COMPUTER AIDED TRAINING DEVELOPMENT SYSTEM (CATDS)

J.D. Jared

Boeing Military Airplane Company
Integrated Logistics Support
Seattle, Washington

ABSTRACT

The newly developed Computer-Aided Training Development System (CATDS) is an innovative approach to reducing the time and expense inherent in the Instructional Systems Development (ISD) process. CATDS is unlike other systems in its flexibility of applications, support of user definitions and ability to interface with Logistics Support Analysis (LSA) databases. The overall goal for the system was to provide better training to DoD customers at a lower cost.

CATDS was written in Turbo Pascal to take advantage of its data manipulation speed and practical use on standard PCs. The system currently uses five major files to support task and training requirements analyses. These are: Task File, Definition File, Index File, Equipment File, and Reference File. These are a combination of user-modified and system-modified files and form the main database for CATDS. In addition to the five main files, CATDS supports the concept of task planning matrices to be used during the task identification phase. The analyst inputs and manipulates data through a series of screens.

CATDS generates management and contractual reports through the successive stages of ISD, and from proposal analysis, to final deliverable courseware and training device requirements, including CDRL items. It provides analytical documents and audit trail documentation for any portion of the ISD process. Information available to management enables them to track progress and identify potential problems quickly.

CATDS has been used effectively to support contractual requirements and proposal efforts for aircrew and maintenance training. CATDS has been used to support the A-6 Replacement Wing program, where over 3,000 tasks were analyzed. CATDS has supported the Egyptian and Italian 707 Tanker programs with approximately 1,500 and 1,200 tasks analyzed. CATDS has been proposed for the Advanced Tactical Fighter, the Army's Light Helicopter (LHX) family, the Space Station, the Facility Intrusion Detection System (FIDS) and additional tanker programs for Brazil, Australia, and Spain.

BACKGROUND

The Instructional System Development (ISD) process has been used in its many guises to varying degrees in training system development since the late 1960's. The analysis effort expended in developing training systems has been characteristically a labor-intensive process; the analyst systematically accomplishing most of the tasks manually. The Navy analysts used the procedures in MIL-T-29053B, Requirements for Training System Development, the Army analysts used the Systems Approach to Training Model (Figure 1) and the Air Force analysts used the Instructional System Development Model (Figure 2). Corporations used their own variations of the model, such as the one in Figure 3. These approaches all had one thing in common, they required a lot of "stubby pencil" effort. A significant amount of the training analyst's time was occupied with recording data or compiling reports, all of which were (and still are) predominantly administrative functions.

FIGURE 1. SYSTEMS APPROACH TO TRAINING MODEL

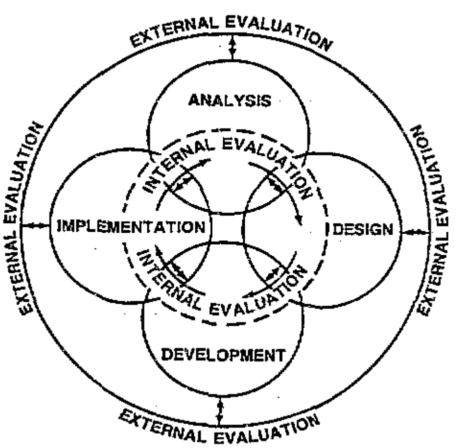
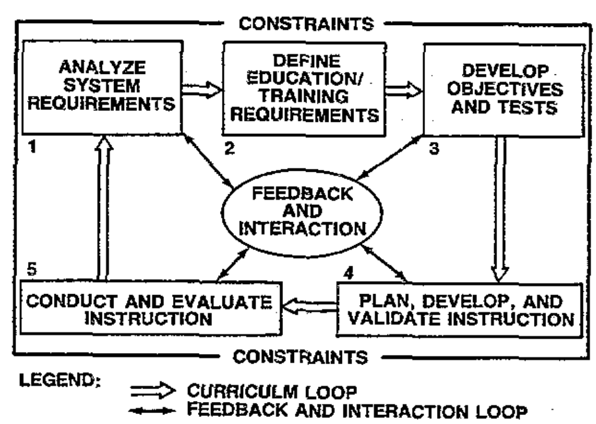


