

AD 682504

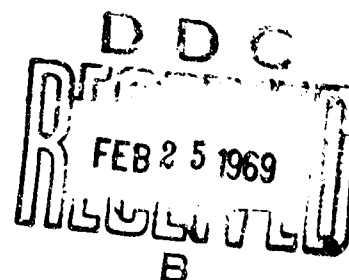
MEMORANDUM

RM-5669-PR

JANUARY 1969

THE RAND/TAC INFORMATION
AND ANALYSIS SYSTEM: VOLUME IV--
THE SYSTEM SOFTWARE

Fred Finnegan and Anders Sweetland



PREPARED FOR:

UNITED STATES AIR FORCE PROJECT RAND

The **RAND** Corporation
SANTA MONICA • CALIFORNIA

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PREFACE

The RAND/TAC information and analysis system provides for the collection, processing and analysis of operations, maintenance and supply data, using an IBM 1401 computer to assist in data purification and in the management and evaluation of aircraft operations and support at base level. The system is unique in that the data collected are identified with the specific sortie (and in some instances to the specific leg within the sortie). This allows the user to perform many kinds of analyses not ordinarily possible, relating mission use to reliability, manpower and spares usage.

The system grew out of a number of special field tests (e.g., Rapid Roger, Skoshi Tiger, Tack Down) exploring the feasibility of using a small business computer to assist with materiel and operations problems at base level. In the tests prior to Combat Dragon, it was necessary to "create" the maintenance analysts through an extensive educational process. Combat Dragon was unique in that Air Force personnel carried out the entire project from data collection through final writeup with no assistance from RAND, other than the initial training in the use of the system.

It is now possible to organize the loose collection of notes, procedures and programs into a formal system description. Accordingly, this RAND effort comprises four Memorandums containing essentially the package of materials used in training the Combat Dragon team. The information is organized as follows: Volume I (RM-5666-PR) is for data collectors and editors responsible for providing the data bank to be used in subsequent analyses; Volumes II (RM-5667-PR) and III (RM-5668-PR) are for analysts (especially people who will be doing maintenance analysis) to familiarize them with the available programs and analysis products, and to encourage them to ask questions and explore the data in an imaginative way; and Volume IV (RM-5669-PR) is for the "data services branch" of the evaluation or analysis team, to identify procedures and to impart an understanding of what the analyst is attempting to do.

Surprisingly, even though the system is entirely computerized, readers need not have a knowledge of computer hardware and software to

follow the text. A knowledge of the details of aircraft weapon systems would be useful, for although we describe such operations, the descriptions are somewhat cursory. In particular, a familiarity with aircraft maintenance procedures would be useful.

The concepts, techniques and programs of the RAND/TAC information and analysis system should be adaptable to future Air Force base-level management information systems, whether manual or highly mechanized. Provided that the appropriate computer is available, the RAND/TAC system can easily be introduced at a base and used without modification for field tests or other purposes. Recent changes in a number of standard Air Force forms and in data linkages, however, may make them preferable to the RAND/TAC forms for a particular base exercise.

With modest changes to current Air Force data collection procedures and reprogramming of the analysis packages, the system would provide a valuable supplement to current base analysis reports--a supplement more attuned to questions that are and should be asked by base maintenance management. The system will also provide a detailed guide and check list for the design-development of new base-level information systems and should provide direct input to analysis portions thereof.

SUMMARY

The RAND/TAC information and analysis system provides for the collection, processing and analysis of operations, maintenance and supply data, using a small business computer to assist in data purification and in the management and evaluation of aircraft operations and support at base level. It is unique in that operational and logistics variables are interrelated through several features of the data and analysis systems to permit identification of operational events connected with a particular sortie and relate these to explicit maintenance or supply actions preceding or following the sortie, management actions, and key environmental conditions.

The system consists of a series of forms for collecting operational data, maintenance actions, maintenance manpower availability, aerospace ground equipment utilization, supply demand, cannibalization and issue data, a series of computer programs and manual procedures for editing, reformatting and processing to provide basic displays, and other programs to provide basic analysis packages. The system is designed to minimize duplicative recording of data elements, and has flexible computer programs to permit a wide variety of analyses.

The four volumes constituting this effort present a complete system description, together with instructions on how to perform analyses using the system programs. Volume I (RM-5666-PR) contains the descriptions of and procedures for collecting and editing the data -the forms, procedures and program operating instructions. Volumes II (RM-5667-PR) and III (RM-5668-PR) are concerned with the analysis programs and procedures, and with analysis design and methods. The first emphasize how the programs work, the second how questions can be answered. In a sense both volumes are written for a career that currently does not exist in the Air Force: the maintenance analog of the operations analyst. A person interested in this field should be versed not only in maintenance but also in data processing, computers, statistical methods and experimental design.

Each time RAND participated in a special field test, such as Combat Dragon, Skoshi Tiger, and Tack Down, it was necessary to "create" the maintenance analysts by an extensive educational process. Volume

II attempts to encapsulate the first part of that educational process. It introduces the prospective analysts to the data bank, the programs and the procedures needed to process the operations, maintenance and supply analysis data.

Volume III is based on the second stage of the learning process. It assumes that the user has now mastered the elements of the program and can focus his attention on answering questions. Thus it addresses analysis fundamentals: dependent and independent variables, data fields, sorting, data selection and tagging. Then it discusses a variety of areas of interest to maintenance management and shows how each can be explored with the system. Finally, some of the background and philosophy of experimental design is discussed.

Volume IV (RM-5669-PR) describes the computer programs used with the system. To encourage a rapprochement between the analysts and the programmers, we have attempted to include sufficient information for the programmer to understand the general outlines of what the analyst is attempting, as reflected by the functions of the computer programs.

ACKNOWLEDGMENTS

It is impossible to credit all those who made contributions to the system. Hall Logan (TAC-OA) and Sergeants James Fisher and Melvin Ericson (TAC) provided most of the maintenance procedures. Calvin Gogerty (RAND) designed the entire supply inclusions. Chauncey Bell (RAND) designed the "off-equipment" bench repair procedures. Sergeant Jack Marshall and Technical Sergeant Elias Martinez contributed to the 1401 programming, as did Mrs. Colleen Dodd of RAND. A special thanks is due Miss Doris Dong of RAND who did the art work.

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GLOSSARY

Abort rate	The rate of aborted sorties made by a unit in a given period. The most frequently used equation is the following: $\text{abort rate} = \text{sorties aborted} / \text{sorties attempted}$.
Action taken	The type of maintenance performed: repair, removed and replaced, calibrated, etc.
AGE	Aerospace ground equipment.
AGE utilization	A display showing both active and standing flight-line utilization of AGE.
Aircraft display	Also called flight-line display and flight line queue sort. Shows pictorially the maintenance and status history of each aircraft for a 24-hour period.
Base-line	Such data are counts of the times an event was attempted, e.g., sorties flown in a certain category.
Break-rates	Along with write-up, break-rates are the major independent variables in determining aircraft recovery and turnaround, and are therefore the major determiners of sortie generation capability. Break-rates are determined for both aircraft and aircraft systems. The equation is as follows: $\text{break-rate} = \text{system fix count} / \text{sorties flown}$.
Chi-square	An analysis program that makes statistical comparisons of frequency counts to determine whether nonrandom behavior exists.
Code 799	No defect discovered.
Code 800	Removed or replaced to facilitate maintenance.
Code T	Removed for cannibalization.
Code U	Replaced after cannibalization.
Combat Dragon	An exercise with A-17A aircraft in Vietnam.
Cost-effectiveness	An exercise with F-4C aircraft at MacDill Air Force Base.
Daily package	Processing of operations, maintenance, supply and scheduling data by means of editing, error listing, and aircraft and work center displays.
Delay time	The accumulation of work interruptions on each system and each work center by aircraft.
Demand rate	Most frequently, supply demand rates. Most frequently, $\text{demand rate} = \text{demand (request)} / \text{sorties flown}$.

Deviation-Degradation (DEVDEG) program	A computer program. Lists and counts missions' deviation-degradation data from the 303 forms.
Dichotomous data	Data that has only two categories: for example, yes-no, 0-1, hit-miss, aborted-nonaborted, malfunctioned-nonmalfunctioned.
Easy data	Data collected by one person at a single collection point, as opposed to tough data.
Edit mask card	Locates the decimal phase that is edited into the data field just before printing.
Edit program	Searches for and identifies errors, reformats data, relieves data recorder of all possible unnecessary burden.
Eight/two pocket	Card drop pocket on the 1401.
Eighty-eighty (80-80) listing	Records are printed as they exist on the card (or tape) without separation of the fields.
Error listing	An image of each card containing a computer-detected error plus a description and location of each error.
ETIC	Estimated time to in-commission status.
ETR delay code	Equipment temporarily removed.
Field location card	Locates low- and high-order positions of the fields on the record.
Flight-line display	See aircraft display.
Frequency Counter (FREQ) program	Searches any field of unknown and unsorted data, builds a table, and counts the frequency of entries in the field.
Gang punch	To punch identical or constant information into all of a file of cards.
Gross fix time	Period from touchdown to end of maintenance. Includes unscheduled maintenance only.
Gross turnaround	Period from touchdown to end of maintenance, includes both scheduled and unscheduled maintenance.
Hard data	Keypunched data, as opposed to soft data.
Harmonic mean	The method of computing helps minimize the effect of unequal sample size by using the reciprocal of n.
Hourly Frequency Accumulate	A program that computes the frequency counts for resource utilization for each of the 24 hours during the day.
How malfunction code (how mal)	Describes the nature of the malfunction: burned, distorted, cracked, overheated, etc.

Independent variables	May affect system behavior, as opposed to dependent variables, which are the things being affected.
KBA	Killed by air.
K-97 report	Check of maintenance data forwarded to the Logistics Command.
Lag time	Period from touchdown until maintenance begins.
Man-hours	Hours of direct labor.
Manpower Utilization Sequence	Relates personnel utilization (direct on-equipment labor) to sorties flown.
Manpower utilization	Searches each minute of the hour to find the number of men working each hour.
Manpower available	Produces a summary card showing the number of men available for each hour of each work center day.
Touchdown counts	Produces a card for each day showing the number of touchdowns for each hour of that day.
Mission essential items	Essential items for accomplishing the objective of the sortie.
MDC	Maintenance data collection portion of AFM 66-1.
MND	Maintenance non-deliveries.
Net fix time	Active fix time when work is being accomplished. Lags and delays are not included, refers only to unscheduled maintenance.
Net turnaround	Same as net fix time except it includes the scheduled maintenance as well.
NORM	Not operationally ready, maintenance.
NOPS	Not operationally ready, supply.
NOS-G	Not operationally ready for supply, grounded.
Drop pocket	Card drop pocket on 1401.
NRIS	Not reparable this station.
Observed frequency	Count of successes, failures, aborts, etc.
Off-equipment file	MDC records of bench repair actions.
On-equipment bench repair	Repair done without item going through conventional materiel control channels.

OR rate	Operationally ready rate: OR rate = hours ready/hours possessed.
Oxnard format	The output format of the Edit program always includes clock hours. Oxnard refers to the project for which the format was designed.
Oxnard project	An exercise with F-101 aircraft at Oxnard Air Force Base.
Pearson product moment correlations	Statistical measure showing the amount of relationship between two measures.
PS code	Primary-secondary code. A column (in record format Ms) for use as a squadron (or other) designator.
Quantitative data	Manhours, elapsed time. Contrasts with frequency count data.
Rapid Roger	An exercise with F-4C aircraft in Thailand.
Recombine program	A special purpose program used in the Recovery Sequence. Eliminates duplications, adds a dummy sortie card to the end of each tail number subset and merges the sortie deck output by Single, First and Last with the nonsortie data output by Compute Elapsed Time.
Recovery Sequence	Preprocessed edit output data. This involves computing elapsed times, converting to Julian Calendar, and coding the sortie data for first, last and single sorties of the day. Requires Col. 80=0, =2, =3 records. Involves four programs: Compute Elapsed Time; Single, First, and Last; Recombine; and Clint.
Recovery Summary (RECSUM) program	An analysis program. Provides a complete, readily comprehensible summary of aircraft recovery and turnaround in a one-page general summary with back-up pages containing detail.
SAC Full Force	An exercise with B-52, B-47, KC-135 and KC-97 aircraft.
Sequential Frequency Distribution	Summarizes and displays events across 24-hour period.
7-cards	Produced by Clint program. Aircraft recovery records that include only the unscheduled maintenance action and the postflights. Aircraft turnaround records that include both scheduled and unscheduled maintenance data.
8-cards	Produced by Clint program. System records that include both scheduled and unscheduled maintenance actions.

9-cards	Produced by Clint program. Work center records that include the scheduled and unscheduled maintenance actions of all work centers.
Sick bird analysis	Determines whether individual tail numbers show atypical write-up rates based on the sorties flown, by obtaining the sortie and write-up counts for each aircraft card, using Chi-square testing for nonhomogeneity.
Single, First and Last (S/F/L) program	A special program used only in the Recovery Sequence. Makes a single sortie card from the pairs of sortie cards resulting when a flight crosses midnight. The program also determines and tags by tail number the sequence of sorties flown each day.
Skoshi Tiger	An exercise with F-4C, F-5A, and F-100 aircraft in Southeast Asia.
Soft data	Data not keypunched, as opposed to hard data. Generally verbal information.
Sortie length	Measured from takeoff to chock time (engine shut-down).
Sparrowhawk	An exercise with F-4C, F-5A, and A-4 aircraft at Eglin Air Force Base.
Splattergrams	Displays write-ups, sortie-by-sortie, to give a snapshot history of each aircraft. Program computes write-up rates for each aircraft and prints them at the end of each tail number.
Spread-field list	Provides a listing with each field isolated from the adjacent one by blanks. Much easier to read than an 80-80 listing.
Support general codes	Scheduled maintenance codes.
Supply 1050 system	The 1050 is the standard supply computer.
System repeat write-up analysis	A repeat write-up is identical to the write-up on the previous sortie.
Tack Down	An exercise with C-130 aircraft at Pope Air Force Base.
Throughput time	Time it takes to get a job out of the computer, measured from request to delivery.
Tough data	Data collected by many persons at many points, tough to get.
TMS	Type, model and series of aircraft.

