've personally created.

Data in the Raw Data screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample Raw Data screen is presented in the figure on the opposite page. Raw Data screen fields are described in the table below.

RAW DATA SCREEN FIELDS

Field Name	Mandatory?	Description
Data Name:	Yes	Single line input
Format:	No	Physical structure of data. Single line input.
Location:	No	Single line input
Username:	Automatically generated	Single line field
Time:	Automatically generated	Single line field
Group:	Yes	Must be existing group(s)
Rec Count:	No	Single line input
Table?	Yes	Yes if Oracle table, no otherwise.
Archived?	Yes	Yes or no response
Desc:	No	Multi-line input
Keywords:	No	Paging region
Software:	Yes	Scrolling region. Tab between name and version.

ADAMS

Browse Raw Data

Data Name: SOFTWARE FAILURE DATA   Username: JSD
    Format: I*4 Stream   Time: 06/01/85:15:10:11
   Location: 123/1220   Group: AXIS

Rec Count: 5M   Table?   N   Archived?   N
      Desc: Actual failure times for sw related hw errors

Keywords: [SOFTWARE
              FAILURE DATA   ]

1::DISK$SHEMP:[JSD.EXP]TESTER.FOR	1.5

\<Up\> = Prev line	\<Enter\> = Do	\<7/8\> = Print	\<-\> = Prev Scr.
\<Down\> = Next line	\<0\> = Exit Scr.	\<PF2\> = Help	\<,\> = Next Scr.

(B_R_DATA_AS)

TECHNICAL PAPER DATABASE OPERATION

Technical Paper describes literature references used by AIRLAB project members during an experiment and publications generated during the course of an experiment. All ADAMS users can browse, add, update and delete any Technical Paper record on the system.

Data in the Technical Paper screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database.*

A sample Technical Paper screen is presented in the figure on the opposite page. Technical Paper screen fields are described in the table below.

Note: papers entered on this screen may include papers written by ADAMS users during an AIRLAB experiment as well as papers written by authors outside AIR-LAB. To enter an ADAMS user in the Author field, type the author's username and press <RET>. ADAMS will fill in the rest of the field with the author's full name. To enter an author who is not an ADAMS user, press <TAB> to get past the username subsection of the Author paging region and enter the author's full name.

TECHNICAL PAPER SCREEN FIELDS

Field Name	Mandatory?	Description
Title:	No	Multi-line input
Archive Loc.:	No	Where journal etc. is stored. Single line input.
Publ. Citation:	No	Name of journal etc. Single line input.
Length:	No	Single line input
Author:	No	Paging region
Institution:	No	Paging region
Keyword:	No	Paging region
Abstract:	No	Scrolling region

ADAMS
Browse Technical Paper

Title: Experiments with Hardware Related Software Errors:
New Results

Archive Loc.: Library
Publ. Citation: FTCS 16   Length: 10

Author: [JSD   J. S. Doe   ]

Institution: [CRI   ]   Keyword: [FLIGHT   ]

This paper describes the results of a series of reliability testing
experiments using flight management software. The experiment investigates
the frequency with which software errors result from hardware malfunctions in
the pilot interface.

<Up> = Prev line	<Enter> = Do	<7/8> = Print	<-> = Prev Scr.
<Down> = Next line	<0> = Exit Scr.	<PF2> = Help	<,> = Next Scr.

(B_TECH_P_AS)

NOTEBOOK DATABASE OPERATION

Notebook is an online experimenter's or engineer's notebook that contains personal and project notes written during an AIRLAB experiment. ADAMS users may browse any Notebook records created by members of their group and add new records to the database, but can only delete and update records they've personally created.

Data in the Notebook screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*. You can enter the Add Notebook action screen from VMS by typing **note** at the prompt. After entering the note, exit the Add Notebook screen to return to VMS.

A sample Notebook screen is presented in the figure on the opposite page. Notebook screen fields are described in the table below.

NOTEBOOK SCREEN FIELDS

Field Name	Mandatory?	Description
Username:	Automatically generated	Single line field
Group:	Automatically generated	Set to PERSONAL; can be redefined. Single line input.
Ident:	Automatically generated	Single line field
Date:	Automatically generated	Single line field
Keyword:	No	Paging region
Text	No	Scrolling region

ADAMS
Browse Notebook Entry

Username: JAS   Keyword: [FLIGHT   ]
    Group: AXIS
    Ident: 1
    Date: 06/17/85:15:24:31

For application section, need to develop a complete example showing process
of generating an interpreter:
1. Grammar: extend BEXP to include functions on boolean expressions
2. Rewrite rules: general OR, binary AND
3. Consistency: check rewrite rules, identifying intersections of LHS

\<Up\>	= Prev line	\<Enter\>	= Do	\<7/8\> = Print	\<-\>	= Prev Scr.
\<Down\>	= Next line	\<0\>	= Exit Scr.	\<PF2\> = Help	\<,\>	= Next Scr.

(B_NOTE_AS)

Chapter 6 — ADAMS Maintenance Operations

WHAT ARE THE MAINTENANCE OPERATIONS

The Maintenance Operations menu contains several actions screens and the following 4 submenus.

        1. Security Database
        2. Relations Database
        3. Logon/off Information
        4. Configuration Management

The Maintenance Operations action screens are:

Access Level	Selected from a submenu under Security Database. Usernames and their ADAMS security levels (S, P, or G).
Project Access	Selected from a submenu under Security Database. Usernames and the projects they are permitted to access.
Keyword	Selected from a submenu under Relations Database. Group keywords associated with project groups.
User	Selected from a submenu under Relations Database. Usernames and the project groups they are associated with.
Project	Selected from a submenu under Relations Database. Projects and their member groups.
Logon	Selected from a submenu under Logoff/on Information. Information entered when users first logon to the ADAMS system.
Logoff	Selected from a submenu under Logoff/on Information. Information entered when users logoff from the ADAMS system.
Software Configuration	Selected from a submenu under Configuration Management. Software installed or removed from AIRLAB's computer system.
Hardware Configuration	Selected from a submenu under Configuration Management. Hardware installed or removed from AIRLAB's computer system.

Note: Users with group level permission can access only Logon/off Information under Maintenance Operations.

The Maintenance Operations menu structure is illustrated as an inverted tree in *Appendix B*, which shows the first few levels of the branching system labeled with screen mnemonics. Each ADAMS screen has a mnemonic associated with it.

Appendix C provides a list of screen mnemonics and their definitions arranged alphabetically for reference.

The general format and contents of menu, action, and report screens are discussed in *Chapter 2*. Database record manipulation is discussed in *Chapter 3*. The manipulation of single line fields, multi-line fields, paging regions and scrolling regions is discussed in the section *How to Input Data on ADAMS Action Screens* in *Chapter 3*.

Unused Page

SECURITY LEVELS AND ADAMS MAINTENANCE

The access permitted to ADAMS users with system (S), project (P), and group (G) privileges for the various Maintenance Operation screens is described in the table on the opposite page. Each account permission column in the table is divided into Read and Write subcolumns. Read permission means a user can browse an entry in the screen, but not add new entries or change or delete existing entries. Write permission means a user can browse, add, update, and delete entries stored in the system.

Four character codes indicate the amount of access permitted to a screen:

X   No access is permitted to this category.

O   Owner: only the username that created the data in this category may access it.

G   Group: in this category, a user may access data created by anyone in the groups the user belongs to.

A   All: in this category, a user may access any data on the system.

MAINTENANCE OPERATIONS SCREEN ACCESS

	Group		Project		System	
	Read	Write	Read	Write	Read	Write
Access Level	X	X	X	X	A	A
Project Access	X	X	X	X	A	A
Keyword	X	X	G	G	A	A
User	X	X	G	G	A	A
Project	X	X	G	G	A	A
Logon	A	A	A	A	A	A
Logoff	A	A	A	A	A	A
Software Configuration	X	A	A	A	A	A
Hardware Configuration	X	A	A	A	A	A

SECURITY MAINTENANCE OPERATION
ACCESS LEVEL SCREEN

The Access Level screen associates ADAMS usernames with access permission level codes (S, P, or G). Only system managers can read and write any access level records.

Data in the Access Level screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample Access Level screen is presented in the figure on the opposite page. Access Level screen fields are described in the table below.

ACCESS LEVEL SCREEN FIELDS

Field Name	Mandatory?	Description
Username:	Yes	Single line input
Access:	Yes	Single line input

ADAMS
Browse User Access Level

	Username	Access
→	JAS	P
	JAT	S
	JSD	P

<Enter> = Do	<PF2> = Help	<Up> = Prev Record
<0> = Exit Screen	<7/8> = Print	<Down> = Next Record

(SEC_B_ACC_LVL_AS)

SECURITY MAINTENANCE OPERATION
PROJECT ACCESS SCREEN

The Project Access screen associates ADAMS usernames with ADAMS projects. Only system managers can read and write any project access record.

Data in the Project Access screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample Project Access screen is presented in the figure on the opposite page. Project Access screen fields are described in the table below.