FIGURE 2. INSTRUCTIONAL SYSTEMS DEVELOPMENT MODEL

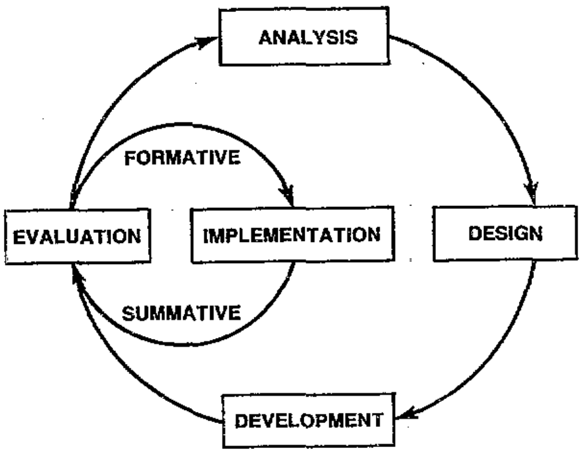


TRAINING ORGANIZATION NEEDS

In order to efficiently meet the needs of a training organization, the analysis system must provide the capability to store and manipulate information about the following entities:

- Tasks
- Personnel
- Equipment
- References
- Hazards
- Skills and Knowledge
- Cues
- Objectives
- Courses
- Media

FIGURE 3. COMMERCIAL TRAINING SYSTEM DEVELOPMENT MODEL



The training analysis and development systems currently in use have one thing in common. They are all concerned with the identification of tasks that individuals or groups are required to perform and how to implant the requisite skills and knowledge. There is a considerable volume of data required to be generated about each task, even if it "falls out" during the training decision process. Figure 4 identifies the type of information about tasks and steps that may be needed by the analyst, subject matter experts and management during the ISD process.

FIGURE 4. TASK AND STEP INFORMATION REQUIREMENTS

<u>Task</u>
<u>Task Identifier</u>
<u>Task Description</u>
<u>Task Analysis Information</u>
(<u>From Subject Matter Expert</u>)
- Work Unit Code
- Work Center
- Personnel Requirements
- Task Frequency
- Time Required to Perform Task
- List of Equipment Required to Perform Task
- List of References Required to Perform Task
- Task Cues
- Job-Site Hazards
  - to people
  - to equipment
- Skills Required to Perform Task
- Knowledge Required to Perform Task
- Proficiency Required to Perform Task
- Task Conditions
- Task Standards
- Task Criticality
- Task Difficulty
- Task Complexity

<u>Training Analysis Information</u>
(<u>From Training Analyst</u>)
- Entry Skills
- Entry Knowledge
- Entry Proficiency
- Training Decision
- Learning Categories
- List of Appropriate Training Media
- Time Between Training and Doing
- Training Hazards
  - to people
  - to equipment
- List of Training References and Documents
- List of Training Equipment and Facilities
- Objectives
- List of Instructional Setting (Courses)

<u>Management Information</u>
- Task Status
- Hardware Status
- Publications Status
- Date Task Was Created
- Date Task Was Last Changed
- Training Analyst Responsible
- Generation Number

TREND TOWARD AUTOMATION

Recent developments in computer technology have made available large amounts of data processing capability to a broad variety of users. This increase in capability has resulted in collateral systems which have been automated, such as logistics support analysis, or are rushing towards automation, like technical manuals in the Automated Technical Order System (ATOS) concept. Many analysts have seen the comparable need to apply the power of the computer to training analysis. Some improvements in analytical efficiency have been noted in recent years with the proliferation of personal computers. Primitive computer-based training analysis systems were typically stand-alone systems, not interfaced with source data systems, but merely placed the paper and pencil processes onto the screen and printer. The training analysts used the computer to record their data and to prepare reports. This advancement greatly facilitated the training analysts' ability to manipulate the stored data. However, it remained largely a manual operation, since the data was still loaded keystroke by keystroke. The keyboard merely replaced the stubby pencil. It seemed significant advances in automation were being made in every field except training analysis.

