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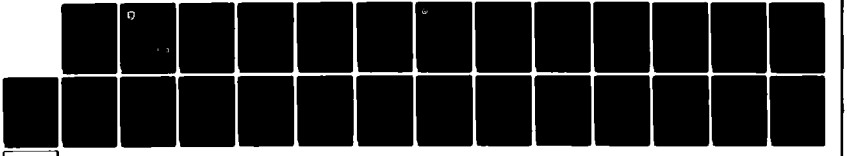

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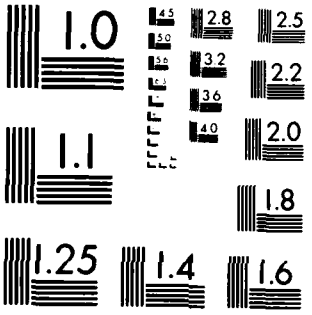

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AD No._____
TECOM Project No. 7-CO-RD3-TTT-00T
USATTC Report No. 840906

METHODOLOGY INVESTIGATION
UNIT 1 REPORT

STREAMLINED TEST REPORTING AND PLANNING (STRAP)

DATA ANALYSIS LABORATORY STANDING OPERATING PROCEDURE (SOP)

by

DAVID A. MORRISON

Materiel Test Division

UNITED STATES ARMY TROPIC TEST CENTER

APO MIAMI 34004

SEPTEMBER 1984

Period Covered:
June through September 1983.
Prepared for:
US Army Test and Evaluation Command, Aberdeen Proving Ground, MD 21005

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Statistical Analysis	Computer Files	
Tropical Testing	Methodology	

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

An internal standing operating procedure (SOP) was developed for the USATTC Data Analysis Laboratory (DAL). An SOP from a similar organization was reviewed and the tasks performed within DAL were analyzed. Personnel from USATTC offices and laboratories met to determine the best way to interface DAL functions with test planning, executing and reporting functions. A draft SOP was written and used, then revised. The SOP specifies DAL personnel responsibilities and describes requirements for Data Analysis Plans.

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APPENDIX

DEPARTMENT OF THE ARMY
UNITED STATES ARMY TROPIC TEST CENTER
APO MIAMI 34004

STETC-MTD-O

8 FEB 1984

SUBJECT: Streamlined Test Reporting and Planning (STRAP) Methodology Investigation: Unit 1 Report -- Data Analysis Laboratory Standing Operating Procedure (SOP), TECOM Project No. 7-CO-RD3-TT1-001

SEE DISTRIBUTION

1. This letter report is the first in a series of final reports on separate units within the scope of subject methodology investigation. The Methodology Investigation Proposal is attached as enclosure 1.

2. BACKGROUND

The US Army Tropic Test Center (USATTC) has developed a set of management tools that aid in planning and executing its testing program. The Test Officer's Guide (TOG) provides an overall structure for test events. The Test Status Information Program (TSIP) is a computerized method of tracking those events. USATTC also has a computer hardware network and procedures for collecting, transmitting, and analyzing test data. Systematic procedures still must be developed, however, for specific areas within USATTC. One such area was the Data Analysis Laboratory (DAL). Work within DAL is performed as required by the test schedule, but had been performed with little formal planning. More structure was needed for DAL to function at top capacity with adequate communication among Center personnel.

3. OBJECTIVE

Develop an internal SOP for DAL which will define the responsibilities of DAL personnel and standardize DAL procedures.

4. SUMMARY OF PROCEDURES

This was a 4-month project which is part of the Streamlined Test Reporting and Planning (STRAP) Methodology Investigation. The project was performed by Chief, DAL under the guidance of Chief, Analysis Branch. At the beginning of this project, USATTC had one year of experience using TOG and TSIP and a good understanding of how test events interfaced with DAL.

For the first phase of the investigation, the functions required of data analysis (within the TOG framework) were analyzed. An SOP from a similar organization was reviewed to help determine the elements needed for a workable document, and an outline of the SOP was prepared.