Turnaround data	Output that includes all maintenance actions.
Units produced	A count of maintenance actions. Each job is assigned one unit of work.
Vector	A record that describes the status of a system at a given time.
When discovered code	Code showing when the malfunction is discovered: before flight, during flight, during inspection, etc.
Work Center Display	Also called work center queue sort. Shows 24-hour pictorial history of work center.
Work unit codes analysis	Summarizes on one page all the meaningful information on form 300 records for each work unit code.
Write-ups	A malfunction is "written-up," i.e., described. Along with break-rates, write-ups are the major independent variables in determining aircraft recovery and turnaround.
Z-score	Score expressed in sigma units.
ZI	Zone of Interior (USA)
Zone punch	11-punch (-) or 12-punch (+) on card used when punching Alpha or special characters.

I. INTRODUCTION

EQUIPMENT SPECIFICATIONS

The equipment specifications for programs listed in this volume are the following:

1. IBM 1401 computer with
 - a. Four tape drives
 - b. 16,000 positions of core storage
 - c. Advanced programming package, including
 - 1) Multiply-divide
 - 2) Address modification
 - 3) Indexing
 - 4) Store address register
 - 5) High-low-equal compare
 - 6) Expanded print edit
 - 7) Move record
2. IBM card sorter
3. IBM printing keypunch

A complete list of the 1401 autocoder source and object programs and instructions for obtaining a copy of the programs are listed in Appendix C.

PROGRAM TABLES AND CONTROL CARDS

The programs described in this volume require control cards^{*} and, in some instances, item master tables for

1. Execution of the programs
2. Control of input and output
3. Selection of data
4. Editing of data

Preparation of the program control cards (items 1, 2 and 3 above) is described in the operating procedure for each program. Before any processing can be done, the data must be processed by the Edit program. Preparation of the item master tables must be accomplished before the Edit program can be executed.

^{*} See Appendix A for all referenced control card and data card formats.

The Edit program requires the following master tables:

1. Work center table
2. Tail number table
3. Aerospace Ground Equipment (AGE) table

The basic information for the tables should be obtained from the Maintenance Analysis section and keypunched in the prescribed format (i.e., formats M1, M2 and M3). A card is punched for each item code, and each table is maintained in item code sequence.

With this system there are three major sequences of data processing with the computer. The first of these is the Data Editing Sequence (also referred to as the Daily Package). The second, called the Recovery Sequence, summarizes the data by the individual sortie. The third, the Analysis Sequence, uses the output of the first two sequences to analyze the data. As would be inferred, this latter sequence is modified extensively, depending on the analyst's needs. The three sequences are shown in Fig. 1, 2 and 3. In addition, because of its complexity, the Manpower Utilization Sequence is also shown, Fig. 4.

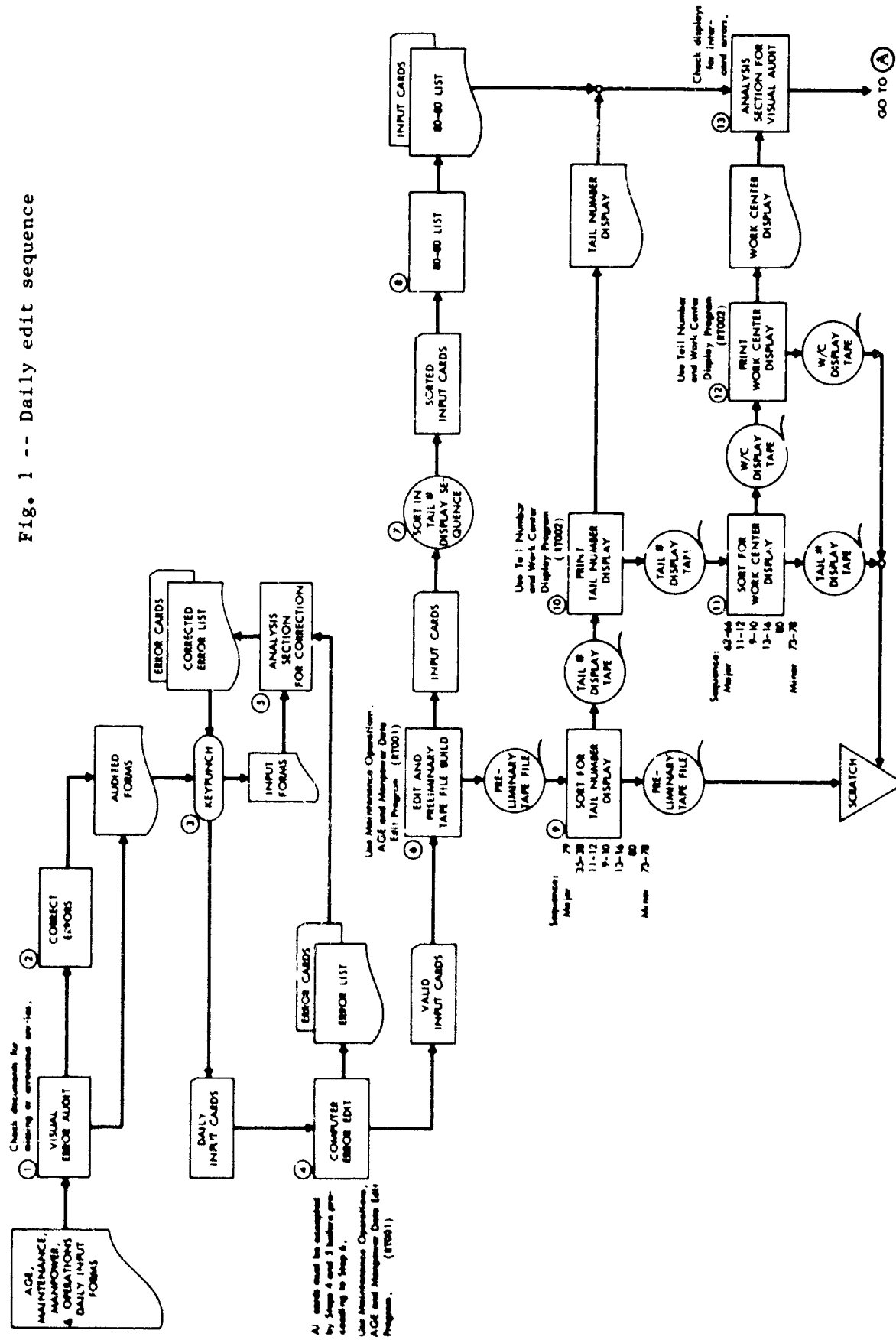


Fig. 1 -- Daily edit sequence (cont.)