CATDS CONCEPTS

The Boeing Computer Aided Training Development System (CATDS) was conceived as a means to assist the training analyst in the collection, recording, manipulation, analysis, and output of the training data. It was designed to satisfy the requirement for a training analysis and development capability which could support both aircrew and maintenance training in a total system concept. It was determined early-on that the system could not and should not replace the expertise of the training analyst. Any models developed for the system would be recommendations only, with the final decision being made by the training analyst. The model decisions would not be recorded without the concurrence of the analyst.

The development of CATDS had five specific objectives:

1. To computerize the task analysis process while retaining active involvement of the training analyst.
2. To improve the efficiency of the ISD/SAT process by reducing the man-hours required for manual recording and manipulation of data.
3. To provide a standardized, systematic means to approach task analysis.
4. To reduce duplication of effort by providing the analyst immediate access to all task analysis data.
5. To make use of Logistics Support Analysis (LSA) data.

Since the objectives of most training analysis systems are to identify tasks that require training and then determine how to go about training people to do them, CATDS focuses on tasks. CATDS uses existing task lists, tasks from LSA or other sources, or it can be used to develop a task list from an equipment list. A wide variety of task-specific data is collected and stored in a task file by CATDS.

From the practical viewpoint, CATDS had to be relatively easy to use and preferably usable on Personal Computers (PC). The latter requirement provides a significant challenge to store all of the data associated with training analysis and courseware development. Despite our target system (IBM PC/XT) having 640 Kbytes of RAM and 20 Mbytes on a hard disk, past experience had shown this could be quickly filled, particularly if more than one weapon system was being analyzed at the same time. An alternative to merely storing large ASCII files had to be developed and implemented. In addition, it was felt the programming language should be capable of being transported between different manufacturers' computer systems. Since it had been previously determined that the system would be directed at PC systems due to the generally widespread availability of these machines, we concentrated on a language suitable for use on most of the varieties. Turbo Pascal was selected as it met almost all of the design criteria. It would run effectively on most PC-DOS/MS-DOS compatible machines.

CATDS DEVELOPMENT

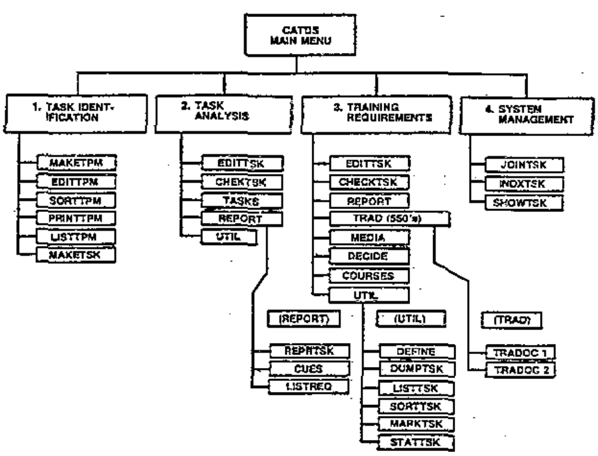
The development of CATDS was a complex project, requiring considerable computer expertise. We requested expert assistance from Boeing Computer Services (BCS). BCS had been working with the BMAC Training and Manpower organization on development of Artificial Intelligence (AI) applications to training. The AI approach maintained data on equipment states by using Boolean matrices, or truth tables. This has proven to be a highly efficient method for storing large amounts of data with small memory requirements. The AI program was a maintenance diagnostic training program using video disc, written in Turbo Pascal and operated on a personal computer. The data storage concept was modified somewhat when applied to CATDS. A schema was developed that uses the first 65 data columns to store relevant information about the task. The stored data might look like this:

150000020500000000000000001234678510-1234TVW CEU

This entry would be followed by the task description. Each element in each position has a discrete meaning, translated by correlation to lines of text in a definition file.