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SUBJECT: Streamlined Test Reporting and Planning (STRAP) Methodology Investigation: Unit 1 Report -- Data Analysis Laboratory Standard Operating Procedure (SOP), TECOM Project No. 7-CO-RD3-TT1-001

Next, the tasks actually performed within DAL during normal workloads were analyzed. Personnel from USATTC offices and laboratories met to determine the best way to interface DAL functions with Detailed Test Plan preparation, data collection, and report writing. The task analysis results were compared to DAL's required functions, and detailed concepts for an SOP were finalized. Finally, a draft SOP was written specifying DAL functions, the responsibilities of DAL personnel, and the requirements for interfacing DAL with other elements of USATTC.

The draft SOP was used in DAL. As required in the SOP, Data Analysis Plans (DAP) were prepared and used to determine the most useful format. Also, these plans were used as formal guidance for the Data Analysis Assistant (DAA) assigned to a particular test. This testing and additional management guidance were used to refine the SOP.

5. SUMMARY OF RESULTS

a. The DAL SOP resulting from this project is at enclosure 2. The SOP describes data management procedures to be used by DAL and directs that a DAP be developed for each test. Each DAP contains a flow chart of the data path within DAL and a brief description of how data will be processed for each subtest. The DAP for each test interfaces with a Data Flow Plan (DFP), which describes the data flow throughout the entire Center for this test. The development of DFPs is the subject of another project within the STRAP Methodology Investigation.

b. The DAPs prepared using the draft SOP documented the tasks DAL performed for a test and gave written guidance from Chief, DAL to the DAAs. The DAP flow chart illustrated the interface with the DFP, showed necessary files, and listed the computerized analyses and output formats required for the final test report.

6. ANALYSIS

a. The procedure used to develop the SOP was successful. Linking DAL's functions to the test events listed in TOG resulted in an SOP that complemented the effective planning and controlling tools already used in USATTC. Discussions with USATTC scientists, engineers, and testers, including management level personnel, provided the guidance necessary to ensure that the DAL SOP would be compatible with the other portions of this methodology investigation, especially with the development of DFPs.

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b. Use of the list of Data Analysis Laboratory Events (Appendix A to enclosure 2) and the DAP (sample at Appendix B to enclosure 2) required by the SOP has proven to be an effective method of documenting the tasks DAL must perform for a test. As such, they are written guidance from Chief, Analysis Branch through Chief, DAL to the DAAs. The DAP is a flexible tool that does not restrict DAL personnel from pursuing analyses beyond those prescribed in the detailed test plan. It is an essential, valuable tool which ensures that all analysis functions are performed in a complete, efficient, timely, and well-documented manner.

7. CONCLUSION

An effective structured procedure, in the form of an SOP, was written for standard data analysis functions within DAL. Although the SOP outlines precise steps for data handling within DAL, that structure does not restrict the flexibility that is needed to accommodate the variety of analytic and statistical approaches required by various test plans, nor does the procedure limit data analysts to the primary statistical analyses called for in the detailed test plan.

8. RECOMMENDATION

The DAL SOP should be updated periodically to reflect changes in TOG and other Center guidance.

9. Distribution List is at enclosure 3.

3 Encl
as

For RICHARD P. BARRERE
Colonel, Infantry
Commanding

John R. Sutherland Jr
LTC, AD
Acting Commander

DISTRIBUTION:
IAW Encl 3

(COPY)

DEPARTMENT OF THE ARMY
United States Army Tropic Test Center
APO Miami 34004

February 1983

METHODOLOGY INVESTIGATION PROPOSAL

1. TITLE. Streamlined Test Reporting and Planning (STRAP)

2. CATEGORY. Environmental Susceptibility

3. INSTALLATION. US Army Tropic Test Center
ATTN: STETC-MTD-A
APO Miami 34004

4. PRINCIPAL INVESTIGATION. Robert J. Fuchs
US Army Tropic Test Center
STETC-MTD-A
APO Miami 34004
AUTOVON 313-285-5412

5. STATEMENT OF THE PROBLEM. Although the US Army Tropic Test Center (USATTC) has come a long way in the past few years to generate an efficient and productive system for preparing test plans and reports, there are a number of areas within the testing operation that need to be streamlined to a more systematic process. Improved operating procedures for the collection, flow, analysis and presentation of test data are needed for more efficient control of data throughout active testing and test reporting. Improvements in the process of developing detailed test plans are also needed, particularly in implementing USATTC's Computer Aided Test Planning (CATPLAN) and in producing computerized forms and questionnaires.