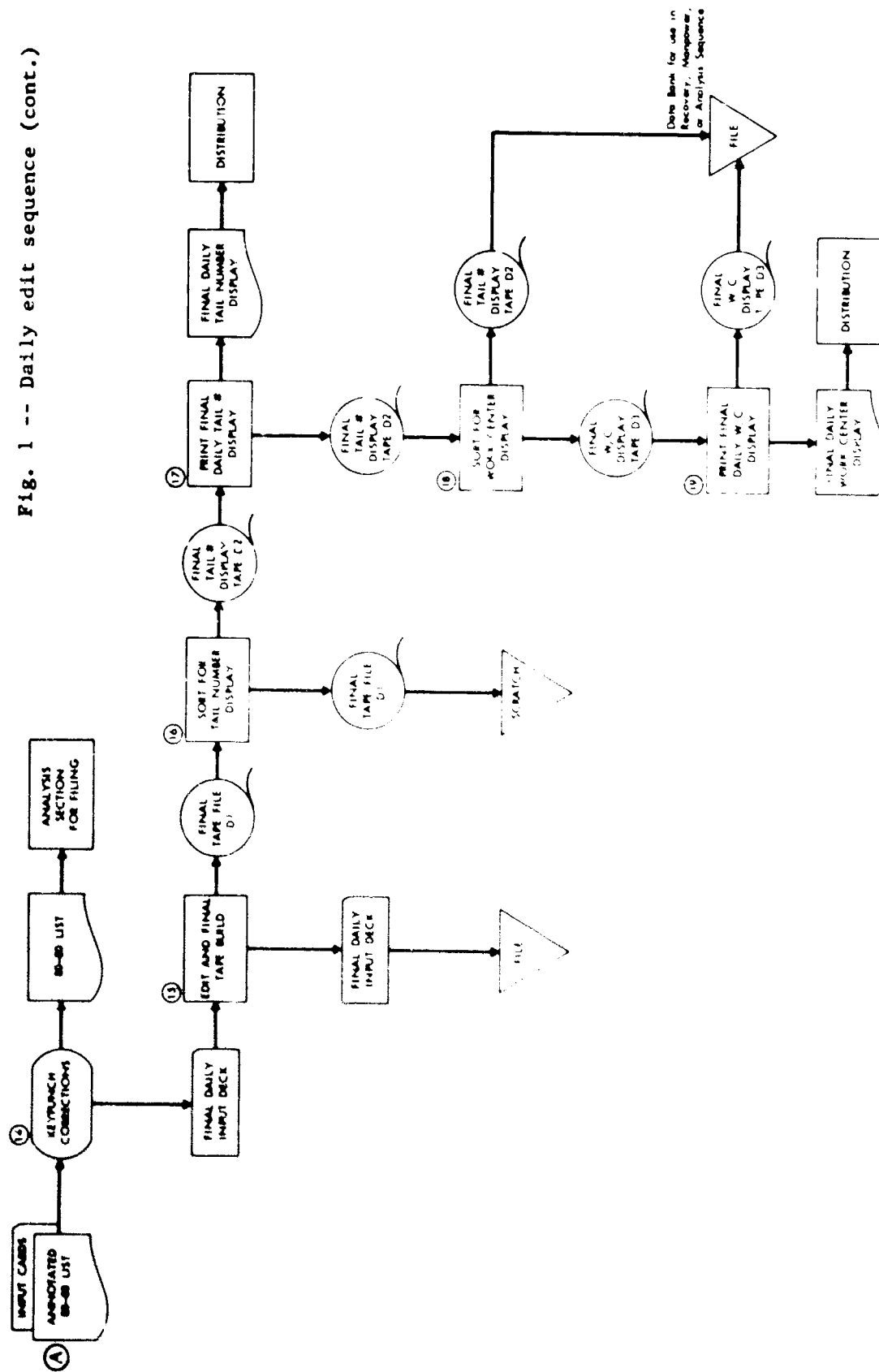


Fig. 2 -- Recovery sequence

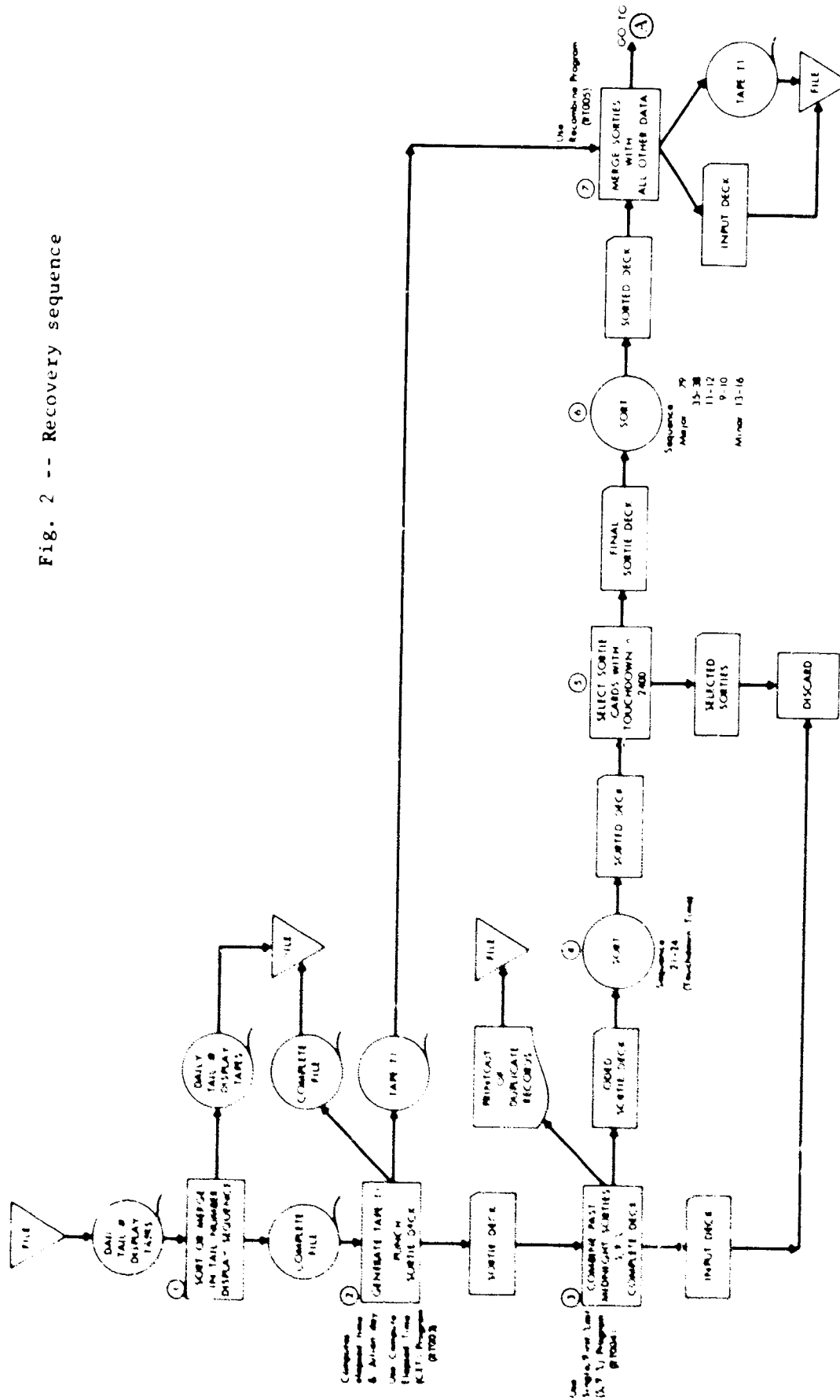
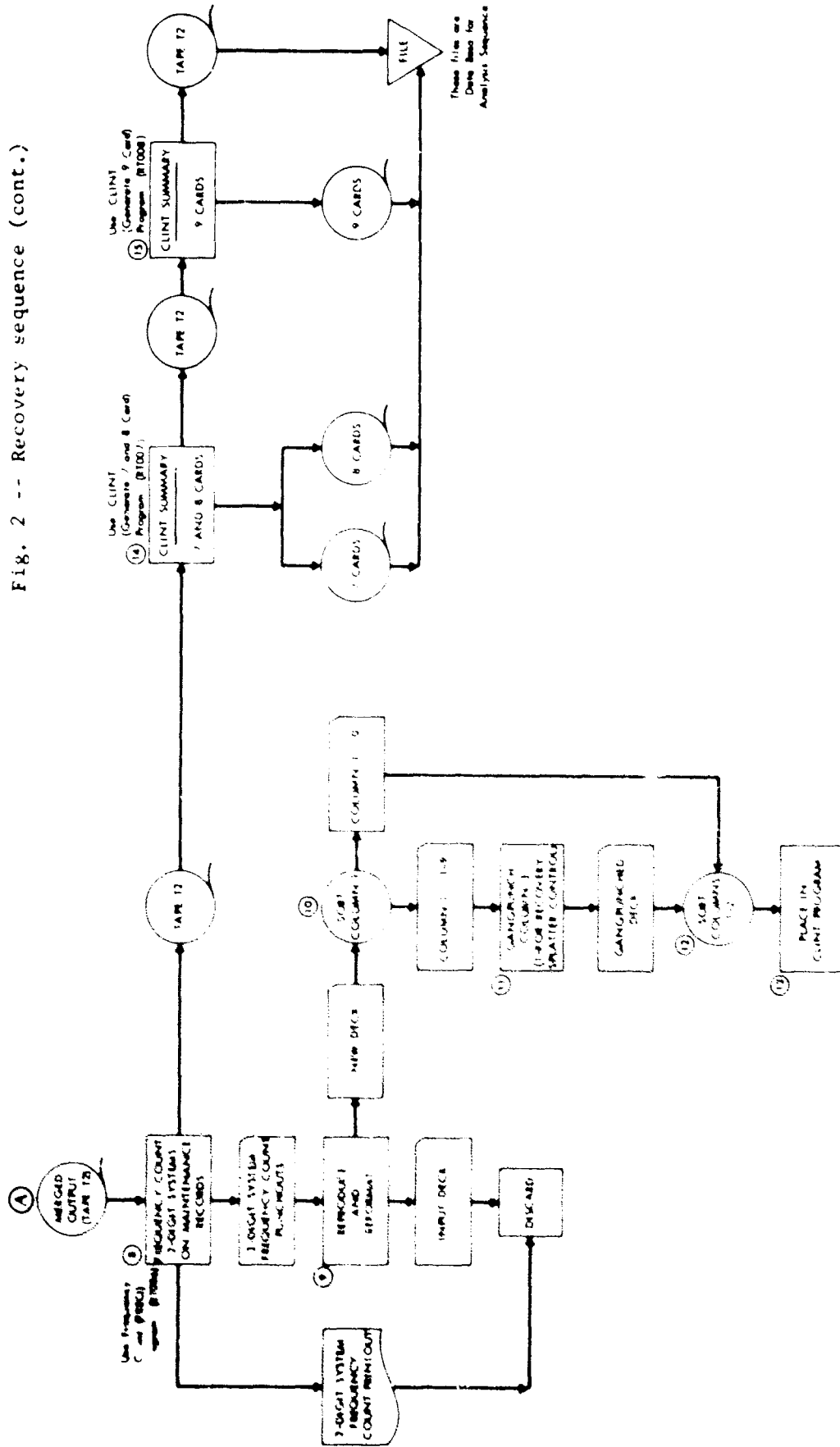


Fig. 2 -- Recovery sequence (cont.)



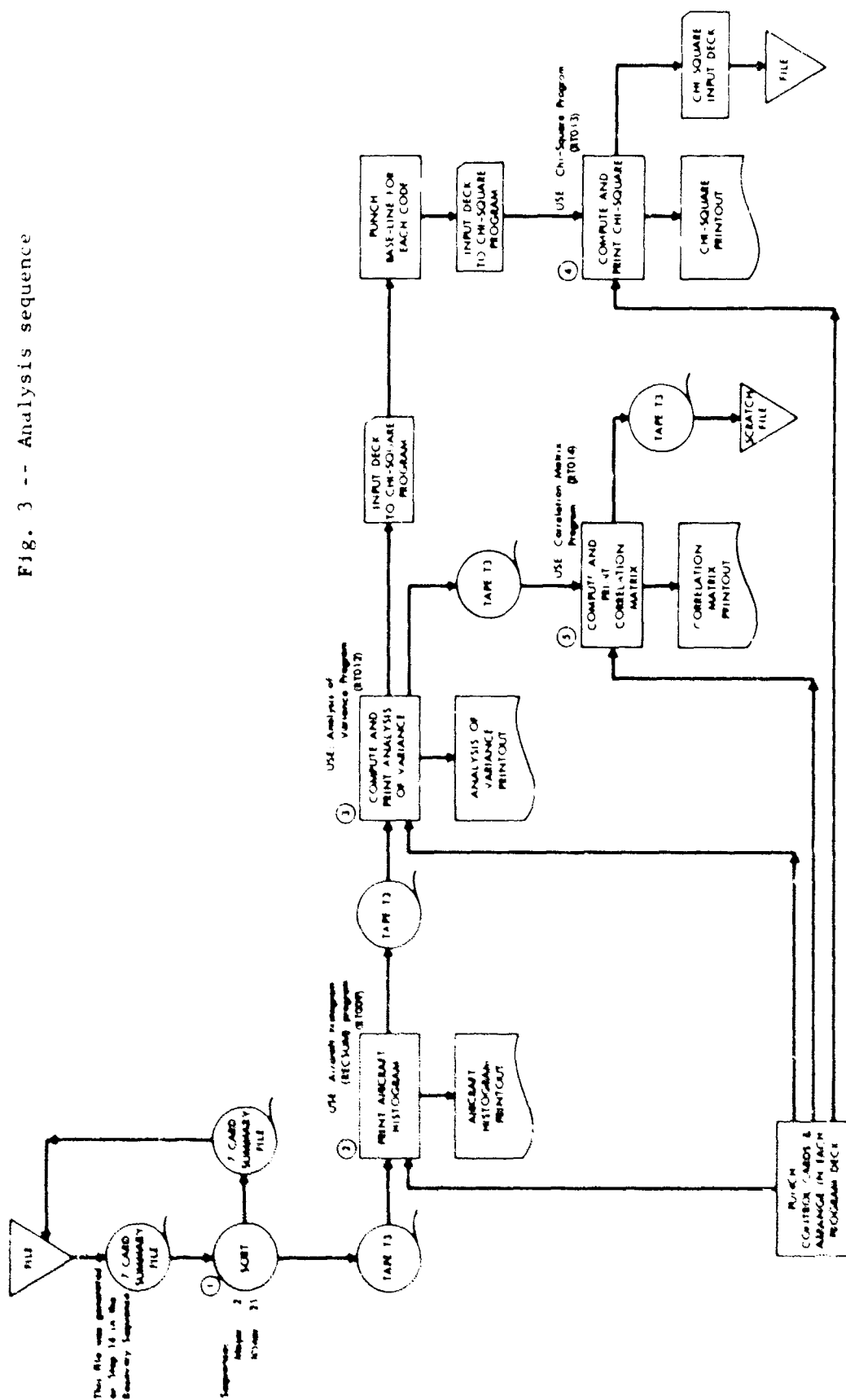
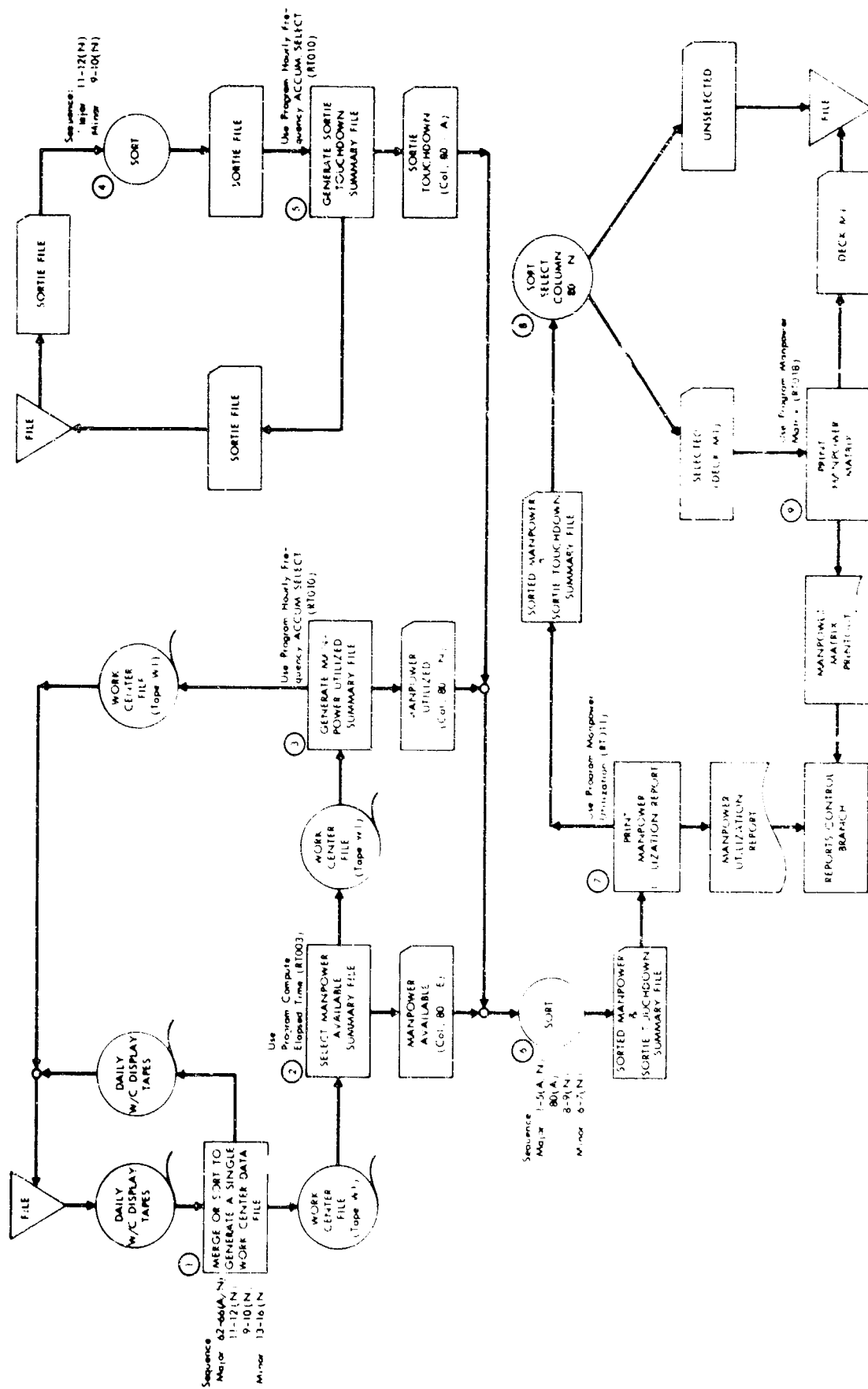


Fig. 4 -- Manpower utilization



II. PROGRAM DESCRIPTIONS

In the following sections each program is described individually in the following sequence:

Purpose--describes the function the program performs.

Method--describes the basic logic of the program.

Operation--describes the operating procedure for executing the program. (One input/output option is described for each program.)

Program setup--shows the deck setup of the program, control cards, tables and input data necessary for execution.

Printout--if the program produces printed output, a sample is shown of a printout that would be produced by executing the program as described in the operating procedure.

The programs process or generate unblocked tape with no tape header or trailer labels.