In an effort to make CATDS easy to use [for training analysts and Subject Matter Experts (SMEs) who are not normally computer experts] a menu-driven user interface was developed. It is hiearchical in nature, as shown in Figure 5, with the major elements of Task Identification, Task Analysis, Training Requirements, and System Management forming the intermediate menus leading to the actual programs that make up the heart of CATDS.

FIGURE 5. CATDS USER INTERFACE STRUCTURE



TASK IDENTIFICATION

In the task identification process, CATDS supports several approaches. If a task list is available from another source, such as technical data, subject matter experts, or LSA, it will support completion of the analysis process. CATDS uses a simple seven-step approach to set up task data files. First, a text file of the tasks is created using a text editor or word processor, with the only constraint being a limitation to 79 total characters on a single line. Next, the text file should be reviewed for completeness. The third step creates a new task file through the use of the CATDS MAKETSK program. Provisions are included to identify task steps. The fourth step uses the CATDS program TASKS to print the created task list. The fifth step uses the CATDS program INDXTSK to create an index file. In the sixth step, the program INITTSK is used to set initial values for various data items, if required. The final step is a transition to the analysis phase.

However, in the early stages of a weapon system development, the only available data input is often an equipment list. This requires additional steps to convert the input data into a form usable by CATDS and the analyst. First, a text file of the system or equipment items is created using a text editor or word processor. Next, as before in the use of task lists, the list is reviewed for completeness. The CATDS program MAKETPM uses the equipment list text file to create a task identification matrix (Figure 6). The task identification matrix is used by the program EDITTPM to allow the SMEs to add item-specific information to this file. The fifth step permits the analyst to print out blank copies of the Task Identification Matrices for use by the SMEs in recording their inputs in an off-line mode. The sixth step is the use of the EDITTPM program to enter the SMEs' inputs into the file. The programs LISTTPM and PRINTTPM are used in the seventh step to create review copies of the Task Identification Matrices. The eighth step uses Option "T" of program MAKETSK to generate a task file. The remaining steps are concerned with review, creation of an index file and transitioning into the analysis process.

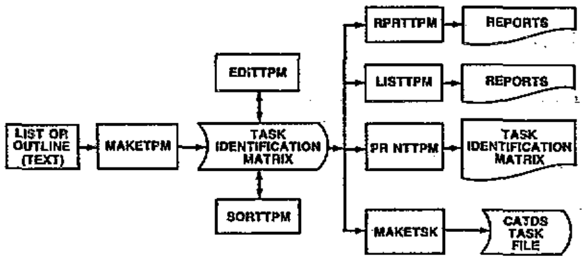
FIGURE 6. TASK IDENTIFICATION MATRIX

Analyst: ____ File: ONEPAGE.TPM Date: 17 NOV 86 Page 1

	Ident.		Description	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
C	67955	X	Test Component	O							O										*	*	*	*					
C	MPSF																												
A	510-1233																												
M	6795541		Another Test Item	O														O											
C	FE																												
A	TO-12345			D							D																		
U	1234678		Better Test Item	O	O								O																
C	TVW										I																		
E	510-1234				D								D																
U	123		Test System	O	O						O		O				O		O										
S	TVW																												
E	510-1234				D						D		D				D												
	Ident.		Description	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

The foregoing process for identifying tasks (Figure 7) seems clumsy when described in words, but in reality, it is quite rapid. Two analysts working for two hours were able to identify over 800 tasks for a proposal document. An added benefit to this approach is that program MAKETSK automatically handles the writing of the task descriptions; spelling is totally uniform. Experience has shown that the simplicity of specifying tasks by this method causes SMEs to tend to err on the side of overcompleteness, which is a highly desirable consequence in the early stages of a project or proposal effort.