6. BACKGROUND. The lack of personnel has not allowed the Center to streamline the data flow process. Now that the Center is staffed properly in the data analysis area, the operations research and mathematical statistician personnel need to develop standard data handling procedures to fill the gaps between procedures established under previous methodology investigations, such as Computer Aided Test Planning (CATPLAN) and Reliable Acquisition Processing, and Integration of Data (RAPID).

7. GOAL. Specifically, the Center will develop techniques to include, but not be limited to the following:

a. Develop an implementation program for CATPLAN. This computer program will automatically copy issues and criteria from Appendix A and distribute them to their proper location in the CATPLAN subtests.

Enclosure 1

Streamlined Test Reporting and Planning (STRAP) (cont)

b. Develop a computerized method for producing human factors questionnaires in a standard (but pliable) format such that the computer output can be used as the printed questionnaires and can be inserted into the test plan without having to be formatted and typed by word processing personnel.

c. Develop a procedure for using data flow plans during active tests, to include data hand-off procedures to the Data Analysis Laboratory.

d. Develop an internal operating procedure for the Data Analysis Laboratory.

e. Develop computerized techniques for producing figures that will appear in final reports, such that stored data can be translated into charts and graphs that are acceptable for the final report.

f. Initiate plans to complete the data matrix designed and reported in the final report for Environmental Issues Guide for the Humid Tropics (EIGHT). Completion of the matrix is a necessary step in developing a systematic approach to an environmental test methodology program at USATTC and to developing a foundation for the TECOM environmental testing program.

8. DESCRIPTION. As needs such as the above arise during reviews and analyses of USATTC's operations, they will be defined specifically and undertaken as separate projects under this investigation. Each goal/project will be completed and reported on separately so that reports from the investigation will be produced as separate goals are accomplished.

9. JUSTIFICATION.

a. Problem. The goals stated above are necessary to the efficient operation of this Center. These goals will be accomplished regardless of the funding level of this investigation. The Center will have an approved project to charge direct labor hours and a mechanism for reporting results.

b. Dollar Savings. When available, the proposed technique will have an impact on every test conducted at USATTC. Estimated savings per test would be approximately 100 man-hours.

c. Workload. It is anticipated that the average USATTC test completion rate of 21 tests per year will be maintained in the near future, resulting in a total savings per year of 2,100 man-hours.

d. Recommended TRMS Priority. 1

e. Association with Requirements Documents. Not applicable.

f. Other. This investigation is being conducted to improve turn-around-time in producing USATTC's main products, the detailed test plan and the final test report.

Streamlined Test Reporting and Planning (STRAP) (cont)

10. RESOURCES.

a. Financial.

(1) Funding Breakdown:

	Dollars (thousands)			
	FY83		FY84	
	In-House	Out-of-House	In-House	Out-of-House
Personnel Compensation	--	--	--	--
Travel	--	--	3	--
Contractual Support	--	0.5	--	2
Consultant & Other Services	--	--	--	--
Materials & Supplies	0.5	--	2	--
Equipment	--	--	2	--
Subtotals	0.5	0.5	7	2
FY TOTAL	1.0		9	

(2) Explanation of Cost Categories:

(a) Personnel Compensation: Not applicable.

(b) Travel: Coordination with other Army environmental test and research activities.

(c) Contractual Support: Software Lease.

(d) Consultants: Not applicable.

(e) Materials and Supplies: Not applicable.

(f) Equipment: Not applicable.

b. Anticipated Delays. None.

c. Obligation Plan.

Obligation Rate (Thousand)	FY84	FQ	1	2	3	4
			2.0	2.0	3.0	2.0

Streamlined Test Reporting and Planning (STRAP) (cont)

d. In-House Personnel.