In the operating procedures the instruction "Load and Go" has the following definition:

Ready tape unit(s)

Ready printer

Ready punch

Place program in reader

Press check reset and start reset on the console

Press check reset and load on the reader

PROGRAM INPUT/OUTPUT FILES

Program Identification	Program Name	Input		Output		
		Cards	Tape	Cards	Tape	Print
RT001	Maintenance, Operations, ACE and manpower data edit	Maintenance, Operations, ACE and manpower data keypunched data	none	1) reformatting valid data (Onboard format)	tape D1 (card images of reformatted valid data)	error card listing
RT002	tail number and work center display	reformatted data	1) tape D2 (sort of tape D1) for tail number display 2) tape D3 (sort of tape D2) for work center display	none	none	1) tail number display 2) work center display
RT003	compute elapsed time	reformatted data	tape D2	option to punch selected cards (code in column 40)	tape T1	none
RT004	single/float/last ('Y/L) sortie cards	sortie cards (format W)	none	coded sortie cards	none	none
RT005	recombine	coded sortie cards	tape T1	summary cards with frequency counts	tape T2	listing of duplicates in file
RT006	frequency count	any card deck (program is general purpose)	any unblocked tape containing images	summary cards with frequency counts	none	listing of counts and contents of field being counted
RT007	Clint (generate 7 and 8 cards)	equivalent to records on tape T2	tape T2	1) 7 cards (aircraft recovery) 2) 8 cards (2-digit system recovery)	1) 7 cards (aircraft recovery) 2) 8 cards (2-digit system recovery)	samples of recovery computations
RT008	Clint (generate 9 cards)	equivalent to records on tape T2	tape T2	9 cards (work center recovery)	9 cards (work center recovery)	samples of recovery computations
RT009	aircraft histogram	7, 8 or 9 cards from Clint programs	7, 8 or 9 card (card images on tape) from Clint programs	summary card with time accumulations	none	aircraft histogram
RT010	hourly frequency accumulate/select	any reformatting data cards	tape D1 (or sorted file of tape D1S)	24-hour spread summary cards (format W)	none	24-hour spread summary
RT011	manpower utilization	24-hour spread summary card (format W)	none	summary of samples	none	manpower utilization
RT012	analysis of variance	any card deck (program is general purpose)	any file with card images	summary of samples	none	analysis of variance
RT013	chi-square	any card deck with the necessary variables	any file with the necessary variables	none	none	chi-square
RT014	correlation matrix	any card deck with the necessary variables	any file with the necessary variables	none	none	correlation matrix
RT015	ACE display	ACE utilization (format S)	sorted tape T2 (program selects and displays format S records)	none	none	ACE display
RT016	deviation-degradation	deviation-degradation comment (format D)	format D records selected from tape T2	none	none	deviation-degradation detail list
RT017	form 305 generator	work center master table (format M)	none	none	none	form 305
RT018	manpower matrix	24-hour spread summary cards (format W)	none	none	none	manpower matrix
AP002	Combat Dragon form 101 operations edit	form 101 operations keypunched data (format CD1-CD7)	cumulative operations data file	none	updated cumulative operations data file	detail list of all card input with error cards identified
DP001	Combat Dragon supply U/X/W card edit	form 401, 402 and 403 supply keypunched data (format CD8-CD10)	cumulative supply data file (format CD11-CD13)	none	updated cumulative supply data file (format CD11-CD13)	detail list of all card input with error cards identified

PROGRAM RT001: MAINTENANCE, OPERATIONS, AGE AND MANPOWER DATA EDIT

Purpose

This program addresses intra-card errors: each card is treated separately. Legality checks fall into four general categories: missing data, illegal data, improper alphabetic or numeric entries, and field comparison errors. The checks made are designed to detect types of errors that have caused the most trouble during the past several years of analyzing maintenance data. Two levels of error control are provided:

1. Data that cannot be processed by the analysis package are rejected immediately. Maintenance records, for example, must contain credible job start and stop times, crew size, work centers and tail numbers.
2. Data that can be processed by the analysis package even though they contain errors can pass through the edit program under control of a switch setting. For instance, a missing how-malfunction code may or may not be important to the circumstances. The switch setting determines whether this type of error is accepted or rejected.

Method

1. The program processes card input only, and the cards must be ordered in major sequence on Col. 80. If desired, the input can be sorted on a minor sequence to assist in locating the source documents of records containing errors.
2. The program edits data and produces records (card or tape) as follows:

Input (Col. 80=)	(In Oxnard Format)*	Output (Col. 80=)
D		M
0		0
If the how-malfunction code is alpha	→	1
?		2
If no landing time	→	S
And if data contains a comment	→	B
3		3
5		E
6		F
7		G
8		H
9		9

See Appendix A for record layouts of data identified by the above codes.

* Volume I, page 9, the Reformatting Function.

3. The program edits data for the following:
 - a. Valid tail numbers, work centers and AGE codes by doing table look-ups in the appropriate item master table. (The program reads and stores the tables before reading any data cards.)
 - b. Improper coding in a column or field. For instance, the month field on all records should fall within the limits of 01-12. If either or both columns are blank or contain alphabetic characters, or if the value punched is less than 01 or greater than 12, the record will be rejected.
 - c. Agreement between two fields. As an example, a maintenance record with job start time equal to or greater than the job stop time would be rejected.
4. Any error sensed in the record will cause the record to be printed (Fig. 6). The printout will show
 - a. A column locator showing the 80 column counts (1-80).
 - b. The card image showing the contents of the card in error.
 - c. An error identifier--a mnemonic under each column or field in error. (Alpha-numeric = A, blank = B, compare = C, error = E.)
5. Output is under control of sense switch settings.

Operation

This operation describes steps 4, 6 and 15 on the Daily Edit Flowchart.

1. Obtain the keypunched data deck for
Aerospace Ground Equipment
Maintenance
Manpower
Operations
2. Place the following tables and table loading stopper card, in the sequence listed, between card numbers 17 and 18 of the object program (card number is punched in Cols. 72-75) shown in Fig. 5.
 - a. AGE table (format M4).
 - b. Tail-number table (format M2).
 - c. Work-center table (format M1).
 - d. Table loading stopper card (format C4).
3. Punch a gang-punch master card (format C6).

Columns	Punch	Field Description
1	"=" (3-8 punch)	Card identity
2	8	Year
3	R	Command code

4. Place the punched card behind the object program.

5. Follow the deck with the keypunched data deck.
6. Mount a scratch tape on unit 1 and unit 2.
7. Sense switches I/O, A, C, F, G--"on".
8. Load and go object program and data deck.
9. Program will
 - a. Read cards.
 - b. Perform edit of each card.
 - c. When an error is sensed:
 - (1) Print a heading identifying the 80 columns of the card.
 - (2) Print the image of the card in error.
 - (3) Print a line of mnemonics locating the column(s) in error (this line is printed after all edits of the card have been completed).
 - (4) Reformat (to the Oxnard format) and write all error-free cards on the tape on unit 1.
10. When the reader stops, press start to process last cards.
11. Program will
 - a. Write an end-of-file on the tape on unit 1. (Tape D1 when final edit.)
 - b. Rewind and unload unit 1.
 - c. Clear punch of all punched error cards.
 - d. Print end-of-job message.
 - e. Halt at IC = 10353.

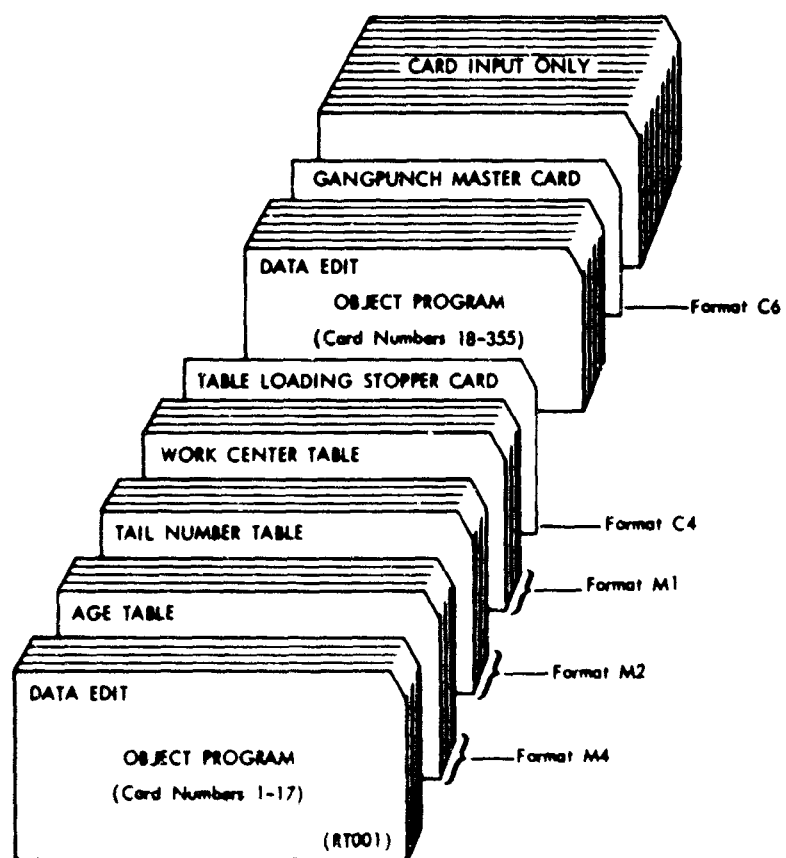


Fig. 5 -- Maintenance operations, AGE and manpower data edit program setup

Fig. 6 -- Error edit printout

PROGRAM RT002: DAILY TAIL NUMBER AND WORK CENTER DISPLAYS

Purpose

The printouts generated by this program are used to allow the following:

1. Error edit. They permit the visual review of inter-card relationships to detect data omissions and inconsistencies. These types of errors are not caught by the error edit program, which is concerned only with intra-card errors.
2. System monitoring. They provide a means for understanding the interweaving of the relationships among operations, maintenance, supply and scheduling.
3. Analysis initiation. They provide a starting point for analyses, which generally begin with hand computations based on display data.

Method

1. The edited operations, status and flight-line maintenance data, in Oxnard format, are processed by this program to produce both the tail-number and work-center displays. The file, which may be card or tape, is ordered as shown:

Tail-Number Display

Major	Col. 79	A	PS code
	Cols. 35-38	N	tail number
	Cols. 11-12	N	month
	Cols. 9-10	N	day
	Cols. 13-16	N	time (hour/minute)
	Col. 80	AN	card type
Minor	Cols. 73-78	AN	report number

Work-Center Display

Major	Cols. 62-66	AN	work center
	Cols. 11-12	N	month
	Cols. 9-10	N	day
	Cols. 13-16	N	time (hour:minute)
	Col. 80	AN	card type
Minor	Cols. 73-78	AN	report number

2. The program displays all formats containing start and stop times by converting the times to quarter-hour segments and using the values as parameters for plotting in the 24-hour display. The character plotted depends on the record being

processed. If it is a sortie record (format M), an "F" will be plotted; if a maintenance record (format K), a numeric digit representing crew size (the count of men performing the job) will be plotted; if a delay record (format L), a "D" will be plotted; if a status record (format Q), an alpha code as defined in AFM 65-110 will be plotted. The pictorial displays are detailed in several fields to the right. For maintenance records the conventional AFM 66-1 data (work unit code, work center, action taken, when discovered, how malfunction and type of maintenance) plus elapsed time (computed by subtracting start time from stop time) and total man-hours (elapsed time multiplied by crew size) will be printed. For sortie records, type of sortie flown, mission number, flight crew and sortie deviation codes will be printed. For delay records, in addition to most of the items listed for a maintenance record, the delay code will be printed.

3. A summary line is printed at the bottom of each display which is a count of the maintenance crew size data pictorially displayed. In addition, an "F" is printed in any quarter-hour segment when the aircraft is flying. To the right of the summary line is a recap of the quarter-hour segments: F (flyers), M (men working) and S (white space).
4. The program allows selection and printing of data for a single day from a multi-day file by punching the desired data in an optional control card (format C7) and placing it in the program deck as shown in the program deck setup.

Operation

This operation describes steps 9-12 and 16-19 on the Daily Edit Flowchart.

1. Sort the final daily edited data tape (tape D1) as follows:

Major	Col. 79	A	squadron
	Cols. 35-38	N	tail number
	Cols. 11-12	N	month
	Cols. 9-10	N	day
	Cols. 13-16	N	clock time
	Col. 80	AN	card type
Minor	Cols. 73-78	AN	report number

2. Call the sorted output tape (tape D2).
3. Place the following tables and control card in the sequence listed, behind the object program shown in Fig. 7:
 - a. Tail-number table (format M2)
 - b. Work-center table (format M1)
 - c. Table loading stopper card (format C4).

4. Mount tape D2 on unit 4.
5. Sense switches I/O, A, C, G--"on".
6. Load and go the object program, tables and stopper card.
7. Program will
 - a. Read unit 4.
 - b. Reformat and list the data in display printout format as shown in Fig. 8.
 - c. Print a daily summary line for each tail number.
 - d. Eject to a new page when a change in tail number is sensed, and print a summary of sorties flown, man-hours expended, and average man-hours per sortie.
 - e. Print a list of tail numbers (contained in the tail-number table) which had no data printed.
 - f. Rewind and unload unit 4.
 - g. Print end-of-job message.
 - h. Halt at IC = 4117.

Work-Center Display

8. Sort the tail number display tape (tape D2) as follows:

Major	Cols. 62-66	AN	work center
	Cols. 11-12	N	month
	Cols. 9-10	N	day
	Cols. 13-16	N	clock time
	Col. 80	AN	card type
Minor	Cols. 73-78	AN	report number

9. Call the sorted output tape (tape D3).
10. Mount tape D3 on unit 4.
11. Sense switches I/O, A, C, E, G--"on".
12. Load and go object program, tables and stopper card.
(Same program and deck setup used to list the tail-number display.)
13. Program will
 - a. Read unit 4.
 - b. Reformat and list the data in display printout format as shown in Fig. 9.
 - c. Print a daily summary line for each work center.
 - d. Eject to a new page on a change in work center code.
 - e. Rewind and unload unit 4.
 - f. Print end-of-job message.
 - g. Halt at IC = 4117.