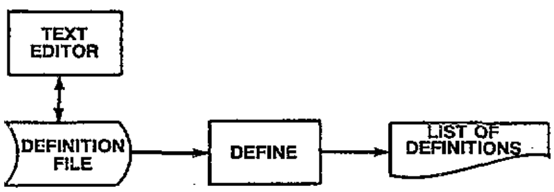
FIGURE 7. CATDS TASK IDENTIFICATION PROCESS



TASK ANALYSIS

During the second step of the training development process, the tasks that have been identified must be analyzed to determine if the tasks require training, and to record task information needed to develop such training. Before this phase of analysis is begun definitions for job codes, conditions, and standards must be placed in a definition file using a text editor, or word processor, as shown in Figure 8. The definition files are used by the system to define text strings to be used in outputs. The four major benefits of using "soft" codes in place of text are: reduced typing labor, reduced computer storage, improved output consistency, and greater system flexibility. Figure 9 shows a sample of the data contained in a definition file.

FIGURE 8. CATDS TASK DEFINITION FILE DEVELOPMENT



Alphanumeric codes are used by the analyst in analyzing the tasks to identify skills (A:-:), knowledge (B:-:), etc. These codes are thereafter associated with the task in the task database and are linked to the definitions in the definition file when outputs are requested. In addition, a reference file and an equipment file should also be established. The reference file is nothing more than a text file containing a list of references. Equipment files are also text files and contain a list of equipment. The analyst uses CATDS program EDITSK to accomplish the analysis.

The use of codes greatly simplifies the data entry requirements for the analyst. All codes starting with an "A" are skill codes, those starting with "B" are knowledge codes, and so on through the alphabet. Each code group has up to 36 possible responses (26 alphabetic and 10 numeric). In some cases, special characters can also be used to represent an entry. Instead of writing/typing text, such as, "Basic FM radio maintenance school", the analyst would enter I:B:. The computer makes the link from the entry to the definition file and automatically converts the code to text in outputs. The analyst saved 29 keystrokes on one entry. The definition file also allows the analyst to reduce the repeated entry of item names. In Figure 9, the use of ### in the verb list is linked to the name of the equipment/item being analyzed. There is a considerable reduction in data entry keystrokes and reduces the requirement for keyboard familiarity on the part of the analyst or SME.

FIGURE 9. DEFINITION FILE — SAMPLE CONTENTS

```
CODE DEFINITION

O:     Navy Sailing Ship Maintenance Training
1:     U.S. Navy
A:A:   Skills gained in "A" school or equivalent OJT
A:B:   Basic skills composite power tools
B:A:   Knowledge gain in "A" school or equivalent OJT
B:B:   Required prerequisite knowledge
C:A:   Given appropriate training device
C:F:   Wings Folded, flaps and slats extended
F:?:   Task frequency is unknown
F:1:   Very infrequently; less than twice a year
G:1:   Organizational level
G:3:   Depot level
I:B:   Basic FM radio maintenance school
J:A:   Avionics Technician (AT)
J:M:   Metalsmith (AMS)
K:1:   No effect on mission
M:L:   Interactive vidodisc
M:S:   Operational trainer
N:3:   Not suitable for aluminum
V:B:   Test ###
V:J:   Repair ###
```

In the use of program EDITTSK, seven different screens are required to complete the task analysis: Basic Task Information; Personnel Factors; Task References; Facilities & Equipment; Conditions & Standards; Task Proficiency Levels; and Job Hazards. The Personnel Analysis screen, as shown in Figure 10, is representative of the task analysis screens. The titles of personnel required to perform the task are entered by the analyst (underlined data), using the "J:" codes in the definition file. The Component codes are used to specify that the task is done by Active Duty, National Guard or Reserve Components. The analyst must use the following codes:

1 = Active Duty
2 = Reserve
3 = Active and Reserve
4 = National Guard
5 = Active and National Guard
6 = Reserve and National Guard
7 = All Components

FIGURE 10. PERSONNEL ANALYSIS SCREEN

```
==============================================================
                      Personnel Analysis

             Title/MOS/AFSC/Rate: A
           Components of Service: 7     [1..7]
             Task Frequency Code: 2     [1..4]
      Percentage of people doing job: 90
Percentage of time spent doing job: 7
            Actual time to perform: 3
                   Task Difficulty: 2

==============================================================
Change Screen: 2
==============================================================
```

The task frequency codes are defined in the definition file. If the data originated from an LSA database, the codes must be interpreted and changed to the standard values as follows:

1: Very infrequently	3: Frequently
2: Infrequently	4: Very frequently

The percentage of people doing the job is derived from surveys, SME experience, or actual user data. CATDS recognizes that not every student will actually perform every task after training. The percent of people who actually do the task is used as part of the basis for deciding whether a task is to be trained or not.