	FY84			
		Man-Hours		Study Hours
	No.	Required	Available	Required
Phy Sci Admin (GS-1301)	1	100	100	
Opns Rsch Anal (GS-1515)	2	1000	1000	
Elec Engr (GS-0855)	1	100	100	
Math Stat (GS-1529)	2	1900	1900	
Gen Engr (GS-801)	1	80	80	
Rsch Psych (GS-180)	1	200	200	
Program Analyst (GS-345)	1	40	40	
Programmer (GS-344)	1	1200	1200	
Tech Editor (GS-1083)	1	300	300	
Tech Info Spec (GS-)	1	500	500	
Biologist (GS-401)	1	300	300	
TOTAL		5,720	5,720	2,000

11. INVESTIGATION SCHEDULE.

	FY83												FY84											
	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
In-House									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R
Contract									A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LEGEND:
- - - Active investigation work
A Award of contract
R Final report due at HQ, TECOM

12. ASSOCIATION WITH TOP PROGRAM. This proposal may result in a new TOP.

FRANK S. MENDEZ
Chief, Materiel Test Division

(END COPY)

DATA ANALYSIS LABORATORY STANDING OPERATING PROCEDURE

OUTLINE

1. GENERAL RESPONSIBILITIES

The primary responsibility of the Data Analysis Laboratory (DAL) is to support tropic testing by managing and analyzing test data. Chief, DAL will review or prepare data collection techniques and forms. Also Chief, DAL will prepare the Data Analysis Plan (DAP) for each test to ensure that procedures are developed for handling all test data. The Data Analysis Assistants (DAA) will enter data into the US Army Tropic Test Center (USATTC) IBM 4331 computer, make computer runs required for data analysis, and prepare output (e.g. tables and graphs) for the final test report. DAL will interface with other elements of USATTC to ensure that the latest techniques and equipment are used to collect, enter, and analyze data.

2. DAL'S ROLE IN TESTING

a. General. The Test Officer's Guide (TOG) gives a step-by-step listing of events (each with a responsible person) that occur in testing. These steps

Enclosure 2

coordinate with those in the Test Status Information Program (TSIP), USATTC's computerized method of tracking and controlling test events and suspense dates. The specific functions of DAL described below are given in the order of events described by TSIP. The interface of DAL and TSIP events is described also. A detailed list of events contained in the discussion below, including the responsible person(s) for each event, is provided in Appendix A.

b. Design Coordination Meeting (DECOM). The test cycle phase during which DAL first becomes involved in testing varies from test to test. For major tests, Chief, DAL will participate in the DECOM. This early participation facilitates planning for the large volume of data such tests generate and minimizes data collection/entry problems.

c. Data Collection Forms/Format. The Detailed Test Plan (DTP) governs all aspects of testing including the course of data analysis. Sample data collection forms to be used during testing are part of the test plan. When requested, Chief, DAL will help subtest authors develop tentative data forms. Chief, DAL will review sample data forms in the published test plan and ensure that all data forms, as well as other collection and storage techniques, are finalized before testing begins. The most feasible, efficient, and advanced technology available in the Center will be used for data collection.

d. DAP. The DAP is a working document that describes the data flow and data analyses DAL must perform during a test. The DTP and the Data Flow Plan (DFP) are the primary source documents used to create the DAP. Chief, DAL prepares the DAP prior to the Data Analysis Coordination Meeting (DACOM), and it is modified as required during the course of testing. A detailed description of the DAP is provided in paragraph 3.b, and a sample DAP is given in Appendix B.

e. DACOM. Chief, DAL will attend all DACOMs, where he will ensure that all data to be collected have a specified recording form/format. If time and workload permit, the DAA assigned to the test will attend the DACOM. Appropriate procedures/forms will be revised when test plan changes involving data occur. The Analysis Coordinator presents a plan for the overall data flow during the life of the test. Any requirements for interim analysis should be presented at the DACOM. Data flow methods within DAL will be finalized based on the DACOM.

f. Data Entry/Data Validation. The DAAs have primary responsibility for data entry, both manual (from the keyboard) and automated. The DAAs, Chief, DAL, test officer, data collectors, and subtest authors all participate in the iterative data validation process. Data flows to and from DAL as described in the DFP.