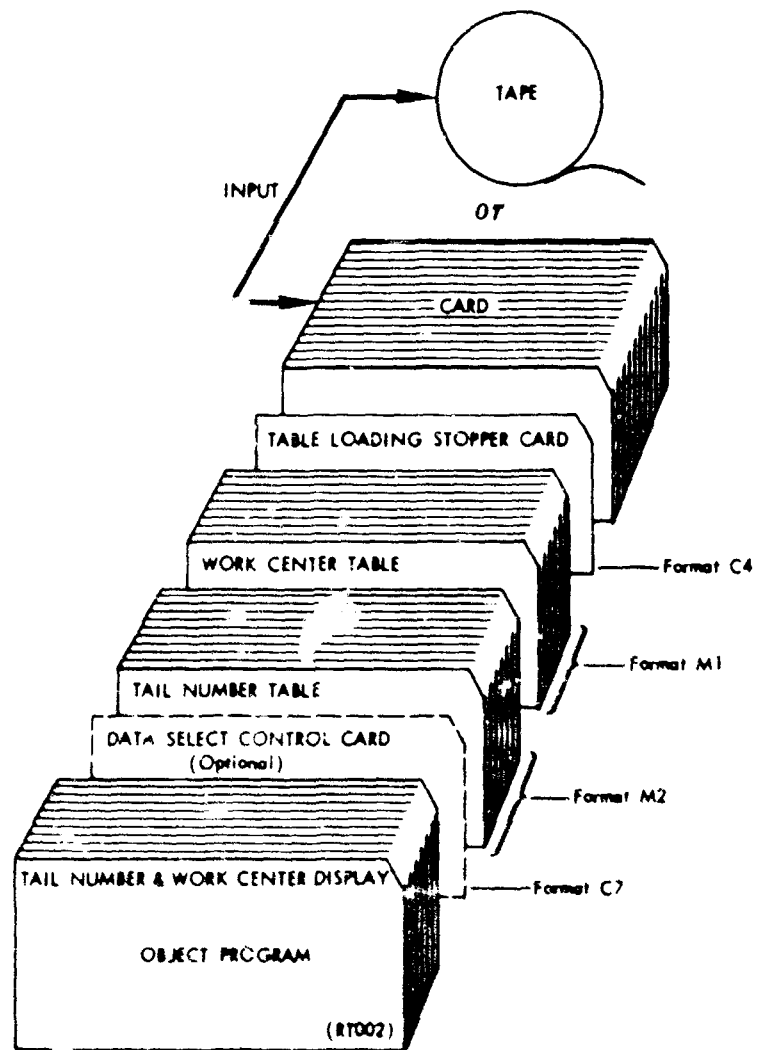


Fig. 7 -- Tail number and work center display program setup

DATE	09-01	AIRCRAFT SERIAL NUMBER 0773										TIME AMT M/M REPTD															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MUC	W/C	ET	25
RECONFIGURED FROM F-1 TO F-1 1/2 COMP 0915 MISSION GO AT 1440 HOURS LOAD CHANGED AND TAKE OFF TIME CHANGED TO 18002231 TOTAL 20.7 43.9																											

Fig. 8 -- Tail number display

PROGRAM RT003: COMPUTE ELAPSED TIME (CET)

Purpose

1. This program will process edited output data (tape D2 or a merged file of tape D2S from the Daily Edit Sequence) and
 - a. Compute elapsed time (job time, delay time, flying time, status time, etc.).
 - b. Convert Gregorian start date to Julian date.
2. The program can also be used as a general purpose record selector (of Oxnard type formats) by punching the desired code, reflected in Col. 80 of the data record, into Col. 3 of the tape input control card (format C13) and setting the appropriate switches.

Method

1. Elapsed time is calculated by first sensing for type of record. Some Oxnard formats, such as comments and sortie deviations (formats V and U), do not have stop times; therefore, the program bypasses the calculation. The start and stop times on other records are converted to minutes; the start minutes are subtracted from the stop minutes, and the result is divided by six to give an elapsed time figure in hours and tenths. The elapsed time is moved to Cols. 70-72 of the record.
2. The Gregorian date to Julian date conversion is accomplished by moving the start day to Cols. 67-69 (a zero is moved to Col. 67 to fill the field). The month is sensed and a value equal to the number of consecutive days through the last day of the preceding month is added to Cols. 67-69 to give Julian date.

The reader will notice that 365 has been added to the Julian dates of January through May. The Rapid Roger exercise began in July 1966 and lasted until February 1967. Adding 365 to the early months of 1967 enabled sorting the data in sequence without having to resort to the inclusion of the year in the Julian date. The Julian date computation should be corrected before using on another exercise.

Operation

This operation is step 2 on the Recovery Sequence Flowchart.

1. Place control card (format C13), punched as follows, behind object program, as shown in Fig. 10:

Columns	Punch	Field Description
1-2	01	Count of input tapes
3	2	Card type to select and punch (code 2 is sortie card, format M).

2. Mount the input tape on unit 1.
3. Mount a scratch tape on unit 2.
4. Sense switches I/O, A, C, D, F--"on".
5. Load and go program and control card.
6. Program will
 - a. Read tape on unit 1.
 - b. Compute elapsed time; convert Gregorian date to Julian date.
 - c. Punch sortie cards.
 - d. Write all other records on unit 2.
7. After the input tape has been processed, program will
 - a. Clear punch of all punched cards.
 - b. Write an end-of-file on unit 2 (this is tape T1).
 - c. Rewind and unload units 1 and 2.
 - d. Print end-of-job message (the program produces no other printing).
 - e. Halt at IC = 1473.
8. The sortie card deck is the input to program S/F/L (RT004).
9. Tape T1 is the input to program Recombine (RT005).

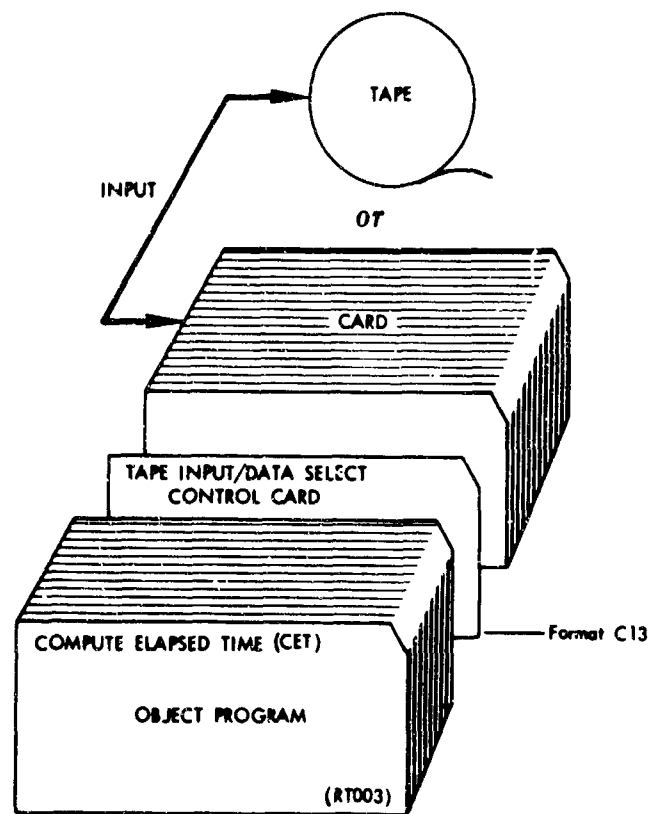


Fig. 10 -- Compute elapsed time program setup

PROGRAM RT004: SINGLE/FIRST/LAST (S/F/L) SORTIE CARDS

Purpose

This program, used only in the Recovery Sequence, will process a deck of sortie cards (format M, sorted in Tail Number Display Sequence) and

1. Make a single sortie card from the pairs of sortie cards resulting when a flight crosses midnight.
2. Determine, by tail number, the sequence of sorties flown each day.

Method

1. The deck of sortie cards processed by this program is obtained by processing the tail number display tape with the Compute Elapsed Time program (RT003). The sortie deck, as punched from the tape, will be in the sequence required by this program.
2. The program reads and loads the sortie cards in core until a change in tail number and date is sensed.
3. The set in core is then analyzed and coded as follows:

S = Single sortie (indicating only one sortie flown by this tail number on this day).

L = Last sortie (indicating this is the last of a minimum of two sorties flown for this tail number on this day).

F = First (or all other sorties flown for this tail number on this day).

In addition to the daily S/F/L code for the tail number, the set will also be numerically sequence coded (if three sorties are flown during the day, in addition to the F and L codes, the sorties will be coded 1 of 3, 2 of 3, and 3 of 3).

4. After this coding has been accomplished, and before the sortie set is punched, the touchdown time of the last sortie in the set is tested to see if it is equal to 2400. If the test is true, the takeoff time of the first sortie of the next set is tested to see if it is equal to 0001. If this test is also true, the pair of sortie cards are combined into a single sortie by taking the touchdown time of the second sortie and moving it to the touchdown time of the first sortie. The elapsed time is recomputed. The program then bypasses the second sortie card.
5. A new, sequenced sortie deck is punched by the program.

Operation

This operation is step 3 on the Recovery Sequence Flowchart.

1. Place sortie deck (format M, punched from tail-number display tape using program CET--step 2 on Recovery Sequence Flowchart) behind object program, Fig. 11.
2. Ready printer and punch.
3. Sense switches I/O, A--"on".
4. Load and go program and data deck.
5. Program will
 - a. Read cards.
 - b. Analyze and code data.
 - c. Punch new sortie deck. (The new deck, in addition to the data contained in the input deck, will reflect the S/F/L code (Col. 63); the numeric sequence code (Cols. 73-74), cross-midnight flyers (combined in one record with flying time recomputed)).
6. When the reader stops, press start to process final cards.
7. Program will
 - a. Clear punch of all punched cards.
 - b. Print end-of-job message (the program produces no other printing).
 - c. Halt at IC = 1062.
8. The new sortie deck is input to program Recombine (RT005).
9. The input deck can be discarded.

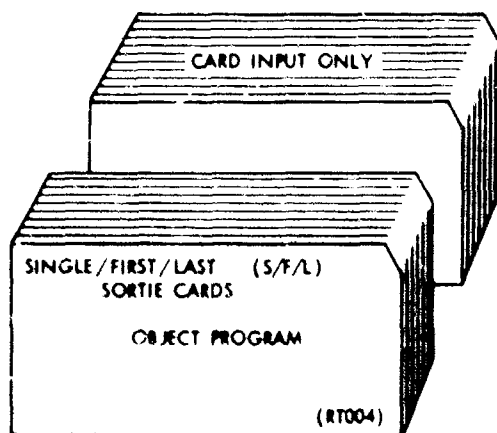


Fig. 11 -- Single/first/last (S/F/L) sortie cards program setup

PROGRAM RT005: RECOMBINE

Purpose

1. This program, used only in the Recovery Sequence, will
 - a. Merge the sortie deck generated by program S/F/L with the sortie-free data tape (tape T1) generated by program Compute Elapsed Time (RT003--CET).
 - b. Test for and eliminate duplicate records.
 - c. Add a dummy sortie card to each tail number subset.
 - d. Generate a tape (tape T2) used by the Clint program.

Method

1. The program merges the sortie deck with tape T1 by
 - a. Reading a card, then reading a tape record and comparing the tail number, month, day and time. The card record is written on tape (tape T2) if the value of the card record is less than the value of the tape record from tape T1. High or equal values allow the record from tape T1 to be written on tape T2.
 - b. As a record is read from tape T1, it is compared to the preceding record and tested for equality on all eighty record positions. If found to be equal, the record is printed and eliminated from the file.
 - c. Before a record is written on tape T2, a test is made to see if the record about to be written has the same tail number as the previous record written. If tail numbers are unequal a dummy record, coded as a sortie, is written as the last record of the previous tail number subset.

Operation

This operation is step 7 on the Recovery Sequence Flowchart.

1. Place control card (format C9), punched with count of input tapes (count=01), behind object program, Fig. 12.
2. Place the sorted final sortie deck (processed on steps 3, 4, 5 and 6 on the Recovery Sequence Flowchart) behind the control card.
3. Mount the input tape on unit 1 (tape T1).
4. Mount a scratch tape on unit 2.
5. Sense switches I/O, A--"on".
6. Load and go program, control card and sortie deck.
7. Program will
 - a. Read unit 1.
 - b. Read cards.

- c. Merge the tape records from unit 1 with the card records, writing a new file on unit 2 (tape T2). The sequence of the file is

Major	Col. 79	squadron
↓	Cols. 35-38	tail number
	Cols. 11-12	month
	Cols. 9-10	day
Minor	Cols. 13-16	time

- d. Test a record before it is written on the tape on unit 2 for 80 column duplication. If it is identical to the previous record, it is eliminated from the file. All duplicate (eliminated) records are printed, as in Fig. 13.
- e. After testing for a duplicate record, test for a change in tail number. Such a change will cause a "dummy" sortie record to be written as the last record of the previous tail number subset. (The dummy record is used when a switch option is selected in the Clint program.)
8. When the reader stops, press start to process last cards.
9. Program will
- Write an end-of-file on tape on unit 2. (This is tape T2.)
 - Rewind and unload tapes on units 1 and 2.
 - Print end-of-job message.
 - Halt at IC = 1812.
10. File sortie deck for use in Manpower Utilization Sequence.