PROJECT ACCESS SCREEN FIELDS

Field Name	Mandatory?	Description
Project:	Yes	Enter existing project, then user. Single line input.
Username:	Yes	Single line input

ADAMS
Browse Project Access

Project	Username
→ SW RELATED HW ERRORS	JAS
SW RELATED HW ERRORS	JSD

<Enter>	= Do	<PF2>	= Help	<Up>	= Prev Record
<0>	= Exit Screen	<7/8>	= Print	<Down>	= Next Record

(SEC_B_PRJ_ACC_LVL)

RELATIONS MAINTENANCE OPERATION
KEYWORD SCREEN

The Keyword screen associates keywords with individual project groups. Information in this category cannot be accessed by users with group permission (G). Project leaders (P) can create or delete keywords for groups under their projects. System managers (S) can access any keyword on the system.

Data in the Keyword screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample Keyword screen is presented in the figure on the opposite page. Keyword screen fields are described in the table below.

KEYWORD SCREEN FIELDS

Field Name	Mandatory?	Description
Group:	Yes	Enter existing group
Keyword:	Yes	Single line input
Comments:	No	Multi-line input

ADAMS
Browse Keyword/Group Relation

Group: CONTROL
Keyword: SOFTWARE
Comments: Flight Interface Version 1.0 has been archived

| <0> | = Exit Scr | <7/8> | = Print | <-> | = Prev Scr |
| <Enter> | = Do | <PF2> | = Help | <,> | = Next Scr |

(REL_B_KEY_AS)

RELATIONS MAINTENANCE OPERATION
USER SCREEN

The User screen associates ADAMS usernames with individual project groups. Information in this category cannot be accessed by users with group permission (G). Project leaders (P) can associate usernames with groups under their projects; system managers (S) can access any username/group relation on the system.

Data in the User screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample User screen is presented in the figure on the opposite page. User screen fields are described in the table below.

USER SCREEN FIELDS

Field Name	Mandatory?	Description
Group:	Yes	Enter existing group
Username:	Yes	Single line input

ADAMS
Browse User/Group Relation

Group	Username
→ AXIS	JAS
CONTROL	JAS
CONTROL	JSD

<Enter> = Do	<PF2> = Help	<Up> = Prev Record
<0> = Exit Screen	<7/8> = Print	<Down> = Next Record

(REL_B_USER_AS)

RELATIONS MAINTENANCE OPERATION
PROJECT SCREEN

The Project screen associates ADAMS projects with individual groups. Information in this category cannot be accessed by users with group permission (G). Project leaders (P) can define groups and associate them with their projects and delete their groups; system managers (S) can access any group/project relation on the system.

Data in the Project screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample Project screen is presented in the figure on the opposite page. Project screen fields are described in the table below.

PROJECT SCREEN FIELDS

Field Name	Mandatory?	Description
Project:	Yes	Single line input
Group:	Yes	Single line input

ADAMS
Browse Project/Group Relation

Project	Group
→ SW RELATED HW ERRORS	AXIS
SW RELATED HW ERRORS	CONTROL

<Enter> = Do	<PF2> = Help	<Up> = Prev Record
<0> = Exit Screen	<7/8> = Print	<Down> = Next Record

(REL_B_PROJECT_AS)

LOGON/OFF INFORMATION MAINTENANCE OPERATION
LOGON SCREEN

The Logon screen contains information identifying the start of each ADAMS session, and an optional Purpose field describing the reason for the session. All ADAMS users can access any Logon record in the database.

Data in the Logon screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample Logon screen is presented in the figure on the opposite page. Logon screen fields are described in the table below.

LOGON SCREEN FIELDS

Field Name	Mandatory?	Description
Username:	Automatically Generated	Single line field
Machine:	Automatically Generated	Single line field
Time:	Automatically Generated	Single line field
Purpose:	No	Single line field

ADAMS
Browse Logon Info

Username: JAS
Machine: 1
Time: 06/14/85:12:30:01
Purpose: To add notes on AIRLAB experiments

\<7/8\> = Print	\<0\> = Exit Screen	\<-\> = Prev Screen
\<PF2\> = Help	\<Enter\> = Do	\<,\> = Next Screen

(B_LOGON_AS)

LOGON/OFF INFORMATION MAINTENANCE OPERATION
LOGOFF SCREEN

The Logoff screen contains information identifying the end of each ADAMS session, and an optional Remarks field for comments on the session just ended. Any ADAMS user can access any Logoff record in the database.

Data in the Logoff screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating The ADAMS Database*.

A sample Logoff screen is presented in the figure on the opposite page. Logoff screen fields are described in the table below.

LOGOFF SCREEN FIELDS

Field Name	Mandatory?	Description
Username:	Automatically Generated	Single line field
Machine:	Automatically Generated	Single line field
Time:	Automatically Generated	Single line field
Remarks:	No	Single line field

ADAMS
Browse Logoff Info

Username: JAS
Machine: 1
Time: 06/14/85:13:28:10
Remarks: Phase one complete

<7/8> = Print	<0> = Exit Screen	<-> = Prev Screen
<PF2> = Help	<Enter> = Do	<,> = Next Screen

(B_LOGOFF_AS)

CONFIGURATION MANAGEMENT
SOFTWARE CONFIGURATION

Software Configuration provides information regarding the installation or removal of software on AIRLAB's computer system. Any user can browse any Software Configuration record. Project leaders and system managers can add, update and delete all records in this subcategory of Maintenance Operations.

Data in the Software Configuration screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating the ADAMS Database*.

A sample Software Configuration screen is presented in the figure on the opposite page. Software Configuration screen fields are described in the table below.

SOFTWARE CONFIGURATION

Field Name	Mandatory?	Description
Sw Name:	Yes	Single line input
Sw Ver:	Yes	Single line input
Date Submitted:	No	Single line input
Submitted By:	No	Single line input
Date Performed:	No	Single line input
Performed By:	No	Single line input
Removed From:	Automatically generated	Set to 0; can be redefined. Single line input; numeric values only.
Installed In:	Automatically generated	Set to 0; can be redefined. Single line input; numeric values only.
Comments:	No	Multi-line input
Statement of Work:	No	Scrolling region

ADAMS
Browse Software Configuration

Sw Name: Flight Interface
Sw Ver: 1.2
Date Submitted: 03/15/85   Submitted By: JSD
Date Performed: 03/29/85   Performed By: JAT
Removed From: 0   Installed In: 1

Comments: Up and running

Flight Interface has been installed on air1.

```
<Enter>  = Do          <7/8>  = Print  <->  = Prev Screen
<0>      = Exit Screen <PF2>  = Help   <,>  = Next Screen
```

(B_SW_CON_AS)

CONFIGURATION MANAGEMENT
HARDWARE CONFIGURATION

Hardware configuration provides information regarding the installation or removal of hardware on AIRLAB's computer system. All users can browse any Hardware Configuration record. Project leaders and system managers can add, update and delete any record in this subcategory of Maintenance Operations.

Data in the Software Configuration screen is manipulated using the browse, add, update and delete functions described in *Chapter 3 — Manipulating the ADAMS Database*.

A sample Hardware Configuration screen is presented in the figure on the opposite page. Hardware Configuration screen fields are described in the table below.

HARDWARE CONFIGURATION

Field Name	Mandatory?	Description
Inventory No:	Yes	Single line input; numeric values only.
Date Submitted:	No	Single line input
Submitted By:	No	Single line input
Date Performed:	No	Single line input
Performed By:	No	Single line input
Removed From:	Automatically generated	Set to 0; can be redefined. Single line input; numeric values only.
Installed In:	Automatically generated	Set to 0; can be redefined. Single line input; numeric values only.
Comments:	No	Multi-line input
Statement of Work:	No	Scrolling region

ADAMS
Browse Hardware Configuration

Inventory No: 71850
Date Submitted: 05/21/85   Submitted By: JSD
Date Performed: 06/19/85   Performed By: JAT

Removed From: 0   Installed In: 3

Comments: Disk

No problems with installation.

<Enter> = Do	<7/8> = Print	<-> = Prev Screen
<0> = Exit Screen	<PF2> = Help	<,> = Next Screen

(B_HW_CON_AS)

Appendix A — Status and Error Messages

STATUS AND ERROR MESSAGES

The following list of status and error messages is sorted alphabetically except the first message in the list which may begin with several different field names.

● *xxxx* field must have a value

     Meaning: This field of a scrolling/paging region must have a value.

     Action: Enter an appropriate value for the region.

● Duplicate key value in table

     Meaning: You entered a key value (e.g., username or data name) that already exists in the data table.

     Action: Enter a new value and try again.

● Error opening file *username.tmp*.

     Meaning: You do not have write access to the current VAX/VMS file directory and cannot perform this function.

     Action: Restart ADAMS under a different directory that you have write access to.

● Error opening menu file *xxxx*

     Meaning: This is an ADAMS internal error.

     Action: The list of valid menus could not be found because the ADAMS logical names are not properly set up. See the system manager to correct this problem.

● Error trying to enter EDT

     Meaning: There was an error while creating a subprocess to run EDT.