(1) All test data coming to DAL will be logged in the DAL test file and must have a data tag for identification. A physical data tag must accompany any data coming to the lab in a physical medium, (i.e., paper, floppy disk). Electronically transmitted data must have the data tag as the

first line of the file transferred. Data are sent to the lab as soon as possible after collection.

(2) Before data are entered into the IBM 4331 computer, the DAAs check the data collection forms to determine if they are completed correctly and if all data are in the specified form/format compatible with established computer file structures. Electronically transmitted data are checked for format before adding them to the designated computer file. Data formats may be changed during the test, but changes must be coordinated with DAL. Data not received in proper format are returned to the test officer.

(3) During data entry, the DAAs note specific data items which appear to be inconsistent, unclear, or questionable. These problems are reported to Chief, DAL and appropriate subtest personnel for resolution, and the required changes are made. Also, the DAAs proofread data as they are entered.

(4) After the data are entered, the DAAs make a preliminary computer run to aid in data validation. As a minimum, the run includes a copy of the data entered (but it may include computer range checks, format checks, etc.). Chief, DAL reviews the run, notes any apparent problems, and sends it to the originating person/office, as specified in the Data Flow Plan. The originator reviews the data, makes any corrections, and forwards them to DAL for incorporation into the computer file.

g. Data Analysis Review Meeting (DARM). Chief, DAL will participate in all DARMs. Prior to each DARM, he will review the specified data collection procedures and status of all data submitted. During the meeting, the actual data collection procedures used will be discussed along with any impact these collection procedures or unscheduled test events may have had on the data. The data analysis events of the DAP will be used as a checklist of analyses to be performed. A preliminary format will be determined for all data and analyses in the checklist. (Note: In some cases the format may be from a standard statistical package or another analysis program, with the subtest author grouping results as he desires or returning the results to DAL to group and print/plot.) The assigned DAA also will attend the DARM if time and workload permit.

h. Data Analysis and Result Presentation. The final DAL test functions are the analysis of test data and preparation of results for the final report. The DAAs run less complex analysis programs with guidance from Chief, DAL, while more complicated analyses require the active participation of both. Chief, DAL will discuss results with the appropriate subtest authors to determine if more computer runs are required or if a different presentation format is needed. This iterative analysis process and the interactive computer environment sometimes dictate that the subtest author and test officer participate in the computer analysis session. The DAAs format the results and prepare and modify charts and graphs, as required by the subtest authors and editors.

3. DATA MANAGEMENT. In order for DAL to work efficiently, a functional structure must be defined. The detailed events list in Appendix A and the elements below provide this structure.

a. The DAL Test File. A DAL file will be maintained for each test. It will contain as a minimum: (a) a copy of the test plan, (b) the Data Analysis Plan, (c) the computer printout of test data, (d) the log of received test data, (e) computer file descriptions, and (f) printed output products of analysis programs. In addition, any other working papers which might be needed for future reference should be archived in the DAL test file.

b. DAP. The DAP describes how DAL will implement the test plan. It will include a narrative section and flow chart(s). The narrative section will briefly describe how DAL will process data from each subtest. The flow chart(s) have four basic events, as described below.

(1) Data handoff - Data arrive at DAL according to the schedule in the DFP.

(2) Data file creation/data validation - Test files are created by the DAAs with guidance from Chief, DAL. DAAs will document all data file descriptions using STETC-AB-FORM 6. A sample file description is presented in Appendix C. Files will be named according to the general naming conventions presented in Appendix D. All DAL personnel and all responsible personnel designated by the DFP participate in the data validation process [subparagraphs 2f (2), (3), and (4)].

(3) Data analyses - The data analyses are initially specified by the DTP. Analyses may be added or dropped as test conditions or test directives require. The analyses specified in this portion of the flow chart are a checklist used by DAL to ensure that all analyses are performed and have a specified output format.