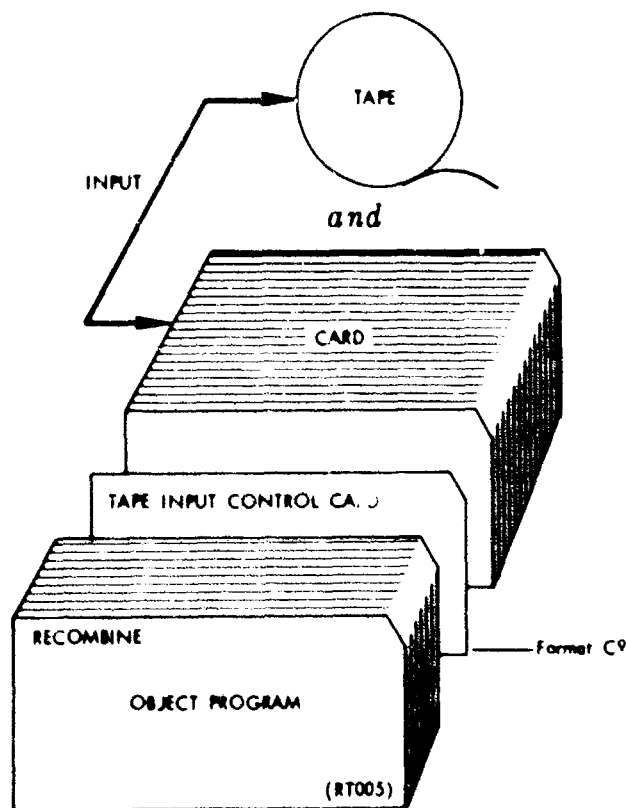


Fig. 12 -- Recombine program setup

DUPLICATES ELIMINATED WHEN GENERATING TAPE T2

131201301	000080	V
132321001	000080	V
132301401	000010	V
134201001	000015	V
134201201	000010	V
134201501	000020	V
134201501	000020	V
134201401	000040	V
134201401	000030	V
134201501	000050	V
134301201	000080	V
134201601	000020	V
134201801	000030	V
134201701	000025	V
134301101	000080	V
134301101	000080	V
134301101	000080	V
133600901	000010	V
133401401	000040	V
133401701	000020	V
143201301	000040	V
121631501	000020	V
143501101	000120	V
143501801	000010	V
132301201	000005	V
131511101	000080	V
152401501	000040	V
133701601	000050	V
133701101	000020	V
133701101	000010	V
133701601	000060	V
133701001	000010	V
133701201	000010	V
133701201	000010	V
133601801	000010	V
133701501	000020	V
133701801	000020	V
133701801	000060	V
133701801	000020	V
133701801	000050	V
133701801	000040	V
133701801	000040	V
134101201	000060	V
134101201	000020	V
133201801	000010	V
133251001	000770	V
134301601	000160	V
134301701	000050	V
F96UNOH090121350TAKE OFF TIME CHA0000MGED 7011000 2310	32231 1M	
F96UNOH090121300NO ACFT AVAIL FOR0000 LOADIN11000G	32231 1M	
238JLEHMH10011900QT/O TIME CHANGED 000010 193011000	32231 1M	
R63E0EHMH10012030QT/O TIME CHANGED 000010 210011000	32231 1M	
A72EHMHMH10012035QT/O TIME CHANGED 000010 211011000	32231 1M	
R63E0EHMH100121000NO ACFT WITH ETIC00005 COMPAT1000TABLE TO LOAD	32231 1M	
07ARKHMH10012305QT/O TIME CHANGED 000010 234011000	32231 1M	
09011740	0823FP	32231 1G
12011830	0823FP	32312 1G
12011830	0823FP	32312 1G
1001150010012136 U	0842	01006432231 13
180115411801154318011557 1011618	0927 HYDRA12043ULIC MULE M	09018002J3 1F
22 1801092518010940	7442	30300332312 1M
1801000118012400 N	7524	099999G 01824032312 13
0901000109012400 N	7556	75140N 00924032231 13
1001000110012400 N	7556	75140N 01024032231 13
1201000112012400 N	7556	75140N 01224032312 13
12011830	7556FP	32312 1G
22 1701050517010520	7553	30200332312 1M
09011315	7629FP	32231 1G
22 1701134017011355	7656	30200332312 1M
1501000115011642 N	7448	74190N 01516732312 23
1301141813012400 N	7522	14550G 01309732312 23
412JASHMH09011805ULOAD CHANGED AND 7589TAKE OFF11000F TIME CHANGED TO 184532231 2M	7589FP	32312 2G
12010425	7641	4114JG 01311532312 23
1301123013012400 N	7680	111GAG 00924032231 23
0901000109012400 N		

Fig. 13 -- Duplicate records eliminated from file

PROGRAM RT006: FREQUENCY COUNTER (FREQ)

Purpose

This program is used to search a maximum of three fields of unknown and unsorted data (card or unblocked tape input) to determine the codes and the frequency of their occurrence in the file. The results are printed and/or punched. The punched output, by adding an additional value, may be used as input to the Chi-square program and/or, by reformatting, may be used as tables required by the Clint program.

Method

The program reads a control card (format C14) that sets up the location(s) of the field(s) to be searched. The table area for holding the codes is blank when the program starts. The code of the first record processed becomes the first member of the table. As each additional record is read, the program searches the table and when it finds the matching code, increases the count of the occurrences for that code. If the code is not found, it becomes the next member of the table. The program has the facility of counting a selected record type (identified in Col. 80) of a mixed format file of data by punching the desired code in Col. 80 of the control card and setting the appropriate sense switch.

If card input, samples may be stacked by separating each sample with a card having an 11-4-8 punch in Col. 1. Summaries are given for each sample.

Operation

This describes steps 8-13 on the Recovery Sequence Flowchart.

1. Punch the following control card (format C14):

Columns	Punch	Field Description
1-3	046	Location of high-order position
4-6	047	Location of low-order position
19-79	(see below)	Printout title
80	0	Record type to count
19-79	TWO-DIGIT SYSTEM COUNT--TAPE T2	

2. Place the control card behind the object program, Fig. 14
3. Mount the input tape (tape T2) on unit 1.
4. Sense switches I/O, A, B, C, E--"on".
5. Load and go object program and control card.
6. Program will
 - A. Read tape 1.
 - b. Build a table of two-digit systems, with frequency counts, from the maintenance records (format K).
7. When unit 1 rewinds and unloads, turn switch G "on". Press start.
8. Program will
 - a. Print and punch (in format 2) the table of two-digit systems the program develops, Fig. 15.
 - b. Print an end-of-job message.
 - c. Halt at IC = 1842.

Note: The following steps describe processing of the punched output deck for use in the recovery sequence on the flowchart. Disposition of the punched output deck will depend on the user's need for having made the frequency count of a data element in a file.

9. Reproduce the punched output as follows:

Columns	into	Columns
26-27		1-2
Gangpunch "S" (11-3-8 punch)		80

10. Sort the reproduced deck on Col. 1.
11. Hold Col. 1 = 0 for step 14.
12. Group all others in a single deck.
13. Gangpunch a "1" in Col. 3 of the deck from step 12.
14. Combine the deck from step 11 with the deck from step 13 and sort:

Cols. 1-2	N.
-----------	----
15. The sorted deck is the two-digit system table (format M3) used in the Clint program.

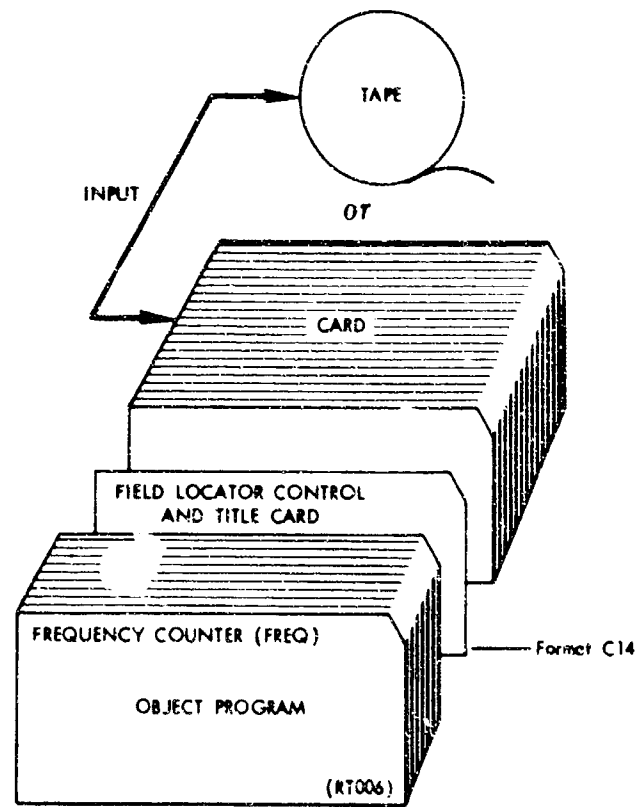


Fig. 14 -- Frequency counter (FREQ) program setup

TWO-DIGIT SYSTEM COUNT -- TAPE 12

DECK 1

FIELD 45- 47

01	3484	.321
03	1211	.111
02	64	.006
04	1394	.128
11	866	.080
74	777	.072
13	504	.046
71	448	.041
91	24	.002
51	99	.009
12	202	.019
42	100	.009
44	76	.007
14	291	.027
06	52	.005
45	252	.023
07	48	.004
73	66	.006
52	141	.013
75	174	.016
09	41	.004
41	139	.013
46	139	.013
23	120	.011
76	33	.003
49	19	.002
77	3	.000
47	47	.004
93	20	.002
05	1	.000
72	21	.002
61	2	.000
96	1	.000
08	1	.000
69	1	.000

RECORDS - 10861

Fig. 15 -- Data file two-digit system frequency counter

PROGRAM RT007: CLINT (GENERATE 7 AND 8 CARDS)

AND RT008: CLINT (GENERATE 9 CARDS)

Purpose

The pair of Clint programs are used to compute aircraft (7-card), system (8-card) and work center (9-card) summaries. The records, summarized by sortie, are the inputs used by most of the analysis programs. The data summarized on each of the records are shown in formats R1, R2 and R3 and are fully described in Vol. II.

Method

1. Sortie records (format M), on-aircraft maintenance records (format K) and status records (format Q) ordered in tail number display sequence (tape T2) are summarized by Clint to produce the 7, 8 and 9 cards.
2. Processing is initialized when the program senses the first sortie for an aircraft. The tail number, touchdown time and flying time are stored to control output of the sortie summary. The program then sweeps through the data summarizing the maintenance and status data, and when the next sortie record is encountered it outputs the summarized data of the previous sortie and reinitializes for summarizing the next sortie.
3. The program uses a table of work centers (format M1) and a table of two-digit systems (format M3) to control processing of the maintenance data. The computer processes only those data identified in both tables. Use of the tables allows a variation of systems and/or work centers to be processed for either recoveries or turnarounds.
4. The program always produces the aircraft record; however, to minimize data volume, the system and work center records are generated only when a maintenance action occurs.

Operation A

Operation A is RT007: Clint (generate 7 and 8 card) step 14 on the Recovery Sequence Flowchart.

1. Punch the lag/delay constant control card (format C1) as follows:

Columns	Punch	Field Description
1-6	99^999	Lag constant
7-12	999999	Delay constant
13-20	SAMPLE 1	Output file identification
80	"X" (11 Zone)	Control card identification

2. Place the following tables and control card, in the sequence listed, behind the lag/delay constant control card, Fig. 16:
 - Two-digit system table (format M3)
 - Work center table (format M1)
 - Table loading stopper control card (format C4)
3. Place the combined deck between card numbers 0025 and 0026 of the object program (card numbers are punched in Cols. 72-75 in the program).
4. Place a tape input control card (format C9), punched with count of input tapes (count = 01), behind the last card of the object program.
5. Mount the input tape (tape T2) on unit 1.
6. Mount a scratch tape on unit 2.
7. Mount a scratch tape on unit 3.
8. Sense switches I/O, A, C, F--"on".
9. Program will
 - a. Read unit 1.
 - b. Write unit 2 (8 card--two-digit systems summary records--format R2).
 - c. Write unit 3 (7 card--aircraft summary records--format R1).
10. After the input tape has been processed the program will
 - a. Write an end-of-file on the tapes on units 2 and 3.
 - b. Rewind and unload units 1, 2 and 3.
 - c. Print an end-of-job message.
 - d. Halt at IC = 3128.

Operation B

Operation B is RT008: Clint (generate 9 card) step 15 on the Recovery Sequence Flowchart.

1. Remove the tables and control cards from program used in Operation A (steps 1-3) and place them between card numbers 0021 and 0022 of the Clint 9-card (RT008) object program, Fig. 17.
2. Place the tape input control card behind the last card of the object program. (See step 4, Operation A.)
3. Follow steps 5-10 listed in Operation A with these changes:
 - a. Scratch tape is not required on unit 3.
 - b. The tape written on unit 2 contains the 9-card work center summary records (format R3).
 - c. Program will halt at IC = 2918.

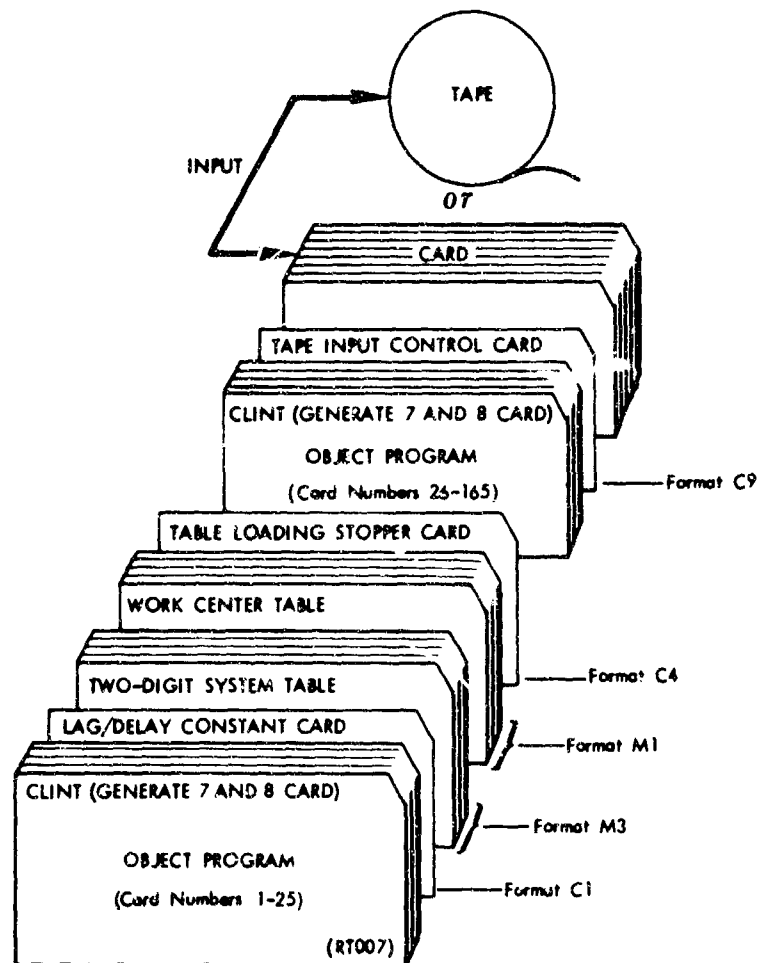


Fig. 16 -- Clint (generate 7 and 8 card) program setup

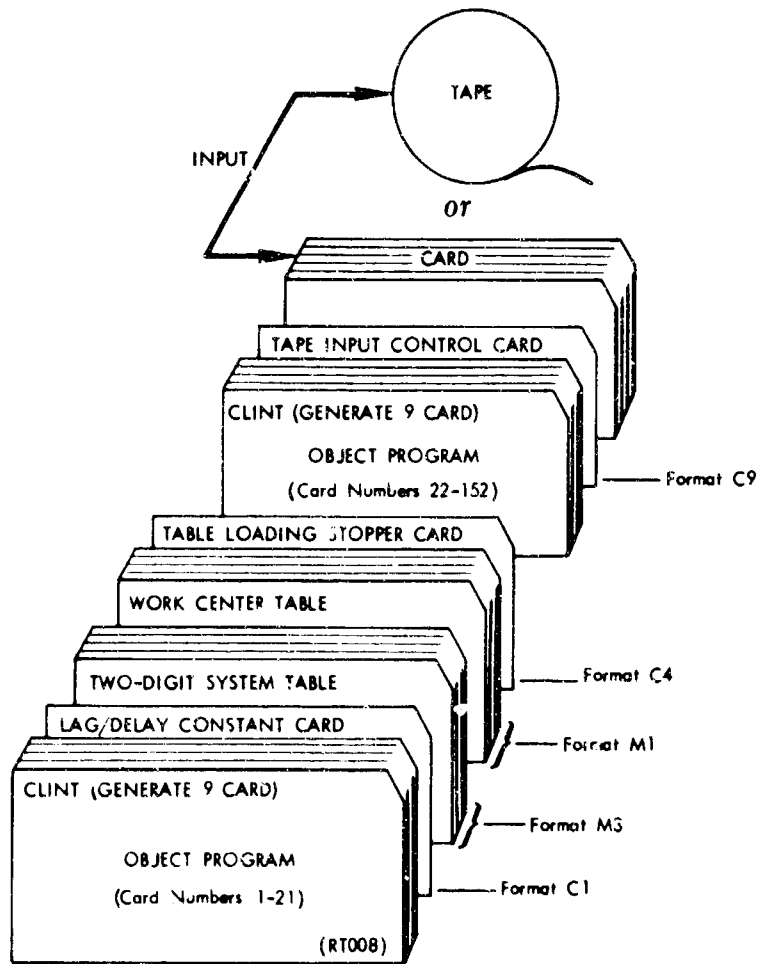


Fig. 17 -- Clint (generate 9 card) program setup

PROGRAM RT009: RECOVERY HISTOGRAM (RECSUM)

Purpose

This is a special purpose program that processes only Clint output. It generates a one-page general summary with detailed backup pages showing a pictorial and numerical summary of aircraft recovery and turn-around, as well as similar summaries of work center and work unit code data.