     Action: You do not have write access to the current VAX/VMS file directory. Change directories and try again.

- Invalid character "*x*" in field

    Meaning: You entered an invalid character in this field.
    Action: Examine input for error and reenter.

- Invalid function key

    Meaning: The key typed is not valid in this context.
    Action: Select a different function.

- Invalid group name, try again

    Meaning: The group name entered is not assigned to you.
    Action: Enter a group you belong to; use <PF2>KEYPAD on Group field to list groups.

- Invalid keyword, hit Gold-Enter to make it a key

    Meaning: You entered a personal keyword that does not exist.
    Action: <PF1>KEYPAD<Enter>KEYPAD will add it to your personal keyword list.

- Invalid keyword, try again

    Meaning: You entered a keyword that does not exist for this group.
    Action: Enter an existing keyword; use <PF2>KEYPAD on keyword field to list keywords.

- Keyword exists, try again

    Meaning: You tried to add a keyword that already exists.
    Action: Enter a new keyword; use <PF2> on keyword field to list keywords.

- No *xxxx* values left

    Meaning: You tried to delete an entry from a scrolling/paging region that did not exist.

    Action: Select a different ADAMS function.

- No groups found

    Meaning: You do not belong to any valid groups.

    Action: Ask your project leader or system manager to add your username to the appropriate groups.

- No keywords found

    Meaning: There are no keywords for the group you have chosen.

    Action: The project leader will define group keywords as needed.

- No more records

    Meaning: There are no more records left in the list.

    Action: Use another search template to retrieve more records.

- No next form

    Meaning: You are at the last record retrieved and tried to advance.

    Action: If the record desired is not in the set retrieved, change the search template and try again.

- No next page in form   .

    Meaning: You tried to go to the next field at the end of the screen.

    Action: Back up to the correct field with the appropriate cursor movement command.

- **No next xxxx page**

    Meaning: You tried to go the the next page of a scrolling/paging region and there is not one.

    Action: If information is missing, add it to the database record.

- **No previous form**

    Meaning: You are at the first record retrieved and tried to back up.

    Action: If the record desired is not in the set retrieved, change the search template and try again.

- **No previous xxxx page**

    Meaning: You tried to go to the previous page of a scrolling/paging region and there is not one.

    Action: If information is missing, add it to the database record.

- **No previous page in form**

    Meaning: You tried to go to the previous field from the first field in a screen.

    Action: Advance to the correct field with the appropriate cursor movement command.

- **No records found**

    Meaning: There are no records matching the current selection criteria.

    Action: Enter a different search template and try again.

- **String not found**

    Meaning: You searched for a non-existent string in a scrolling text region.

    Action: Enter a string that is in the text region.

- That project does not exist, try again

  Meaning: You entered a project name that does not exist.
  Action: Enter an existing project. Contact the ADAMS system manager for project names.

- This action invalid for this group

  Meaning: You tried to enter a keyword for a group with the <PF1>KEYPAD <ENTER>KEYPAD sequence.
  Action: Only project leaders can add group keywords.

- You cannot modify that group, try again

  Meaning: You entered a group name that you do not have modify access to.
  Action: Enter a group name you can modify; use <PF2>KEYPAD on the Group field to list groups.

- You cannot modify that project, try again

  Meaning: You entered a project that you do not have modify access to.
  Action: Enter a project you can modify. Contact the ADAMS system manager for project names.

- You do not have access to that function
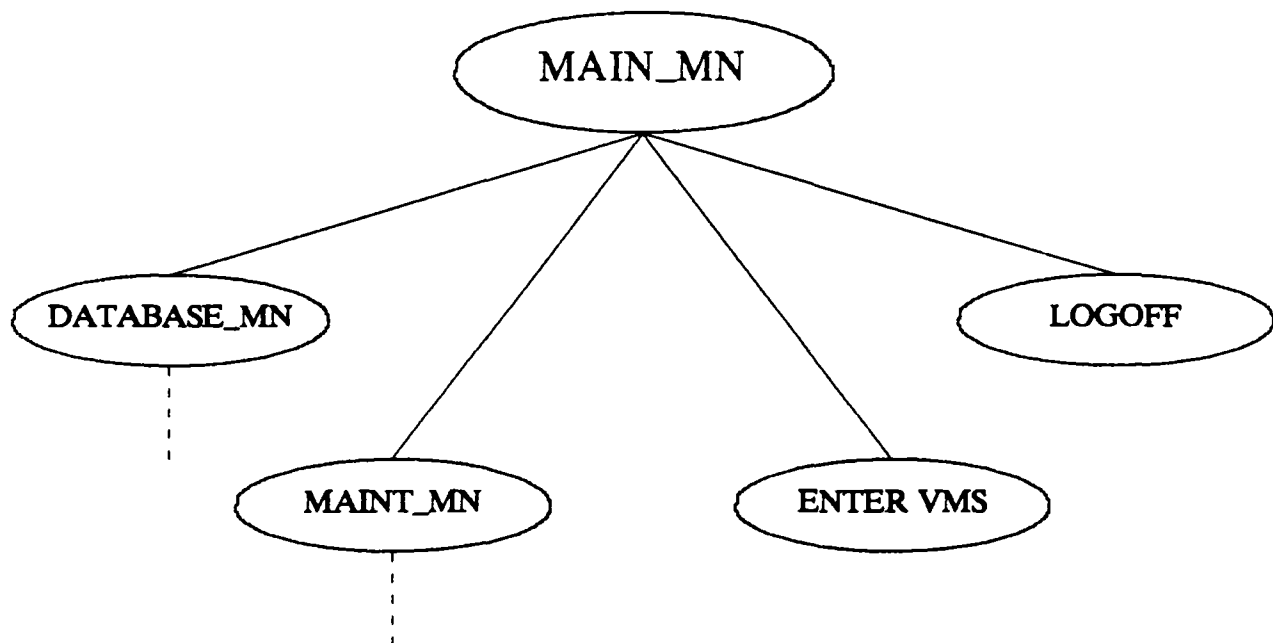
  Meaning: You tried to access a security protected function and do not have the proper level of security clearance.
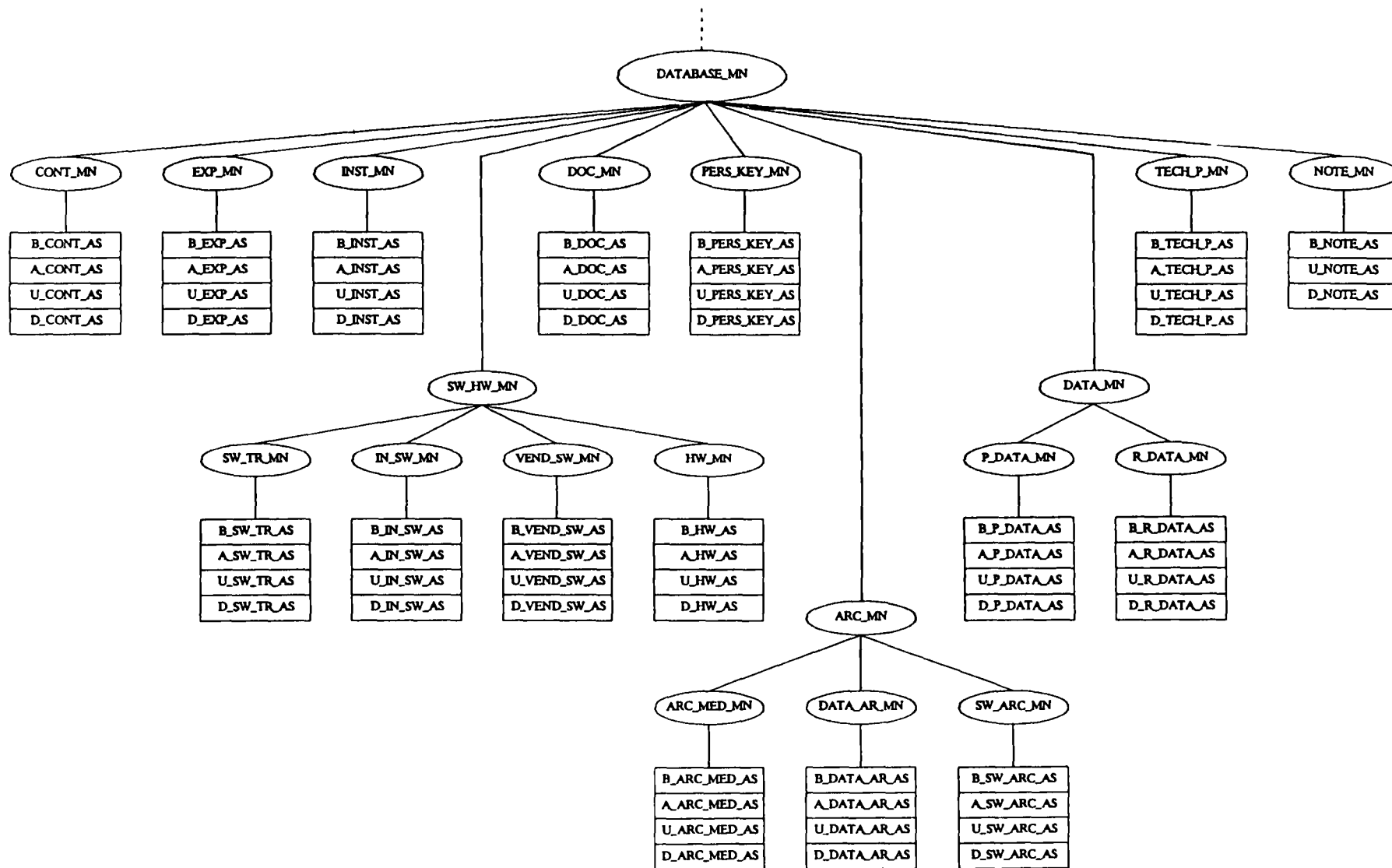 Action: Contact your project leader or system manager to determine your security clearance level.
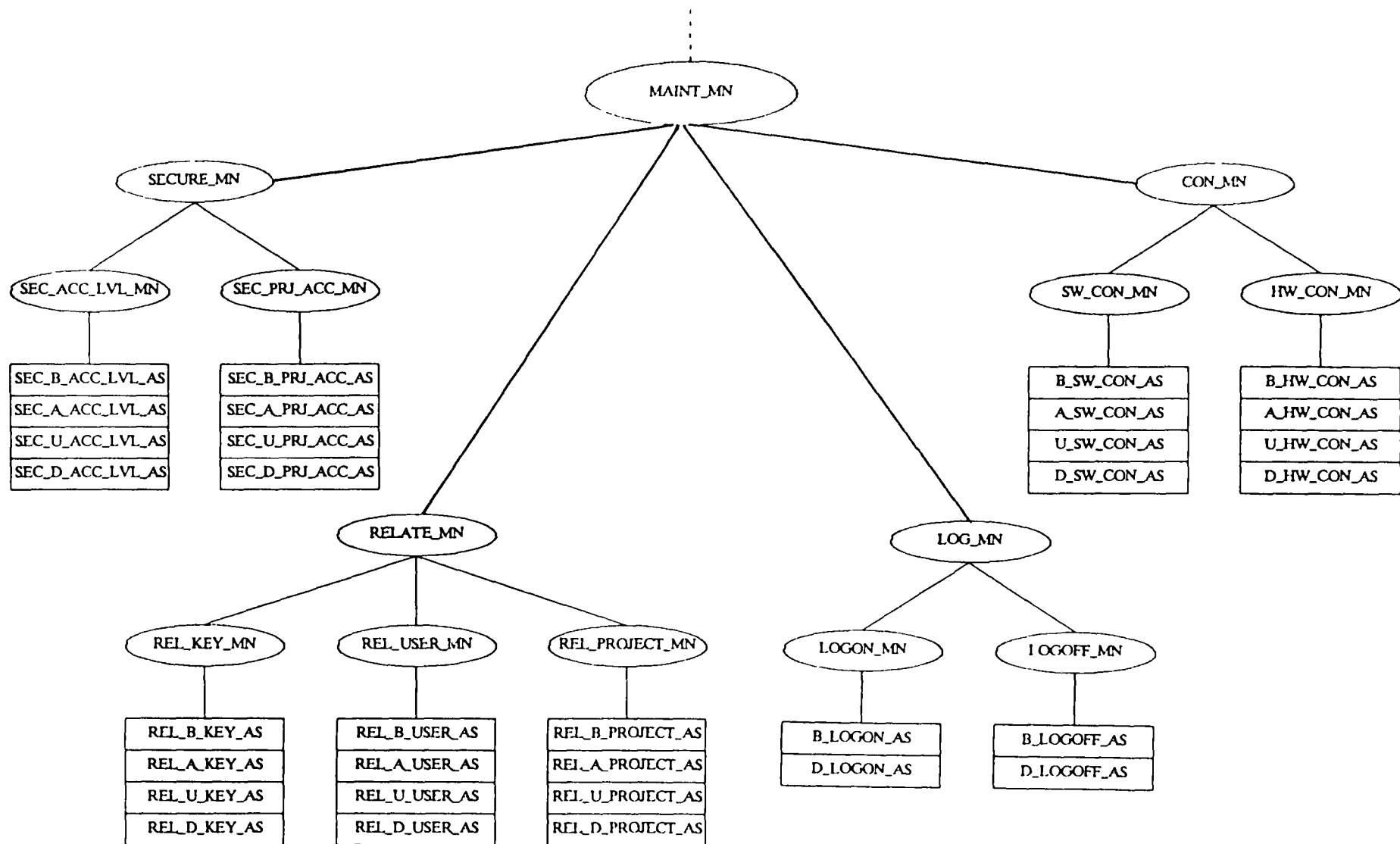
Appendix B — The ADAMS Menu Tree Structure