The training analyst uses his knowledge, skills and experience to select codes from the previously developed definition file to identify the environment and requirements of a task or a task step. Similar analyses are used to complete the remainder of the Personnel Analysis screen. The data forms the basis for determining the need for training and who will receive it.

ANALYZING TRAINING REQUIREMENTS

After tasks have been identified and analyzed, the training requirements analysis process identifies those tasks that require training. The CATDS program EDITTSK uses screens "A" through "G" to capture the data and decisions of the training analyst during the training requirements analysis. These screens are:

A. Training Hazards
B. Training References
C. Entry Proficiency Levels
D. Training Decisions
E. Instructional Factors
F. Cues, Facilities, & Equipment
G. Skills & Knowledge

The Training Decisions Screen "D", as shown in Figure 11, is representative of those used during the training analysis process. Training decisions made by the analyst are recorded using this change screen. Referring to Figure 11, probability of poor performance is used as a relative measure of task complexity and is indicated by the analyst according to the following codes:

1: Extremely rare; procedure consists of only one step and no decisions.

2: Rare; procedure consists of one to five steps and decisions.

3: Average; procedure consists of six to ten steps and decisions.

4: High; procedure consists of over ten steps and decisions.

FIGURE 11. CHANGE SCREEN D. : TRAINING DECISIONS

```
==========================================================

                    Training Decisions

Probability of Poor Performance : 1    [1=none .. 4=high]
      Refresher Training Reqmnt: 1    [1 .. 4]
               Task Criticality: 1    [1 .. 4]
            Training Rationales: HEC
              Training Decision: Y    [Y or N]
Months between Training and Task: 1    [0 .. 60]

==========================================================
Change Screen: D
==========================================================
```

Refresher training requirements are a relative measure of the amount of delay that can be tolerated between the time training occurs and the time actual performance would normally take place. Codes and their meanings are as follows:

1: Refresher training can be postponed indefinitely/ OJT sufficient.

2: Refresher training can wait until a subsequent mission/task.

3: Refresher training required for a mission/task.

4: Frequent refresher training required.

A single numeric code indicating why the task is or is not a critical task may be specified. The meaning of this code is defined in the "K" list of definitions in the definition file. Training rationales are reasons supporting or denying the need for formal training. Analysts may specify several codes from the definition file for this purpose. The training decision line in Figure 11 is used to record the final decision as to whether or not training is required. The length of time between training and time of actual performance may be significantly long, which is why there are up to 60 months available in the program.

CATDS has a feature to support the train/no-train decision. Program DECIDE is a rule-based expert system that gives management and analysts outputs for comparison. DECIDE was developed to provide a uniform method of analyzing and presenting train/no-train decisions. DECIDE takes its inputs from several key fields in the task data base, among them training and job hazards, task criticality, task frequency and task complexity.

CATDS will also generate media recommendations. Program MEDIA makes use of expert system technology in selecting media for a training system. The task learning categories previously entered with program EDITTSK are compared to a matrix of media that are the CATDS media list and their respective fulfillment of the specified learning categories. Media are presented for each task in the order of their best fit to the supplied learning categories, as well as the "estimated" media selection entered by the analyst for each task which is presented for comparison. The media considered also include training devices, such as flight and maintenance simulators. The level of detail is suitable for use as functional requirements for training device specification development. In addition, the unique file maintenance aspect of CATDS provides an excellent audit trail back to the initial training requirement identification.