(4) Data output formatting - The final event is formatting output data for the final test report. The DAAs will format data with the guidance of the Technical Editor and the appropriate subtest authors.

c. Retention/Destruction of Data. Test data will be kept on active computer files or in the DAL test file. When the test report is sent to US Army Test and Evaluation Command (TECOM) for approval, the computer files are taken offline and written to tape. After TECOM approves the final report, the DAL test file is boxed and stored with the test officer's file. After 2 years, the file is destroyed. The computer tape files will be kept for the same 2-year period, and will then be purged.

4. SPECIAL PROJECTS. Occasionally, DAL will perform analyses for projects which are not associated with a particular test. Requests for support on such projects will be made by Disposition Form through Chief, Analysis Branch. This formal request is needed to document workload and ensure that all requests are for official USATTC projects.

5. COMPUTER HARDWARE/SOFTWARE. One important goal of DAL is to maintain the computer hardware and software required to operate in the most efficient, cost effective manner possible. In order to accomplish this goal, Chief, DAL will continually monitor equipment/software available on the market, review government and industry publications, and attend applicable conferences and schools to maintain the necessary expertise. He will also maintain a close working relationship with the testing laboratories and Automatic Data Processing personnel to help ensure that equipment/software purchases are compatible and that the most efficient communications and data processing techniques are used.

APPENDIX A. DATA ANALYSIS LABORATORY EVENTS

EVENT No.	RESPONSIBLE PERSON	EVENT
1.	C, DAL	Receive preliminary test information and review before DECOM (for complex tests only).
2.	C, DAL	Participate in DECOM for complex tests. Determine if any item-peculiar data collection systems are required and estimate any extraordinary requirements that may be made of DAL.
3.	C, DAL	Assist subtest authors in preparation of data collection forms for first draft of test plan if requested to do so.
4.	C, DAL	Receive copy of the published test plan.
5.	C, DAL	Review data collection forms in test plans. Ensure forms design will facilitate data entry while collecting all necessary information.
6.	C, DAL	Receive copy of format for data collected using automated data collection methods.
7.	C, DAL	Review format of data from automatic data collection equipment. Ensure format is compatible with files required for data analysis on the IBM 4331 computer.
8.	C, DAL	Prepare draft DAP prior to DACOM. The draft should contain all elements of DAP, except that the flow chart will not yet have the data output formats.
9.	DAA	Participate in DACOM to finalize all data formats and assure all data have a specified recording format. Data Flow Plans should also be finalized. Determine any interim analysis requirements that can be specified at this time.
10.	C, DAL	Brief the DAP to DAA assigned to the test. This includes outlining data file layouts.
11.	DAA	Prepare detailed file descriptions on STETC-MTD-AB-FORM 6 of all data files required for test. File forms in DAL test file.
12.	DAA	Receive data according to time schedule in Data Flow Plan.
13.	DAA	Check to see if data tag is completely filled out.

EVENT No.	RESPONSIBLE PERSON	EVENT
14.	DAA	Check data to make sure they are in the proper format (finalized at DACOM).
15.	DAA	Return data to data collector if there is no data tag, the data are not in the proper format, or if data are of obviously unacceptable quality.
16.	Data Collector	Respond to deficiencies noted (Go to event No. 12)
17.	DAA	Log data in DAL test file.
18.	DAA	Enter data in computer file specified by DAP, marking inconsistent, missing, unclear or questionable data. Also verify accuracy of data input against data received.
19.	DAA	Prepare as a minimum computer printout of data entered. If appropriate make computer checks of data for range of values, format, etc.
20.	C, DAL	Review raw data, computer printouts and results of automated data checks prepared by Data Analysis Assistants. Return original data and computer printout, with noted deficiencies, to personnel specified in the Data Flow Plan.
21.	Data Collector	Review computer printouts, note any errors, respond to any additional discrepancies noted by DAL personnel. Return changed, validated data to DAL.
22.	DAA	Incorporate data changes determined during the validation process.
23.	DAA, C DAL	Incorporate all appropriate information in DAL test file.
24.	DAA	Incorporate all necessary computer file changes required for data analysis.
25.	DAA, C DAL	Perform interim analyses required by test personnel.
26.	C, DAL DAA	(At DARM) Discuss data collection procedures used during the test and determine any impact data collection procedures have on data analysis.