THE ADAMS MENU TREE STRUCTURE

The ADAMS menu system is structured like a tree's branching root system, with the main menu at the trunk's base and the individual report screens at the tips of the roots. The structure is illustrated in this Appendix, which shows the first few levels of the branching system labeled with screen mnemonics.

```
                        ┌──────────────┐
                        │   MAIN_MN    │
                        └──────────────┘
         ┌────────────────┬──────┬──────────────┐
  ┌──────────────┐        │      │        ┌──────────────┐
  │ DATABASE_MN  │        │      │        │    LOGOFF    │
  └──────────────┘        │      │        └──────────────┘
         ┊          ┌──────────────┐  ┌──────────────┐
         ┊          │   MAINT_MN   │  │  ENTER VMS   │
                    └──────────────┘  └──────────────┘
                           ┊
```

```
                                    MAINT_MN
         SECURE_MN                                              CON_MN

   SEC_ACC_LVL_MN    SEC_PRJ_ACC_MN              SW_CON_MN        HW_CON_MN

   ┌──────────────┐  ┌──────────────┐            ┌──────────┐   ┌──────────┐
   │SEC_B_ACC_LVL_AS│ │SEC_B_PRJ_ACC_AS│         │B_SW_CON_AS│  │B_HW_CON_AS│
   │SEC_A_ACC_LVL_AS│ │SEC_A_PRJ_ACC_AS│         │A_SW_CON_AS│  │A_HW_CON_AS│
   │SEC_U_ACC_LVL_AS│ │SEC_U_PRJ_ACC_AS│         │U_SW_CON_AS│  │U_HW_CON_AS│
   │SEC_D_ACC_LVL_AS│ │SEC_D_PRJ_ACC_AS│         │D_SW_CON_AS│  │D_HW_CON_AS│
   └──────────────┘  └──────────────┘            └──────────┘   └──────────┘

              RELATE_MN                                    LOG_MN

   REL_KEY_MN   REL_USER_MN   REL_PROJECT_MN      LOGON_MN        LOGOFF_MN

   ┌──────────┐ ┌──────────┐ ┌──────────────┐    ┌──────────┐   ┌──────────┐
   │REL_B_KEY_AS││REL_B_USER_AS││REL_B_PROJECT_AS│ │B_LOGON_AS │  │B_LOGOFF_AS│
   │REL_A_KEY_AS││REL_A_USER_AS││REL_A_PROJECT_AS│ │D_LOGON_AS │  │D_LOGOFF_AS│
   │REL_U_KEY_AS││REL_U_USER_AS││REL_U_PROJECT_AS│ └──────────┘   └──────────┘
   │REL_D_KEY_AS││REL_D_USER_AS││REL_D_PROJECT_AS│
   └──────────┘ └──────────┘ └──────────────┘
```

Appendix C — Screen Mnemonic Names

SCREEN MNEMONIC NAMES

This Appendix provides a list of screen mnemonics and their definitions arranged alphabetically for quick reference.

A_ARC_MED_AS	Add Archive Medium
A_ARC_MN	Add Archive
A_CON_AS	Add Contributor
A_DATA_AR_AS	Add Data Archive
A_DATA_MN	Add Data
A_DOC_AS	Add Documentation
A_EXP_AS	Add Experiments
A_HW_AS	Add Hardware
A_HW_CON_AS	Add Hardware Configuration
A_INST_AS	Add Institution
A_IN_SW_AS	Add Inhouse Software
A_NOTE_AS	Add Notebook
A_P_DATA_AS	Add Processed Data
A_PERS_KEY_AS	Add Personal Keyword
A_R_DATA_AS	Add Raw Data
A_SW_ARC_AS	Add Software Archive
A_SW_CON_AS	Add Software Configuration
A_SW_HW_MN	Add Software/Hardware
A_SW_TR_AS	Add Software Trouble Report
A_TECH_P_AS	Add Technical Paper
A_VEND_SW_AS	Add Vendor Software
ARC_MN	Archive Menu
B_ARC_MED_AS	Browse Archive Medium
B_ARC_MN	Browse Archive
B_DATA_AR_AS	Browse Data Archive
B_DATA_MN	Browse Data
B_DOC_AS	Browse Documentation
B_EXP_AS	Browse Experiments
B_HW_AS	Browse Hardware
B_HW_CON_AS	Browse Hardware Configuration
B_INST_AS	Browse Institution
B_IN_SW_AS	Browse Inhouse Software
B_LOGOFF_MN	Browse Logoff
B_LOGON_AS	Browse Logon
B_NOTE_AS	Browse Notebook
B_P_DATA_AS	Browse Processed Data
B_PERS_KEY_AS	Browse Personal Keyword
B_R_DATA_AS	Browse Raw Data
B_SW_ARC_AS	Browse Software Archive