Method

1. The program requires:
 - a. A general title card (format C10) to define the data sample.
 - b. Two subtitle cards (format C11) to define the mnemonic codes appearing in both sides of the histogram.
 - c. A field locator card (format C3). This control card will contain the locations of the major and minor control fields--the locations of the characters to be printed in the left and right histogram; the location of the data field the program is to treat in detail; the print position for printing of asterisks to identify the item being detailed. Data must be sorted by major and minor.
2. The program plots the mnemonics in the left and right histogram by converting the value of the item being detailed from hours and tenths to quarter-hour segments. The result of the computation is used as an index for locating the column in the matrices where the mnemonic will be plotted. The rows in the columns are searched until a blank cell is found for receiving the mnemonic. If all cells in a column are full, the mnemonic does not get plotted; however, a count is made of all items that exceed the bounds of the matrices.
3. While the program is computing and plotting the mnemonics, it is also summarizing other data from the records (such as man-hours, flying time and gross recovery). The summaries are used for the statistical printout below the histogram and, for selected minors, writing a summary tape.
4. When the program senses a change in minor control, the minor summary page is printed and all minor working cells are reset to receive the data from the next minor control group. The same procedure is followed when a change in major control is sensed.

Operation

This operation describes steps 1 and 2 on the Analysis Sequence Flowchart.

1. Sort the 7-card summary tape (generated on step 14 of the Recovery Sequence Flowchart) in the following sequence.

Major Col. 2 record type
Minor Col. 21 S/F/L sequence code

The sorted output tape is tape T3.

2. Punch a general title card (format C10):

Column
1 80
SAMPLE AIRCRAFT TURNAROUND TIME DISTRIBUTION--S/F/L

3. Punch two subtitle cards to define the mnemonics to be printed in the left and right histogram (format C11):

Left histogram:

Column
15 80
SINGLE, LAST AND ALL OTHER SORTIES

Right histogram:

Column
15 80
SORTIE TYPE

4. Punch a field locator control card (format C3):

Columns	Punch	
1-3	402	Major control--high-order position
4-6	402	Major control--low-order position
7-9	421	Minor control--high-order position
10-12	421	Minor control--low-order position
13-15	421	Location of left histogram character
16-18	416	Location of right histogram character
19-21	442	Location of data variable
22-24	235	Asterisk print location
25-26	01	Count of input tapes
80		\$(11-3-8) Card identity

5. Place the control cards, in the sequence as listed above, behind the object program, Fig. 18.
6. Mount the input tape (tape T3) on unit 1.
7. Sense switches I/O, A--"on".
8. Load and go object program and control card.

9. Program will
- Read tape.
 - Print a one-page histogram for each change sensed in the minor control field (in this instance, for each S/F/L code).
 - Print a one-page histogram for each change sensed in the major control field (in this instance, for each record type), Fig. 19.
 - Rewind and unload the tape on unit 1 after all data have been processed.
 - Print an end-of-job message.
 - Halt at IC = 4233.

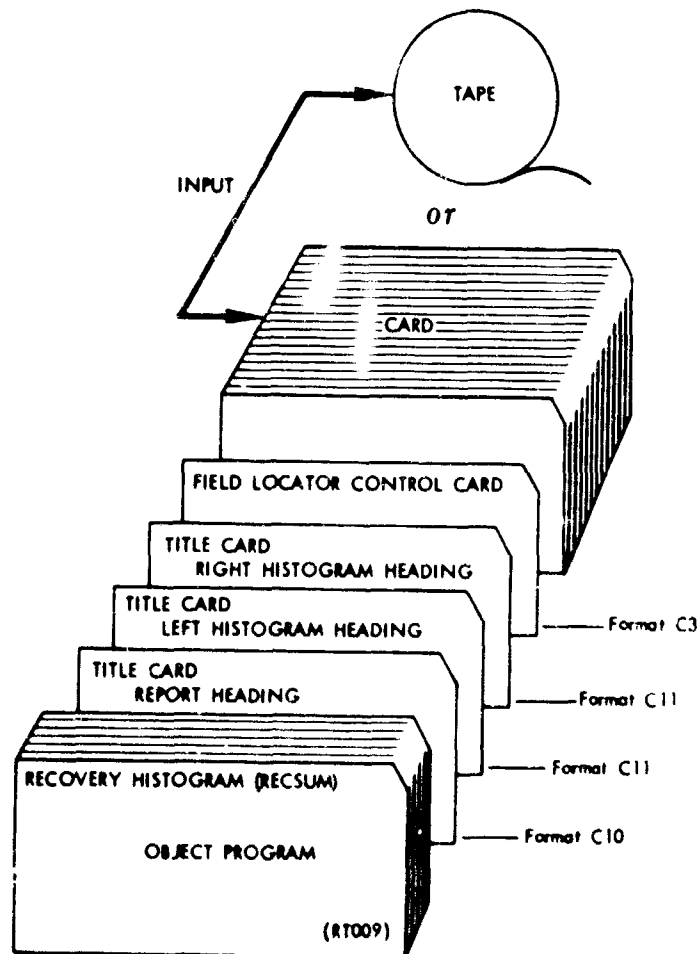


Fig. 18 -- Recovery histogram (RECSUM) program setup

SORTIE TYPE

SINGLE, LAST AND ALL OTHER SORTIES

[illegible]

84 ITEMS GREATER THAN 12 HOURS
OUT OF ROUNDS DATA ARE COMPUTED BUT NOT PLOTTED

	LAC	DELAY	NET	GROSS	FILE TOTALS UNITS	HANHOOURS	FLY-HRS	WRITE-UPS	BREAKS	MORS	NORM
TOTALS--	159.2	2193.4	3716.8 0000	6069.4	8879	11508.6	661.0	1126	334	6247.3	2519.5
AVC--	.34	4.73	0.01	13.06	19.14	24.80	1.38	2.43	.72	13.46	5.43

Fig. 19 -- Aircraft turnaround time distribution

PROGRAM RT010: HOURLY FREQUENCY ACCUM/SELECT (HFA)

Purpose

This general purpose program is used to produce a summary card containing the maximum number of times an event happens each hour across a 24-hour period. Examples are the count of sortie touchdowns each hour, the number of men available each hour, and the maximum number of men working each hour.

Method

1. The program requires a control card (format C12) punched with the following: the code of the type of record being processed; the location of the controlling data field (such as work center or tail number); and, if there is a value to be summed, the location of the value (crew size is an example). The generated output may be coded in Col. 80 by punching the desired code in Col. 79 of the control card.
2. After reading and storing the control card, the program reads and processes the selected records by converting the start and stop times to minutes. The converted times are used as parameters for adding a value (from the data if the location is punched in the control card. A "1" is added if the field in the control card is blank) into a matrix representing the 1440-minute day. There are 1440, 4-position counters for accumulating the counts. The value is added to the minutes, starting and ending with the parameters of the start and stop times. As an example:

Start Time	Stop Time
1000	1200

will be converted to minutes

600	720
-----	-----

The value will be added in counters 600 through 720.

3. When a change in control is sensed, the program separates the matrix into 24 60-minute segments. Each minute in each segment is tested to find the largest value in that segment for moving to the output record. The generated output record then contains the largest value for each of the 24 hours in the control group. The program resets all of the counters to zero and continues to process the next group.

Operation

This operation describes steps 1 through 5 on the Manpower Utilization Sequence Flowchart. Generate sortie touchdown, manpower available and manpower utilized 24-hour summary file for manpower utilization report. (Note: This procedure will assume a number of daily work center display tapes have been merged or sorted together in work center display sequence to generate one output file known as tape w1.)

1. Punch control card (format C13):

Columns	Punch	Field Description
1-2	01	Count of input tapes
3	E	Card type to select and punch (Code E is the manpower available (format R))

2. Place the control card behind the Compute Elapsed Time object program, RT003.
3. Mount tape W1 on unit 1.
4. Sense switches I/O, A, D--"on".
5. Load and go the object program and control card.
6. Program will
 - a. Read unit 1.
 - b. Punch the manpower available file.
 - c. Rewind and unload unit 1.
 - d. Clear the punch of all punched cards.
 - e. Print end-of-job message.
 - f. Halt at IC = 1473.

7. Hold the punched data deck for step 24.

8. Punch control card (format C12):

Columns	Punch	Field Description
1-3	062	Work center field--high-order position
4-6	066	Work center field--low-order position
7-9	026	Crew size field--high-order position
10-12	026	Crew size field--low-order position
79	N	Output card identity code
80	0	Input card type to accumulate

9. Place the control card behind the Hourly Frequency Accum/Select object program, Fig. 20.
10. Mount tape W1 on unit 1.
11. Switches I/O, A, B--"on".
12. Load and go the object deck and control card.
13. Program will
 - a. Read unit 1.
 - b. Summarize and punch the Manpower Utilized file (a daily

summary card is punched for each work center with Cols. 1-54 in the same format as the manpower available (format R). The manpower utilization record will also contain man-hours expended punched in Cols. 59-64 and will be identified with an "N" in Col. 80).

- c. Spread and print the hourly summary data (Fig. 21).
 - d. Rewind and unload unit 1.
 - e. Clear the punch of all punched cards.
 - f. Print end-of-job message.
 - g. Halt at IC = 1803.
14. Hold the punched data deck for step 24.
 15. Obtain the sortie flown data deck (from step 7 on the Recovery Sequence Flowchart) and sort:

Major	Cols. 11-12	N	month
Minor	Cols. 9-10	N	day
 17. Punch control card (format C12):

Columns	Field Description
1-3	Leave Blank
4-6	Leave Blank
7-9	Leave Blank
10-12	Leave Blank
79	A
80	2
 18. Place the control card in front of the sortie deck.
 19. Place the control card and sortie deck behind the Hourly Frequency Accum/Select object program.
 20. Sense switches I/O, A, "on".
 21. Load and go the object program, control card and data deck.
 22. Program will
 - a. Read cards.
 - b. Summarize and punch the Sortie Touchdown file. (A summary card is punched for each day with Cols. 6-54 in the same format as format R. Columns 1-5 will be blank. Flying time for all sorties for the day will be punched in Cols. 59-64. The summary card will be identified with an "A" in Col. 80.)
 - c. Spread and print the hourly summary data (Fig. 22).
 - d. Clear the punch of all punched cards.
 - e. Print end-of-job message.
 - f. Halt at IC = 1803.
 23. Maintain the sequence of the punched data deck and hold for step 25.
 24. Combine the Manpower Available file (Col. 80=E, from step 7) and the Manpower Utilized file (Col. 80=N, from step 14) and sort:

Major	Cols. 1-5	AN	work center
	80	A	card identity
	8-9	N	month
Minor	6-7	N	day

25. Place the Sortie Touchdown file (Col. 80=A, from step 23) in front of the sorted Manpower Available and Utilized file (from step 24).
26. The combined deck is the input to the Manpower Utilization program (RT011).