EVENT No.	RESPONSIBLE PERSON	EVENT
27.	C, DAL	(At DARM) Using the analysis events of the DAP as a checklist, determine a preliminary final report format for results of each analysis.
28.	C, DAL	Record the analysis result formats (determined during the DARM) in the DAP as the final events in the DAP flow chart.
29.	DAA, C DAL	Make the analysis runs and format results as specified in the DAP flow chart.
30.	C, DAL	Discuss analysis results with subtest authors and determine if more computer runs are necessary or if the data format should be changed.
31.	DAA	Make any computer runs and format results required as result of fine tuning the test report.
32.	DAA	Archive computer files to tape when final report is completed.
33.	DAA	Give DAL Test file to Test Officer for storage when final report is completed.
34.	DAA	Purge tape files after two years of archival storage.
35.	TO	Destroy test file (including DAL file) two years after final report is published.

APPENDIX B. SAMPLE DATA ANALYSIS PLAN

NARRATIVE SECTION

RECEIPT INSPECTION - DAL will enter receipt inspection data in the IBM 4331 computer, if requested by the test officer.

TROPIC EXPOSURE AND PERFORMANCE - The test has now been limited to two XM24 Hybrid Collective Protective Equipment Units which are mounted in an S250 shelter. Performance data will be collected during the four functional checks and the two mission test cycles. The first functional check is after receipt inspection and new equipment training. Then, two 72-hour missions are performed on each of the two XM24 units. Another functional check is done on each unit, and they are placed into storage for 7 months. After storage, a third functional check is done, followed by a second cycle of 72-hour missions and, then, a final functional check.

During each functional check, differential pressure data will be collected at three points inside the shelter; (1) at the door, (2) in the center, and (3) at the unit. These pressure readings will be taken three times during the functional check. Each trial will begin when the enclosure has a stable overpressure. Pressure will be measured as the door is opened, and will continue to be measured for about 1 minute.

During each mission, the following performance parameters will be measured hourly: (1) temperature readings at eight locations, (2) relative humidity inside the shelter, and (3) pressure differential.

Airflow rates to the facemasks and total airflow rate will be measured before and after each 72-hour mission on each XM24. Thus, there will be a total of eight flow rate measurements. Facemask flow rate will be measured with and without caps.

The Atmospheric Sciences Laboratory Meteorological Team (Panama) will constantly measure required meteorological data. In addition, meteorological conditions during the functional checks will be recorded every 5 minutes.

RELIABILITY AND LOGISTIC SUPPORTABILITY - The Data Analysis Laboratory (DAL) will not input reliability, availability, and maintainability (RAM) or logistic supportability data into the computer unless asked by the RAM Engineer to do so.

SAFETY - DAL will enter safety data from the safety questionnaire into the computer. Data will be analyzed as required by the subtest author at the end of testing.

HUMAN FACTORS - DAL will input human factors questionnaire data into the IBM 4331 for analysis at the end of testing. Sound pressure level data and noxious fume levels will be input, if required by the Human Factors Engineer.