B-SW_CON_AS	Browse Software Configuration
B_SW_HW_MN	Browse Software/Hardware
B_SW_TR_AS	Browse Software Trouble Report
B_TECH_P_AS	Browse Technical Paper
B_VEND_SW_AS	Browse Vendor Software
CON_MN	Configuration Management Menu
CONT_MN	Contributors Menu
D_ARC_MED_AS	Delete Archive Medium
D_ARC_MN	Delete Archive
D_CON_AS	Delete Contributor
D_DATA_AR_AS	Delete Data Archive
D_DATA_MN	Delete Data
DATABASE_MN	Database Operations Menu
D_DOC_AS	Delete Documentation
D_EXP_AS	Delete Experiments
D_HW_AS	Delete Hardware
D_HW_CON_AS	Delete Hardware Configuration
D_INST_AS	Delete Institution
D_IN_SW_AS	Delete Inhouse Software
D_LOGOFF_MN	Delete Logoff
D_LOGON_AS	Delete Logon
D_NOTE_AS	Delete Notebook
D_P_DATA_AS	Delete Processed Data
D_PERS_KEY_AS	Delete Personal Keyword
D_R_DATA_AS	Delete Raw Data
D_SW_ARC_AS	Delete Software Archive
D_SW_CON_AS	Delete Software Configuration
D_SW_HW_MN	Delete Software/Hardware
D_SW_TR_AS	Delete Software Trouble Report
D_TECH_P_AS	Delete Technical Paper
D_VEND_SW_AS	Delete Vendor Software
DATA_MN	Data Menu
DOC_MN	Documentation Menu
EXP_MN	Experiments Menu
INST_MN	Institutions Menu
LOG_MN	Logon/off Menu
LOGOFF_MN	Logoff Menu
LOGON_MN	Logon Menu
MAINT_MN	Maintenance Menu
NOTE_MN	Notebook Menu
PERS_KEY_MN	Personal Keyword Menu
REL_A_KEY_AS	Relation Add Keyword
REL_A_PROJECT_AS	Relation Add Project
REL_A_USER_AS	Relation Add User

REL_B_KEY_AS	Relation Browse Keyword
REL_B_PROJECT-AS	Relation Browse Project
REL_B_USER-AS	Relation Browse User
REL_D_KEY_AS	Relation Delete Keyword
REL_D_PROJECT_AS	Relation Delete Project
REL_D_USER_AS	Relation Delete User
REL_KEY_MN	Relation Keyword Menu
REL_PROJECT_MN	Relation Project Menu
REL_U_KEY_AS	Relation Update Keyword
REL_U_PROJECT_AS	Relation Update Project
REL_USER_MN	Relation User Menu
REL_U_USER_AS	Relation Update User
RELATE_MN	Relations Menu
SEC_A_ACC_LVL_AS	Security Add Access Level
SEC_ACC_LVL_MN	Security Access Level
SEC_A_PRJ_ACC_AS	Security Add Project Access
SEC_B_ACC_LVL_AS	Security Browse Access Level
SEC_B_PRJ_ACC_AS	Security Browse Project Access
SEC_D_ACC_LVL_AS	Security Delete Access Level
SEC_D_PRJ_ACC_AS	Security Delete Project Access
SEC_PRJ_ACC_MN	Security Project Acess
SEC_U_ACC_LVL_AS	Security Update Access Level
SEC_U_PRJ_ACC_AS	Security Update Project Access
SECURE_MN	Security Menu
SW_HW_MN	Software/Hardware Menu
TECH_P_MN	Technical Paper Menu
U_ARC_MED_AS	Update Archive Medium
U_ARC_MN	Update Archive
U_CON_AS	Update Contributor
U_DATA_AR_AS	Update Data Archive
U_DATA_MN	Update Data
U_DOC_AS	Update Documentation
U_EXP_AS	Update Experiments
U_HW_AS	Update Hardware
U_HW_CON_AS	Update Hardware Configuration
U_INST_AS	Update Institution
U_IN_SW_AS	Update Inhouse Software
U_NOTE_AS	Update Notebook
U_P_DATA_AS	Update Processed Data
U_PERS_KEY_AS	Update Personal Keyword
U_R_DATA_AS	Update Raw Data
U_SW_ARC_AS	Update Software Archive
U_SW_CON_AS	Update Software Configuration
U_SW_HW_MN	Update Software/Hardware

U_SW_TR_AS	Update Software Trouble Report
U_TECH_P_AS	Update Technical Paper
U_VEND_SW_AS	Update Vendor Software

.

Appendix D — An ADAMS Usage Example

APPENDIX D
AN ADAMS USAGE EXAMPLE

Purpose/Background

The following example illustrates the use of ADAMS to record and retrieve information about experimental research being conducted by the Research Triangle Institute using AIRLAB as a part of a NASA-LaRC sponsored program in software reliability. The goal of this program, which is being pursued by the Fault Tolerant Systems Branch of NASA - LaRC under the technical direction of G.E. Migneault, is to find a means of credibly performing reliability evaluations of flight control software. The program entails the funding of academic studies, data gathering experiments, and includes the conduct of in-house software reliability analyses.

The example contained in this Appendix depicts an organization of project data chosen by the project members. This organization permits rapid retrieval of information related to the different software reliability experiments presently being conducted. AIRLAB users who are working on other projects may prefer a different organization, that is, one which is tailored to suit their needs.

Using ADAMS

Defining the Software Reliability Research Project

Defining the Software Reliability Research project using ADAMS involved establishing a framework which organizes the research activities and specifying a set of project keywords fundamental to retrieving key information associated with the project. We first chose to decompose the project into groups which correspond to the distinct software reliability experiments being conducted as the most suitable framework for organizing information about the multiple experimental activities. Second, to facilitate communication between project members working within a group and between groups with similar goals, we established group memberships and defined a standard set of keywords. The project groups, group members, and group keywords are described in the following sections.

Project Groups

The software reliability research project currently has four experimental efforts for which AIRLAB is a critical resource. These are:

(1) Automated repetitive run testing of the Launch Interceptor Condition Software to collect data on 100 replications

(2) Fault Interaction Experiments using the N-VERSION CONTROLLER on Systems 1,2,4,5,6,7,8 and 9.

(3) Reliability Testing of the Pitch Axis Control Software on System 4.

(4) Development of the Viking Lander Software Specification on System 4.

Each of these activities has been established by the Project Leader as a group under the Software Reliability Research project in the ADAMS Relations data base using the Add Project Action Screen. This data base entry is shown in Figure 1.

ADAMS
Browse Project/Group Relation

Project	Group
SOFTWARE RELIABILITY RESEARCH	AUTOSIM
SOFTWARE RELIABILITY RESEARCH	INTEXP
SOFTWARE RELIABILITY RESEARCH	PITCH AXIS
SOFTWARE RELIABILITY RESEARCH	VIKING

\<Enter\> = Do	\<PF2\> = Help	\<Up\> = Prev Record
\<0\> = Exit Screen	\<7/8\> = Print	\<Down\> = Next Record

(REL_B_PROJECT_AS)

Figure 1. Software Reliability Research Project Groups

Group Members

Different members of the RTI staff are associated with one or more of the group activities within the Software Reliability Research project. To identify which staff members are associated with each group, the Add User Action Screen was used by the project leader to specify group members in the ADAMS Relations database. Figure 2 shows the data in the first scrolling region of the Group Relation database entry.

Group Keywords

To make information about the software reliability project easily accessible to all project members, we decided to define a set of standard project keywords which are applicable to each group activity in the project and which are used in the same manner by each group member. Our choice of keywords reflects the type of information being communicated. The consistent use of these keywords must be enforced if the project is to benefit from their use. The use of multiple keywords when entering activity information provides multiple paths to data base entries containing more than one type of information.

The following list describes the keywords which have presently been defined by the Project Leader in the Relations database using the Add Keyword Action Screen.

DESCRIPTION - index for descriptions of the research activities being conducted (An example is the first entry for an experiment as shown in Figure 3. This entry describes the experimental goals and contains the Description keyword).

DIRECTORIES - index for all directories associated with the research activity

PROBLEMS - index for all entries which are related to problems encountered during the conduct of the research.