In addition to training and media recommendations, CATDS has the capability to group related tasks into preliminary instructional modules with program COURSE. The resulting modules can be used as course descriptions, as shown in Figure 12, or for further analysis.

REPORTS

For support of system management, CATDS produces reports for program managers and analysts. It has the capability to produce 27 different reports, many of which meet the requirements of MIL-STD-1379B/C, MIL-T-29053B, and other Contract Data Requirements List (CDRL) Data Item Descriptions (DIDs). The partial task listing in Figure 13 is an example of the reports that can be generated by CATDS. Each task and task step has its unique identification number and the structure of the data base that allows the analyst and the system to maintain the internal audit trail required in analysis and report generation.

System management is enhanced by the variety and types of reports available from CATDS. The Manager's Report (Figure 14) identifies the task and step identification number, who analyzed the task, when it was created, when it was last changed, the generation number, publications status, hardware status, task status, and the model recommendation for train or no-train. This and the other 26 available reports provide management enhanced visibility over the status and progress of the training program development.

FIGURE 12. COURSE DESCRIPTION — GENERATED BY COURSE

```
Course Title: CIN C-602-3761  A-6 Airframe/Hydraulics Org. Mt. Crse.

Course Objective
  Demonstrate a knowledge, in writing, of
  Demonstrate a knowledge, by performing repairs of

Course Prerequisites
  Skills gained in A School or 6 months equivalent OJT
  Basic skills A-6E existing support equipment
  Basic skills with common aircraft hand tools
  Basic skills with common aircraft power tools
  Demonstrate a knowledge, in writing, of
  Demonstrate a knowledge, by performing repairs of

Personnel
  Corrosion Control (all ratings)                      DOS: None
  (AMH) Aviation STructural Mechanic Hydraulis         DOS: DB-9760
  (PC) Plane Captain (all ratings)                     DOS: None
  Familiarization                                      DOS: None
  (AMS) Aviation Structural Mechanic Structures        DOS: DB-9760
  Test Team

Media
  Reference Books, Manuals or Text (Print)
  Reference Charts
  Overhead Transparencies
  FAM Trainer/Full Scale Mock-up

Course Content

ADS005 Inspect Spar, rear, IB, L&R
VOS005 Preserve Spar, rear, IB, L&R
AOS007 Inspect Spar, leading edge, IB, L&R
VOS007 Preserve Spar, leading edge, IB, L&R
AOS008 Inspect Can, Slat Track, IB, L&R
HOS008 R & R Can, Slat Track, IB, L&R
JOS008 Repair Can, Slat Track, IB, L&R
VOS008 Preserve Can, Slat Track, IB, L&R
AOS009 Inspect Ribs, tank end, intermediate, IB, L&R
...
```

FIGURE 13. LIST OF TASKS AND STEPS — GENERATED BY STEPS

```
15 NOV 86      Task Steps from File: TEST.TSK        Page 1

Inspect Actuator [ADA001]
   1. Remove access cover [ADA001/010]
   2. Visually inspect Test Item for corrosion and cracks [ADA001/020]
   3. Replace access cover tightly [ADA001/030]
   4. Record inspection in aircraft maintenance log [ADA001/040]

Test Actuator Base Plate at depot (NARF) [BDC003]

Test Actuator [BDA001]

Test Upper Hydraulic Line [BDC003]

R & R Lower Return Hydraulic Line [HDC002]

R & R Upper Hydraulic Line [HIC003]
```