FLOW CHART

DATA HANDOFF	DATA FILE CREATION/ DATA VALIDATION	DATA ANALYSES	FORMATS
Pressure Data - Data collected in functional checks will arrive on strip recordings through Mr. Bryan after each functional check. One file will be created to hold all functional check data. A second file will be created to store times for pressure to stabilize. This file is created from data in the first file.	HCPEFNC	1 - Plot pressure versus time for each trial and sensor location during the functional checks. The plots will be shown to mathematical statistician (MS) for possible use in the Storage and Performance subtest.	Hewlett-Packard (HP) line plot format with time scale 60 seconds long.
	HCPETIME	2 - The time for pressure to stabilize at each sensor location will be determined and a file created to store the times by trial.	None - an interim step.
		3 - Analyses of variance (ANOVA) will be run at end of testing to check for changes in time to stabilize pressure.	Standard Process General Linear Model (PROC GLM) output format.
Flow Rate Data - Data are gathered before and after each 72-hour mission.	HCPEMISS	4 - Run ANOVAs to see if pressure is changing during the test.	Standard PROC GLM output.
		5 - Plot pressure (if desired by MS) for possible use in final report.	HP line plot format.
Meteorological data during storage will be obtained from standard Meteorological team reports.	HCPEMET	6 - Calculate normal maximum, minimum, and average meteorological information.	Standard meteorological data table format for reports.
Meteorological data during testing will be obtained from the test officer through Mr. Bryan. They will be integrated into other performance data files above (HCPEFNC and HCPEMISS) to see if Meteorological conditions affect performance.		7 - Analyses as determined by discussion with MS to determine effects of weather on performance.	To be developed.
Safety data from form F-4 questionnaire.	HCPESAF	8 - Run Process Frequency (PROC FREQ) to get frequency of response for safety questions.	Standard PROC FREQ output.
Human Factors (HF) data from HF questionnaires.	HCPEHF	9 - Run PROC FREQ to get frequency of response for HF questions.	Standard PROC FREQ output.

APPENDIX C. SAMPLE DATA FILE DESCRIPTION

XO	TEST	TEST OFFICER	LAYOUT DATE
685	Hybrid Collective Protection Equipment	CPT Carpenter	5 October 1983

CMS DATA SET NAME	SAS DATA SET NAME
HCPEFNC SAS C	

COLUMN NUMBER	DESCRIPTION OF DATA
1	DATE: 11 August 1983, etc.
2	
3	UNIT: 1, 2 (HCPE unit #)
4	
5	
6	SENSOR: HCPE (Location of pressure
7	DOOR sensor)
8	CENTER
9	
10	TRIAL: 1, 2, 3 (Trial number at a
11	sensor location)
12	
13	
14	HR Exact time data measurements
15	MIN were taken
16	SEC
17	
18	
19	VOLTS Voltage reading to be changed to
20	pressure according to the
21	calibration curve for the
22	sensor.
23	
24	PRECIP RAIN (is it raining at time of
25	NO pressure reading)
26	
27	APRESS Ambient Air Pressure
28	
29	WIND Wind velocity at time of
30	pressure reading.
31	
32	
33	
34	
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COLUMN NUMBER	DESCRIPTION OF DATA
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CODES/REMARKS

This file is to be maintained by Mr. DeLeon. Column numbers for variables should be disregarded since data are not stored in a strict columnar layout.

APPENDIX D. COMPUTER FILE NAMING CONVENTIONS

1. Naming conventions ensure that DAL personnel can identify the general nature of a computer file by looking at its name, even if the interested person did not originally create the test file.

2. The naming conventions apply only to Conversational Monitor System (CMS) files on USATTC'S IBM 4331 computer system. File names under CMS consist of, at most, eight alphanumeric characters, with the first character being a letter. File names within DAL will identify the test item, the type of data in the file, and the sequence number of the file, if necessary.

a. Test item identification - The first part of the file name will identify the test item. If the item has an Army designation such as XM5, XM18, etc., this designation will be the first part of the file name. If no such designation exists, or if it is too long, an easily recognizable acronym may be used i.e., LDS might be used for Lightweight Decontamination System.

b. Type of data - The next part of the file name will identify the type of data in the file. Some examples follow:

RAM	Reliability and Maintainability data
FNC	Functional check data
MISS	Mission data
HF	Human factors data
SAF	Safety data

c. Sequence number - If more than one file for the same type of data (paragraph b) is required, then the last portion of the file name will identify which data of that type are contained in the file. For example, if mission data are collected for each of 5 missions, then the last portion of the file names might be MISS1 - MISS5.

3. Some examples of possible file names, and what the names tell about the file, are given below. It should be noted that only a limited amount of information can be conveyed in eight characters, but the same eight characters should be enough to find a desired file if the interested person has a rudimentary knowledge of the test.

XM5FNC1	Data from the first functional check of the XM5 (Static frequency converter)
XM272HF3	Human factors questionnaire responses for the XM272 (Water testing kit) the third time the questionnaire was administered.

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