REPORTS - index for all system and technical reports associated with the research

TOOLS - index for all hardware and software tool tools associated with the conduct of the research

STATUS - index for both personal and project notes which contain information about the status of the research

PROB[n] - index for the nth problem in the series of implementations of software problems being studied as a part of the continuing experiments in software reliability

```
                      ADAMS
              Browse User/Group Relation


                  Group              Username

        AUTOSIM          GEM
        AUTOSIM          JRD
        AUTOSIM          RCB
        AUTOSIM          SEM
        INTEXP           GEM
        INTEXP           JRD
        INTEXP           RCB
        INTEXP           SEM
        PITCH AXIS       GEM
        PITCH AXIS       HO
        PITCH AXIS       JRD


   <Enter> = Do        <PF2> = Help    <Up>    = Prev Record
   <0>     = Exit Screen  <7/8> = Print  <Down>  = Next Record


   17 records found.                          (REL_B_USER_AS)
```

Figure 2. Project Group Members

RAW DATA - index for the raw data associated with the research

PROCESSED DATA - index for the processed data associated with the research

Note that the chosen Software Reliability Project keywords intersect the different types of information requested when making an ADAMS entry. This intersection was intentionally chosen to provide cross-indexing between ADAMS experiment

```
┌─────────────────────────────────────────────────────┐
│                      ADAMS                          │
│                 Browse Experiment                   │
│                                                     │
│       Ident:   1              Group:   AUTOSIM      │
│       Name:    AUTOMATED REPETITIVE RUN TESTING     │
│       Desc:    The purpose of the experiment is to gather failure data │
│                from 100 replications of repetitive run testing of the three │
│                implementations of the LIC software. │
│                                                     │
│                    ⎡GEM        ⎤                    │
│       Username:    ⎢           ⎥                    │
│                    ⎣JLP        ⎦                    │
│                                                     │
│                    ⎡NASA–LARC    ⎤                  │
│       Inst:        ⎢             ⎥                  │
│                    ⎣RTI          ⎦                  │
│                                                     │
│                    ⎡DESCRIPTION  ⎤                  │
│       Keyword:     ⎢             ⎥                  │
│                    ⎣PROB1        ⎦                  │
│                                                     │
│       Sw Name:     ⎡AUTOSIM        Ver: 1.5  ⎤      │
│                                                     │
│   ┌─────────────────────────────────────────────┐  │
│   │ <0>     = Exit Scr   <7/8>  = Print   <->  = Prev Scr │  │
│   │ <Enter> = Do         <PF2>  = Help    <,>  = Next Scr │  │
│   └─────────────────────────────────────────────┘  │
│                                                     │
│  1 record found.                        (B_EXP_AS)  │
└─────────────────────────────────────────────────────┘
```

Figure 3. An Experiment Entry with a "Description" Keyword

entries, software entries, and data entries.

Documenting the Research Activities

The Software Reliability Research activities conducted as a part of the project are documented in several ADAMS database entries. The following sections describe a sample of entries related to the AUTOSIM group under the Software Reliability Research project.

Experiment Entry

Figure 3 shows an experiment activity example . It was entered using the Add Experiment Action Screen of the ADAMS Database Menu. This entry describes the AUTOSIM experiment. Other entries which contain information about the experiment were made using the Add Notebook Screen with AUTOSIM as the group field entry.

```
                        ADAMS
                 Browse Notebook Entry




                                            ⎡RAW DATA        ⎤
     Username:  JRD            Keywords:    ⎢STATUS          ⎥
                                            ⎣                ⎦
        Group:  AUTOSIM
        Ident:     3
         Date:  07/12/85:15:51:14

  ┌──────────────────────────────────────────────────────────────┐
  │ The data collection effort has been halted for two reasons:   │
  │ 1. The results of the investigation of the non-observation of │
  │ fault 7 are pending.                                          │
  │ 2. System 3 has been experiencing system disk problems which  │
  │ result in loss of data due to the method of restarting        │
  │ AUTOSIM.                                                      │
  │                                                                │
  └──────────────────────────────────────────────────────────────┘

  ┌──────────────────────────────────────────────────────────────┐
  │ <Up>    = Prev line <Enter> = Do     <7/8> = Print <-> = Prev Scr. │
  │ <Down>  = Next line <0>     = Exit Scr. <PF2> = Help <,> = Next Scr. │
  └──────────────────────────────────────────────────────────────┘

    1 record found.                                    (B_NOTE_AS)
```

Figure 4. A Project Notebook Entry

Notebook Entry

In collecting the 100 replications of data for the AUTOSIM experiment, the system disk on System 3 experienced several failures during the second and third weeks of June. In addition to the experiment entry shown in Figure 4 which indicated a stopped status, a personal note was made to record the problems with the system. This personal notebook entry is depicted in Figure 5.

ADAMS
Browse Notebook Entry

Username: JRD   Keywords: $\begin{bmatrix} \text{AUTOSIM} \\ \text{PROBLEMS} \end{bmatrix}$

   Group: Personal
   Ident: 1
   Date: 06/24/85:14:18:24

AUTOSIM is currently running on 3::DISK$LARRY:[SIMTEST.3.SIM.PROB1].
SYSTEM 3 has been unreliable as there are problems with I/O on the system
disk. SEM has currently stopped running AUTOSIM during the day.
GEM has been notified.

| <Up> | = Prev line | <Enter> | = Do | <7/8> | = Print | <-> | = Prev Scr. |
| <Down> | = Next line | <0> | = Exit Scr. | <PF2> | = Help | <,> | = Next Scr. |

1 record found.   (B_NOTE_AS)

Figure 5. A Related Personal Notebook Entry

Experimental Software Entry

A software tool was developed by RTI to fully automate the repetitive run testing of the Launch Interceptor Condition Software. The tool, known as AUTOSIM, was described using the Add In-House Software Action Screen entry for the Database Operations. The experiment software entry is shown in Figure 6.

```
                            ADAMS
                    Browse Inhouse Software


        Name:   AUTOSIM                          Group:   AUTOSIM
     Version:   1.0              Online?  Y        Date:   02/20/85
      Author:   SAM MCBRIDE
      Expert:   SEM         Sam McBride
        Desc:   Tool which controls the repetitive run testing of the
                LIC problem


    Add Info:   Uses the N-VERSION CONTROLLER and the N-VERSION
                CONTROLLER INTERFACE.


                [DESCRIPTION              ]
   Keywords:    |DIRECTORIES              |
                [                         ]

  ┌────────────────────────────────────────────────────────────────┐
  │ 3::DISK$LARRY:[SIMTEST.3.SIM.PROB1.AUTO]                         │
  │                                                                  │
  └────────────────────────────────────────────────────────────────┘

  ┌────────────────────────────────────────────────────────────────┐
  │ <Up>     = Prev Line  <Enter>  = Do      <7/8>  = Print  <-> = Prev Scr. │
  │ <Down>   = Next Line  <0>      = Exit Scr.  <PF2>  = Help  <,> = Next Scr. │
  └────────────────────────────────────────────────────────────────┘

   1 record found.                                     (B_IN_SW_AS)
```

Figure 6. An Experimental Software Entry

Documentation Entry

A technical report was written to document the AUTOSIM tool and to fulfill the contract reporting requirements. The corresponding documentation entry is shown in Figure 7. Technical papers associated with the experiment were documented using the Add Technical Paper Action Screen.

ADAMS
Browse Documentation

```
      Doc Id:  AD-001
      Vendor:  RTI
     Subject:  AUTOSIM DOCUMENTATION
    Part Num:  NAS1-16489;NO.24
      Hw/Sw:   S
       Title:  AUTOSIM: A Repetitive Run Modeling Test Tool by J.R.
               Dunham and S.E. McBride


     Remarks:  The report documents the AUTOSIM tool using the
               Jackson Schematic Logic Diagrams.


    Keywords:  [AUTOSIM                          ]
```

<Enter> = Do	<PF2> = Help	<-> = Prev Record
<0> = Exit Screen	<7/8> = Print	<,> = Next Record

1 record found.   (B_DOC_AS)

Figure 7. A Documentation Entry

Data Entries

There are three types of data entries which can be made using ADAMS. These entries contain information about raw data, processed data, and archived data. In making these entries, we used AUTOSIM Group Keywords to establish links between the data entries.

Figure 8 contains an example of a RAW DATA entry which describes failure data that was generated during repetitive run testing of the LIC problem prior to installation of AUTOSIM. It was recorded as a part of the AUTOSIM project since the data was compared to that recorded during the AUTOSIM testing of the LIC software as part of the validation of the AUTOSIM tool.

This raw data was subsequently been archived and the archive information was recorded using the Add Archive Action Screen of ADAMS.

The raw data was also processed and the actual failure rates retained in a tabular form for later analysis. The location of the processed data was recorded using the Add Processed Data Action Screen.

Figures 8, 9, and 10 show the Raw Data, Archived Data, and Process Data entries for the manual repetitive run replications respectively.

ADAMS
Browse Raw Data

Data Name: SIM.DAT   Username: JRD
    Format: SEE NASA CR-172553   Time: 06/25/85:15:15:46
  Location: 3::DISK$LARRY:[SIMTEST.3.SIM.PROB1]   Group: AUTOSIM

Rec Count: 692   Table?   N   Archived?   Y
     Desc: Contains LIC failure data prior to AUTOSIM. Archive name =
             LIC1. Failure time tables in 3::DISK$LARRY:[JRD.DATA].