FIGURE 14. MANAGER'S REPORT — GENERATED BY SHOWTSK

15 NOV 86 Tasks from task file: TEST.TSK Page 1

Task/Step ID	TA/ SME	Date Task Created	Date Last Changed	Gen. Number	— Statuses — Pub.	HW	Task	Model T/NT
1G1	1st	15 NOV 86	15 NOV 86	0	G	G	G	?
1E1	1st	15 NOV 86	15 NOV 86	0	G	G	G	?
1E2	1st	15 NOV 86	15 NOV 86	0	G	G	G	?
ADA001	JDD	15 NOV 86	15 NOV 86	2	G	G	G	Y
ADA001/010	JDD	15 NOV 86	12 DEC 86	2	G	G	G	Y
ADA001/020	JDD	15 NOV 86	15 NOV 86	2	G	G	G	Y
ADA001/030	JDD	15 NOV 86	10 DEC 86	2	G	G	G	Y
ADA001/040	GJM	16 NOV 86	16 NOV 86	3	G	G	G	Y
BJA001	MEG	15 NOV 86	15 NOV 86	3	G	G	G	Y
RDA001	JDD	15 NOV 86	15 NOV 86	2	G	G	G	Y
SIA001	JDD	15 NOV 86	15 NOV 86	1	G	G	G	N

CAPABILITIES

CATDS has been used by the Boeing Military Airplane Company in support of several programs and for proposal development. Training analysts have used CATDS in the analysis of over 3,000 tasks in support of the A-6 Replacement Wing program for the U.S. Navy. In the Egyptian and Italian 707 tanker/transport aircrew and maintenance training programs, approximately 1,500 and 1,200 tasks were analyzed respectively. The manhours required to accomplish the training analysis and program development were reduced by approximately 30 percent over previously used systems. This savings includes the lower portion of the learning curve for the analysts.

CATDS was used during the A-6 Replacement Wing program to identify maintenance training equipment fidelity requirements. These requirements, in turn, were used in the development of Prime Item Development Specifications (PIDS).

A significant benefit to the training analyst has been the use of CATDS in proposal development. There is a quantum step forward in the amount of detail that can be incorporated into a proposal. In a proposal to develop training for the Australian 707 Tanker/Transport RFP, two analysts working only two days identified and analyzed 1,008 tasks. CATDS was used to analyze these tasks and create preliminary course outlines. These course outlines were included in a Tentative Training and Training Equipment Plan (TTEP) which was included with the proposal.

CATDS has used task data obtained from the LSA database for training and training requirements analyses. In preliminary preproposal work on the Army's light helicopter (LHX) program CATDS was used to extract tasks directly from the LSA data base, specifically the C06 Records. This was accomplished on two separate occasions to verify the effectiveness of the process. It has also been used to obtain and analyze tasks from the A-6 LSA data base. With the experience of accessing LSA data, it is not too difficult to envision access to paperless publication databases.

SUMMARY

CATDS is an effective and efficient tool for the training analyst to develop training programs for operator and maintenance personnel. The unique data file management capability of CATDS provides a clear audit trail for courseware and training devices. The report capability alerts training analyst to changes in hardware design or training requirements. Analyst's decisions can be compared to computer-generated models. The use of CATDS reduces man-hour expenditures in proposal development, training analysis and training development, contributing to reduced life cycle costs. The various reports provide for greater management visibility of program status and progress. CATDS operates on standard PCs. It retains analyst's unique expertise by requiring all decisions to require approval prior to finalization. It enforces adherence to analytical procedures by standardizing the methodology used by the analyst on each task and program. CATDS has demonstrated compatibility with LSA standards.

ACKNOWLEDGEMENTS

Mr. Gary McNeil, Boeing Military Airplane Company, Wichita, KS, was one of the main initiators of the CATDS development effort. His understanding of training systems aided immeasurably in the system effort and in this paper. Mr. John Howell, Boeing Computer Services, Wichita, KS provided the artificial intelligence expertise and technical capability to blend the various training analysis and development requirements into a cohesive and usable system.

ABOUT THE AUTHOR

Mr. J.D. Jared is a Training Analyst with BMAC's Integrated Logistics Support organization in Seattle, WA. He is the training and technical order lead for the BMAC Advanced Tactical Fighter (ATF) program effort. He was recently reassigned from BMAC's Simulation and Training System organization in Huntsville, AL. He holds an MBA degree from Harvard University and a BA degree in Radio-Television from the University of Washington. He was recently enrolled in a Computer Information Systems degree program at Athens State College, Athens, AL.