Keywords: ⎡AUTOSIM   ⎤
            ⎣PROB1   ⎦

AUTOSIM	1.5

\<Up\> = Prev line	\<Enter\> = Do	\<7/8\> = Print	\<-\> = Prev Scr.
\<Down\> = Next line	\<0\> = Exit Scr.	\<PF2\> = Help	\<,\> = Next Scr.

1 record found.   (B_R_DATA_AS)

Figure 8. A Raw Data Entry

ADAMS
Browse Data Archive

Date: 06/26/85:17:40:31
Username: JRD
Group: AUTOSIM

Table: N
Data Name: LIC1
Archive ID: AUTOSIM.LIC1
Archive Type: 1600 BPI Tape

Comments: The data archived is a result of the installation of AUTOSIM - It contains the LIC data from the manual runs executed prior to AUTOSIM installation 2/06/85.

<Enter> = Do	<PF2> = Help	<-> = Prev Record
<0> = Exit Screen	<7/8> = Print	<,> = Next Record

1 record found.   (B_DATA_AR_AS)

Figure 9. An Archived Data Entry

ADAMS
Browse Data Archive

Date: 06/26/85:17:40:31
Username: JRD
Group: AUTOSIM

Table: N
Data Name: LIC1
Archive ID: AUTOSIM.LIC1
Archive Type: 1600 BPI Tape

Comments: The data archived is a result of the installation of
               AUTOSIM - It contains the LIC data from the manual
               runs executed prior to AUTOSIM installation 2/06/85.

\<Enter\> = Do	\<PF2\> = Help	\<-\> = Prev Record
\<0\> = Exit Screen	\<7/8\> = Print	\<,\> = Next Record

1 record found.   (B_DATA_AR_AS)

Figure 9. An Archived Data Entry

Glossary

GLOSSARY OF ADAMS TERMS

Access Level: Associates ADAMS usernames with access permission level codes (S, P, or G). The Access Level screen is discussed in *Chapter 6*.

account: Sometimes called a VAX/VMS username or user logon. You must have a valid AIRLAB account on VAX/VMS to use ADAMS. ADAMS and VAX/VMS are discussed in *Chapter 2*.

action screen: Used to browse, add, update and delete database records. Action screens are discussed in *Chapter 2*.

ADAMS: The AIRLAB Data Management System is an online environment that supports research at AIRLAB.

Add function: Creates new ADAMS database records and adds them to the database. The Add function is discussed in *Chapter 3*.

AIR1: The DECnet node name of AIRLAB's Digital Equipment Corporation (DEC) VAX 11/780. Also called *System 1*.

archive: Information that is not actively being used in an AIRLAB project. Archived information is usually stored on offline media (e.g., magnetic tapes).

Archive Medium: Tapes, disks, etc. which are available at AIRLAB for archiving files. The Archive Medium screen is described in *Chapter 5*.

arrow key: One of the four arrow keys on the terminal keyboard (up, down, left, right). The right and left arrow keys move the cursor right or left respectively on an action screen. The up and down arrow keys move the cursor in the scrolling and paging region on report screens.

auto wrap: A feature provided in some computer systems that automatically wraps information being typed at a terminal onto the next line of text when the end of the terminal screen is reached. ADAMS does not support auto wrap.

Browse function: Examines database records in a working set. Each report screen displayed represents a single database record. The Browse function is discussed in *Chapter 3*.

bug: An error in the construction of a computer program (i.e., software) that results in a malfunction. Bugs in AIRLAB software are reported with the Software Trouble Report screen.

case (upper/lower): Upper case letters (i.e., capital letters) are generated by pressing the <SHIFT> key while typing at the terminal keyboard. Some ADAMS data fields are all upper-case (e.g., keywords). Lower-case characters entered in these fields are automatically converted to upper-case.

command: An instruction to a program like ADAMS or the VAX/VMS operating system to perform a function. Many ADAMS commands are executed by pressing a terminal keypad key.

Contributor: AIRLAB researchers who use ADAMS to support their work. The Contributor screen is discussed in *Chapter 5*.

cursor: A special character displayed on a terminal screen that indicates where text is currently being entered or the active field for ADAMS commands. The cursor is sometimes displayed as a small box, and sometimes as an underscore character. The cursor may or may not blink, depending on the terminal's set up.

data access: The process of retrieving, deleting, or modifying existing data records in the ADAMS database. Permission to access a given data record depends on the username's security level and the type of data. ADAMS security is discussed in *Chapters 2, 5*, and *6*.

Data Archive: Tells what data has been archived by which AIRLAB contributors. The Data Archive screen is discussed in *Chapter 5*.

data retrieval: The process of reading records from the ADAMS database and making them part of the active working set. Once data records are retrieved, they can be altered using the Update function or removed from the database using the Delete function.

database: A collection of information stored on the computer's disks. The ADAMS database can only be accessed through the ADAMS user interface. Access to individual data records is restricted by user, project, and group using the ADAMS security system (see *Chapter 2*).

database function: Add, Update, Delete, and Browse are the only valid operations that can be performed on ADAMS database records. These functions are described in *Chapter 3*.

Database Operation: A set of submenus under the ADAMS main menu for manipulating database records. Database Operation screens are described in *Chapter 5* (see also *Maintenance Operation*).

database record: An individual report screen or data item stored in the ADAMS database. One or more database records are retrieved from the database and made part of the working set by setting up a template to qualify the search (see also *template*).

DEC: Digital Equipment Corporation, manufacturers of AIRLAB's VAX 11/780 computer and the VAX/VMS operating system.

default value: Certain fields on ADAMS action screens are automatically assigned a standard (i.e., default) value that the user can override by typing another acceptable value in the field.

Delete function: Removes existing ADAMS data records from the database. The Delete function is discussed in *Chapter 3*.

device: Hardware associated with a computer system that performs one or more specialized functions (e.g., disk drives for storing data).

diagnostic message: Information generated by a computer system like ADAMS that describes action taken in response to a command or warns of error conditions.

directory: A special location under the VAX/VMS operating system where files are stored. File directories may have subdirectories under them; this is useful for separating data files by project or experiment.

Documentation: User manuals, guides, and other media used during an AIRLAB project. The Documentation screen is discussed in *Chapter 5*.

editor: An interactive computer program for creating and modifying text files. EDT is the most commonly used VAX/VMS editor.

EDT: See *editor*.

error condition: A fault in a computer system caused by bad data, incorrect user input, or internal errors that prevents the system from operating correctly (see also *bug, fix*, and *diagnostic message*).

error message: See *diagnostic message*.

Experiment: AIRLAB experiments that a group is working on under a project. The Experiment screen is discussed in *Chapter 5*.

field help: An ADAMS status message that describes the contents of a field on an action screen. The help command is described in *Chapter 2*.

field name: The label associated with an ADAMS action screen field. Action screens and their fields are described in *Chapters 5* and *6*.

field value: The data value associated with an ADAMS action or report screen field. A field value is usually displayed to the right of the field name, but this depends on the nature of the field (single line, multi-line, scrolling region, or paging region).

file: Information stored on a disk (see also *database*).

fix: Changes made to a computer system to repair a bug (see also *bug*).

function: See *Add function, Delete function, Update function,* or *Browse function.*

Gold key: The <PF1> key in the top row of the numeric keypad. Many keypad keys perform more than one function; alternate functions are selected by pressing the Gold key first.

group keyword: An identifier group members can use to tag database records for later retrieval by members of their group. Group keywords are discussed in *Chapter 6* (see also *Keyword* and *Personal Keywords*).

group level: Security level that allows a user to create and access common group data, use group keywords, and create and access personal data. Group level security is discussed in *Chapter 2* (see also *project level, system level*).

group member: A username that has been assigned to a group by a project leader or system manager.

hardware: The physical components of a computer system, including devices (as opposed to the programs that run on the system: see also *software*).

Hardware Configuration: Selected from a submenu under Configuration Management. Hardware installed or removed from AIRLAB's computer system.

Hardware Unit: Hardware that supports AIRLAB experiments. The Hardware Unit screen is discussed in *Chapter 5*.

ident: A numeric identifier field associated with certain types of ADAMS database records. An ident field value is automatically assigned to a newly created data record.

Inhouse Software: Software written at AIRLAB to support experiments. The Inhouse Software screen is discussed in *Chapter 5*.

insert mode: Used to insert information in the middle of an action screen field's value. Insert mode is discussed in *Chapter 3* (see also *overstrike mode*).

Institution: Organizations that are conducting experiments at AIRLAB. The Institution screen is discussed in *Chapter 5*.

interaction: The process of performing work at a computer terminal by typing commands at the keyboard and observing the system's response on the terminal screen (see also *invoke*).

interface: The part of a computer system that a user directly interacts with, including terminal screen displays, diagnostic messages, and all keyboard and keypad commands.

invoke: To call up a computer program or operating system function by typing a command at the terminal keyboard (see also *interaction*).

key value: An ADAMS action screen field value that is used to select data records for retrieval (e.g., username or data name).

keyboard: In the ADAMS User's Guide, usually refers to the main part of the terminal keyboard (as opposed to the numeric *keypad*).

keypad: The set of numeric keys, programmable function keys (PF), <Enter>, and punctuation keys to the right of the main part of the terminal keyboard.

Keyword: The Keyword screen is discussed in *Chapter 6*. It associates keywords with individual project groups (see also *group keyword* and *Personal Keywords*).

Logoff: Used as a verb to describe the process of terminating an interactive session on AIRLAB's computers. The Logoff screen is described in *Chapter 6*. It contains information identifying the end of each ADAMS session.

Logon: Used as a verb to describe the process of accessing AIRLAB's computers and the ADAMS system. Occasionally used as a synonym for *username* (see also *username*). The Logon screen is described in *Chapter 6*. It contains

information identifying the start of each ADAMS session.

main menu: The set of ADAMS options that first appears after the initial Logon screen. The ADAMS menu structure is diagrammed in *Appendix B* (see also *menu, menu screen*, and *menu tree*).

Maintenance Operation: A set of submenus under the ADAMS main menu for manipulating database records related primarily to ADAMS maintenance and security functions. Maintenance Operation screens are described in *Chapter 6* (see also *Database Operation*).

mandatory: Describes an action screen field that must be filled out when creating a template for data record retrieval or entering a new data record (see also *optional*). Failure to supply a value for a mandatory action screen field will generate an error message.

menu: A list of ADAMS command options displayed on the terminal screen. An individual option is selected by typing its menu index (displayed next to the option name on the screen). ADAMS menu structure is diagrammed in *Appendix B*.

menu-driven: Describes a user interface (like ADAMS) that provides menus and submenus for user interaction (see also *menu*).

menu screen: An ADAMS screen that displays a menu of options (see also *action screen* and *report screen*).

menu tree: Certain menu options display secondary menus when they're selected. The overall branching structure of the ADAMS menu system resembles an inverted tree, with the main menu at the root. ADAMS menu structure is diagrammed in *Appendix B*.

mnemonic: A short descriptive name associated with ADAMS menu and action screens. ADAMS screen mnemonics are listed alphabetically in *Appendix C* and on the *ADAMS Quick Reference Card*.

modify permission: A username that can delete or update an existing ADAMS database record has modify permission for that record. (see also *read permission* and *write permission*).

multi-line field: An ADAMS action or report screen field that has a single value that fits across multiple lines (see also *single line field, scrolling region*, and *paging region*).

Notebook: Online experimenter's or engineer's notebook that contains personal and project notes written during an experiment. The Notebook screen is discussed in *Chapter 5*. Notes can also be created from any menu by pressing <.>ᴋᴇʏᴘᴀᴅ command to move to the Notebook screen, or outside the ADAMS system with the *note* command under VAX/VMS. See *Chapter 2* for a discussion of ADAMS commands.

online: A computer program, database, or data file that is directly accessible to the computer user is said to be online (as contrasted with *archived*).

operating system: A set of programs that allow a number of users to share a computer's hardware and software resources (see also *VAX/VMS*).

operator: One or more special characters used to specify data record creation date limits for qualifying database retrieval. Search templates are discussed in *Chapter 3*. This term is also used to refer to a person who's responsible for monitoring a running computer system, mounting user tapes, etc.

optional: Describes an optional action screen field that can be filled out to qualify data record retrieval or entered on a new data record (see also *mandatory*).

ORACLE: A database management system at AIRLAB. The ADAMS system uses ORACLE to maintain its database file, but the ORACLE transactions are hidden from the user.

overstrike mode: Used to type over information already entered in an action screen field. Overstrike mode is discussed in *Chapter 3* (see also *insert mode*).

page: A single terminal screen or portion of a terminal screen used for displaying data. Used as a verb, this term refers to the action of bringing up the next region of data for display on the screen.

paging region: An ADAMS action or report screen field that contains one or two values surrounded by brackets. To enter a paging region, press <1>ᴋᴇʏᴘᴀᴅ; to page through the region, use the arrow keys. (See also *single line field*, *multi-line field*, and *scrolling region*.)

password: A secret key used to access a VAX/VMS username.

permission: See *read permission*, *modify permission*, and *write permission*.

Personal Keywords: Identifiers defined by the individual ADAMS user to tag and later retrieve database records. The Personal Keywords screen is discussed

in *Chapter 5* (see also Keyword and group keyword).

privilege: Refers to the level of access a username has been granted to a subset of the ADAMS database. ADAMS security is discussed in *Chapters 2, 5, and 6* (see also *data access, security validation,* and *group/project/system level*).

Processed Data: A data set resulting from the processing of raw data (e.g., statistical analysis, data reduction). The Processed Data screen is discussed in *Chapter 5.*

Project: Associates ADAMS projects with individual groups. The Project screen is discussed in *Chapter 6.*

Project Access: Associates ADAMS usernames with ADAMS projects. The Project Access screen is discussed in *Chapter 6.*

project leader: An ADAMS user who is responsible for one or more experiments under an AIRLAB project (see also *system manager* and *group member*).

project level: Security level that allows a user to deactivate and reactivate projects, define and undefine group keywords, and assign and deassign users to project groups. Project level security is discussed in *Chapter 2* (see also *group level, system level*).

prompt: A message printed on the terminal screen requesting user input (see also *cursor* and *field name*).

qualified search: A limited retrieval of records from the ADAMS database based on a search template. Search templates are discussed in *Chapter 3* (see also *operator* and *template*).

Raw Data: Provides information about unprocessed AIRLAB experimental data. The Raw Data screen is discussed in *Chapter 5.*

read permission: A username that can retrieve an existing ADAMS database record for browsing has read permission for that record (see also *modify permission* and *write permission*).

record: See *database record.*

regular keyboard: See *keyboard* and *keypad.*

report screen: An ADAMS screen that displays a retrieved data record from the database (see also *action screen* and *menu screen*).

reverse video: A way of highlighting text on a DEC computer terminal screen by displaying it in a different color background.

screen: See *action screen*, *menu screen*, or *report screen*.

scrolling region: An ADAMS action or report screen field that contains one or more lines of text surrounded by a box (see also *single line field*, *multi-line field*, and *paging region*).

security level: See *group level*, *project level*, or *system level*.

security validation: The process that the ADAMS system goes through in checking to see if a user has permission to access a data record. ADAMS security is discussed in *Chapters 2, 5,* and *6* (see also *data access* and *group/project/system level*).

session: A complete period of VAX/VMS and/or ADAMS work from logon to logoff.

shared database: A set of data that can be manipulated by several users simultaneously. The ADAMS database is discussed in *Chapter 2*.

single line field: An ADAMS action or report screen field that fits on a single line (see also *multi-line field*, *scrolling region*, and *paging region*).

software: The programs that run on a computer system (as opposed to the physical components that make up the system (see also *hardware*).

Software Archive: Tells what AIRLAB software has been archived and on which devices. The Software Archive screen is discussed in *Chapter 5*.

Software Configuration: Selected from a submenu under Configuration Management. Software installed or removed from AIRLAB's computer system.

Software Trouble Report: For reporting and viewing software bugs and fixes to them. The Software Trouble Report screen is discussed in *Chapter 5*.

status message: See *diagnostic message*.

storage media: Tapes, disks, or other devices used for storing data. See also *Archive* and *Archive Medium*.

string: A data field that contains upper and/or lower case characters, numbers, and special characters (as opposed to purely numeric data). An address or

name would be an example of a string.

submenu: A menu that appears as a result of choosing an option on another menu (see also *menu* and *menu tree*).

System 1: Refers to AIRLAB's DEC VAX 11/780 computer (see also *AIR1*).

system level: Security level that allows a user to access any data in the ADAMS system and grant access to ADAMS to other users. System level security is discussed in *Chapter 2* (see also *group level, project level*).

system manager: An ADAMS user who is responsible for maintaining the ADAMS system, creating new projects, and validating new ADAMS users (see also *project leader* and *group member*).

table (ORACLE): Entries in an ORACLE database that satisfy a specific relation. See the ORACLE documentation for further information.

Technical Paper: Describes literature references used and generated during an AIRLAB experiment. The Technical Paper screen is discussed in *Chapter 5*.

template: An action screen whose fields are used to qualify a data record retrieval. Templates are discussed in *Chapter 3* (see also *operator* and *qualified search*).

tree: See *menu tree*.

Update function: Modifies fields in existing ADAMS data records and replaces them in the database. The Update function is discussed in *Chapter 3*.

User: A user is someone who uses a computer to support his/her research. The User screen is discussed in *Chapter 6*; it associates ADAMS usernames with individual project groups.

user interface: See *interface*.

username: An account name used to get access to AIRLAB's VAX/VMS operating system (see also *account, Logon,* and *Logoff*).

validation: See *security validation*.

VAX/VMS: The operating system (see also *operating system*) for AIRLAB's DEC VAX 11/780 computer.

Vendor Software: Software purchased from non-AIRLAB vendors to support experiments. The Vendor Software screen is discussed in *Chapter 5*.

working set: The ADAMS database records retrieved as a result of a qualified or unqualified search (see also *qualified search*, *operator*, and *template*).

write permission: A username that can create a new ADAMS database record and add it to the database has write permission for that kind of record (see also *modify permission* and *read permission*).

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