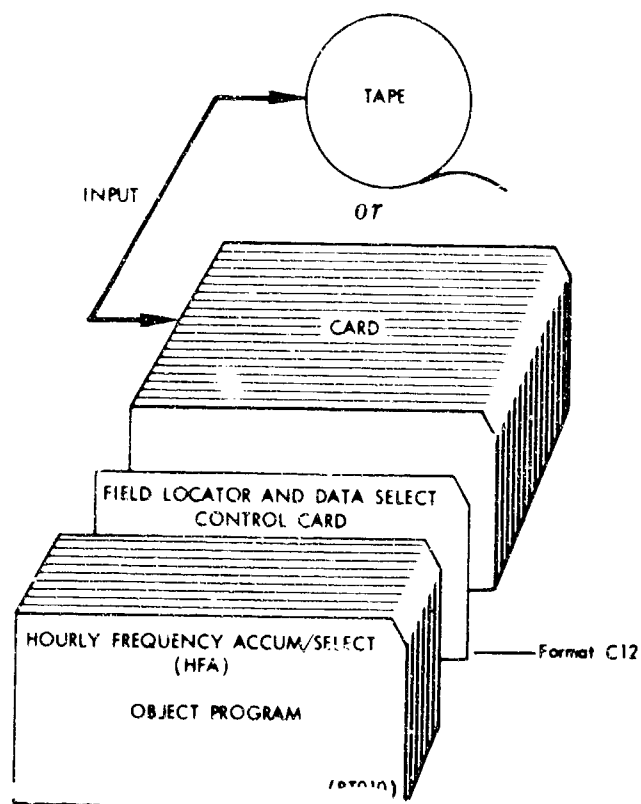


Fig. 20 -- Hourly frequency accum/select (HFA) program setup

MANPOWER UTILIZATION HOURLY SUMMARY

DATE	ORCA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	HOURS
1701	13320	5	5	5	5	9	4	5	1		3	3	3	2	2			4	4	2	2			3		49.8
1801	13320					2	2			1											2	2		2	2	8.1
0901	13330	3	5	5	4	6	6	5	6	1		3	3	3	5	3	3	6	6	6	5	7	5	5	3	89.1
1001	13330	4	5	5	3	2	2	3	5	5	3	4	4	4	1	3	4	4	4	5	6	7	3	2		70.0
1101	13330	6	3	4	4	4	1	7	3	2	2	1	1	2	3	1	2	3	1	3			1	2	2	42.0
1201	13330	2	4	2	2			2	2	4	3	5	5	2	2	2		4	2	4	3	6	6	4	4	50.3
1301	13330	2	2	1	2						2	2	2	1	1	2	2	3	2	2	2	5	6	6		28.1
1401	13330	5	2	2	2			2	2				1	1	1	1	1	5	3	3	5	2	3	6	5	34.5
1501	13330	3	5		2	5		1							2	2	4	4	4	2	3	3	7	5	3	42.2
1601	13330	5	4	4	4	2	7	3	4				4			2	2	4	3	4	4	5	5	3	2	47.7
1701	13330			2	1	1	1	2	1	1	2	3	2	2	4	5	3	4	4	9	6	6	4	4	2	53.5
1801	13330	6		2	2	5	6	5			3	2			1	1	1	5	3	2	3	3	6	3	3	42.7
0901	13340	3	1	1	1	1	2	2		3	1	1	1					4	6	5	6	4	4			31.0
1001	13340			2	1	2	1		1	1	1	3	3	2	2	4	5	5	5	5	6	6	6	6	2	51.9
1101	13340	7	4	3	2	4	5	5	5	3	6	6	7	8	5	2	4	4	4	6	6	5	7	7		88.5
1201	13340	1	1	1	1	1	2	5	4	6	6	7	7	5	2	7	10	5	5	5	5	9	5	7	7	92.9
1301	13340	2		2		1	1	4	6	6	6	6	4	3	5	5	4	6	1	5	4	6	6	6		68.9
1401	13340	4	1	4	4	2	2	3	3	4	4	4	4	4	5	7	3	2	4	4	4	9	5	3	3	76.1
1501	13340	2	4	4	2	3		2		1	1				3	3	3	2	4	5	5	7	8	7	5	53.3
1601	13340	4	5	5	5	6	6	6	5	8	9	9	10	10	6	6	2	7	8	10	12	11	9	10	8	152.8
1701	13340	5	6	7	5	4	6	7	7	9	8	8	5	4	7	3		8	6	5	6	6	8	6	3	113.5
1801	13340	7	5	5	6	4	6	5	6	11	6	4	4	5	6	6	5	7	8	6	5	8	8	3	2	113.3
0901	13360	2	7	4	4	1	2	2				2	1	1	2	1	1	1	2		2	2	2		3	24.3
1001	13360	2	4		3	3			4	2	1	3	2	1		2					3	2				19.4
1101	13360	4	2	2		1	1	1	1	2			3	3	1	2			2	4	1		1	2		17.0
1201	13360	2	3								2	2		2	2	1		1	3	2		2				12.2
1301	13360			2	2	4	2			1	2	2		1				2	4	2	2	2	1	2	2	20.7
1401	13360	4	5	2	3	4	4	3	3				1	1	1	1	3	3	2		2		3	5		36.1
1501	13360	4	4			4	5	5	1	1		1	1								2					22.1

Fig. 21 -- Manpower utilization hourly summary

SORTIE TOUCHDOWN HOURLY SUMMARY																									
DATE	ORGN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
0901				2	3	1			4	1	4	2	1		1	1		4	3		3	3		6	
1001		2		2	4	2				2	5	3			2	4	7				2	2	4		2
1101		4	2	2	6			6			3			5			9		1	2	2		4		4
1201						7	1		4	2	2	4		2		2	4	4	1	2	4			3	4
1301				1	4	1	2		6	1		3	2	3		2	4	5		4	6	1	1	2	
1401		1	3			2	6		4	3	4				3	2	8	2		1	1	2	6		2
1501				4	4	4		4	2	4			2	2		2	9		1	3		4		5	4
1601				4	4	2				5	7			2		6	3				4		4		4
1701		2		3	2	4	3		4	2	3		2	3	3	2	6		1	1	4	2	2	2	2
1801		2	2	4	2		4		4	2	4			1	2	2	7		1		4	2	4		

Fig. 22 -- Sortie touchdown hourly summary

PROGRAM RT011: MANPOWER UTILIZATION

Purpose

This program is used to generate a detail printout, by work center for selected periods, showing on separate pages the counts, in a 24-hour spread, of the manpower available and the manpower utilized for each day in the period. A third page is generated showing summaries of the first two. Inputs to this program are generated by the Hourly/Frequency/Accum/Select Program (RT010).

Method

Three sets of records (manpower utilization, Col. 80 = N; manpower available, Col. 80 = E; and sortie touchdown, Col. 80 = A) are combined and sorted by date (minor), card type and work center (major). The records are read and detail listed spreading the hourly summaries across the page. Hourly values are summed to produce an average for each work center processed in the sample. The sums are divided by the count of input records to develop the average. The averages are printed at the end of each type of record and are also printed on a summary page for each work center. The summary page contains the hourly utilization rates (number of men utilized divided by number of men available), total number of sorties, total man-hours and man-hour utilization rate.

If desired, the off-equipment man-hours may be included in the summary. This is accomplished by adding a deck of work center off-equipment summary data (see format AA). One summary card is required for each work center for each day.

Operation

This operation describes step 7 on the Manpower Utilization Sequence Flowchart.

1. Punch title card (format C5):

Columns	Punch	Field Description	
1	(11-3-8) punch	card identity	
2-61	(see below)	title	
2	SAMPLE--MANPOWER UTILIZATION		30

2. Place the following, in the sequence listed, behind the object program, Fig. 22:
 - Work center master table (format M1)
 - Title card (format C5)
 - Data deck (from step 6 of the Manpower Utilization Sequence Flowchart)
3. Sense switches I/O, A--"on".
4. Load and go the object program, table, title card and data deck.
5. Program will
 - a. Read cards.
 - b. List each data card, Figs. 24-27.
 - c. Print a summary line and eject to a new page on a change of card type.
 - d. Eject and print a summary page on a change of work center code.
6. When reader stops, press start to process last cards.
7. Program will
 - a. Print end-of-job message.
 - b. Halt at IC = 4704.

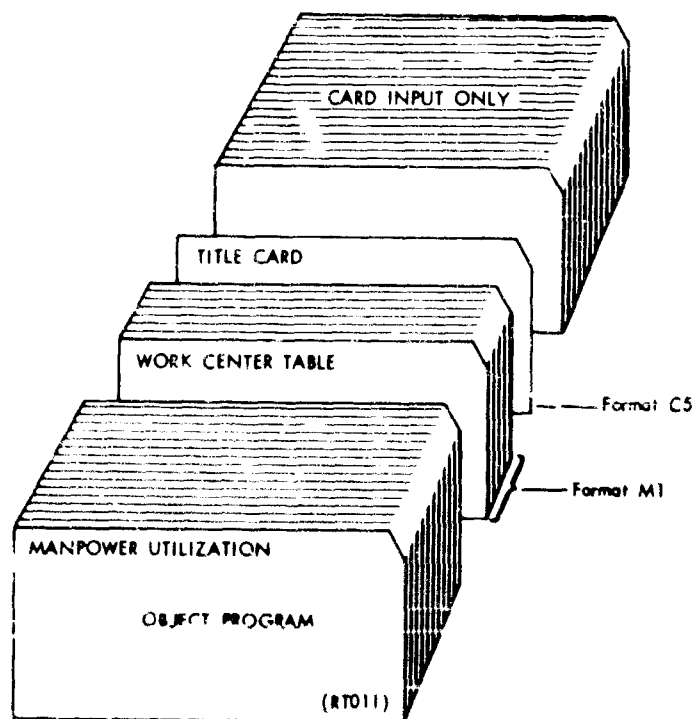


Fig. 23 -- Manpower utilization program setup

SAMPLE - MANPOWER UTILIZATION																									
DAILY SORTIE TOUCHDOWNS, BY HOUR, FOR MONTH 01																									
DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	AVG
09/01				2	3	1		4	1	4	2	1		1	1		4	3		3	3		6		1.62
10/01	2			2	4	2			2	5	3			2	4	7				2	2	4		2	1.75
11/01	4	2		2	6			6		3			5			9		1	2	2		4	2	4	2.16
12/01		4			7			4	2	2	4		2		2	4	4	1	2	4			3	4	2.08
13/01		1	4	1				6	1		3	2	3		2	4	5		4	6	1	1	2		2.00
14/01	1	3			2			4	3	4					2	8	2		1	1	2	6		2	2.04
15/01		4		4	4			4	2	4	1	2	2		2	9		1	3				5	4	2.23
16/01				4	4				3	7			2		6	3				4		4	4		1.79
17/01			3	2	4	3		4	2	3		2	3	3	2	6		1	1	4	2	2	2	2	2.20
18/01	2	2	4	2		4		4	2	4			1	2	2	7		1		4	2	4			1.95
TOTAL	11	16	11	19	34	21		36	18	36	13	7	18	11	23	57	15	4	13	30	16	25	24	18	2.00
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1.10	1.10				3.40			1.80		1.30		.70	1.80	1.10	2.30	1.50		.80	3.00		1.60	2.50			1.80
	1.60	1.50		2.10			3.60	3.60		3.60						5.70									

Fig. 24 -- Manpower utilization: touchdown summary

DAILY MANPOWER AVAILABLE, BY HOUR, FOR MONTH OF										SAMPLE - MANPOWER UTILIZATION															
WORK CENTER 12041 TESTS FLIGHT TIME FLIGHT #A SECT 1																									
DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	AVG
09/01	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	10	10	10	10	10	10	10	10	12.66
10/01	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	10	10	10	10	10	10	10	10	13.41
11/01	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	10	10	10	10	10	10	10	10	12.66
12/01	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	11	11	11	11	11	11	11	13.45
13/01	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13.75
14/01	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	12	12	12	12	12	12	12	12	13.79
15/01	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	11	11	11	11	11	11	11	13.08
16/01	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	11	11	11	11	11	11	11	11	13.37
17/01	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	11	11	11	11	11	11	11	12.33
18/01	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	11	11	11	11	11	11	11	11	12.25
TOTAL	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	110	110	110	110	110	110	110	110	13.07
13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	
13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00

Fig. 25 -- Manpower utilization: manpower available

DAILY MANPOWER UTILIZED, BY HOUR, FOR MONTH OF
WORK CENTER 12041 TESTSO FLIGHT LINE FLIGHT 4A SECT 1

TESTSO FLIGHT LINE FLIGHT -A SECT F																									
DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	AV
09/01	3	6	7	5	4	5	4	15	10	9	3	8	5	6	11	7	4	9	6	9	10	5	9	9	7.00
10/01	4	3	9	9	8	7	5	11	9	12	7	10	6	6	9	9	8	6	6	8	7	7	6	8	7.50
11/01	6	8	12	3	6	6	8	13	10	11	9	15	9	10	9	7	8	9	4	9	5	4	7	6	8.00
12/01	9	5	6	10	2	9	13	5	14	15	8	7	11	15	10	14	12	13	8	9	8	8	10	8	9.50
13/01	12	5	9	12	8	7	11	11	7	15	10	8	11	10	4	6	6	8	9	1	8	3	9	4	8.08
14/01	4	2	3	11	12	8	10	11	9	9	9	7	6	9	9	13	14	11	9	9	9	7	5	3	7.16
15/01	7	7	4	1	3	8	5	13	4	15	14	11	14	15	11	9	12	7	8	12	3	6	5	7	8.50
16/01	5	11	10	5	6	15	12	9	14	20	13	12	10	10	10	11	17	10	5	3	9	5	9	8	10.12
17/01	8	7	3	10	11	8	11	18	21	16	8	10	7	13	6	12	9	5	5	8	7	10	6	6	9.17
18/01	14	11	9	8	3	6	8	10	10	11	8	8	3	8	8	1	14	9	6	6	7	7	6	3	8.08
TOTAL	70	66	70	66	49	82	83	113	117	126	94	100	80	100	93	93	103	90	18	76	72	63	72	62	8.40
3	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
7.60	7.00	6.60	6.20	5.80	5.40	5.00	4.60	4.20	3.80	3.40	3.00	2.60	2.20	1.80	1.40	1.00	.60	.20							

Fig. 26 - Manpower utilization: manpower utilized

WORK CENTER -12041- AVERAGES AND UTILIZATION RATES FOR MONTH 01

TESTED FLIGHT LINE FLIGHT -A SECT 1

.....

TOUCHDOWNS 1.10 1.10 3.40 1.80 1.30 1.80 2.30 1.50 1.30 1.60 2.40

-AVG- 1.60 1.90 2.10 3.60 3.60 3.60 3.60 3.60 3.60 3.60 3.60

AVAILABLE 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50 13.50

-AVG- 13.50 13.50 13.50 14.60 14.60 14.60 14.60 14.60 14.60 14.60 14.60

UTILIZED 7.60 7.00 4.90 4.30 11.70 9.40 8.00 9.30 10.30 6.80 7.20

-AVG- 6.80 6.60 8.20 11.30 12.60 10.00 10.00 9.30 9.30 7.60 6.20

-53-

UTIL RATE .56 .52 .36 .61 .80 .86 .68 .55 .64 .94 .62 .65 .65

.50 .49 .61 .77 .86 .68 .68 .64 .64 .64 .69 .57 .56

AVG ERS UTIL - .64

TOTAL SORTIES - 480

FORM 300 TOTAL MANHOURS - 1,293.1

MANHOURS PER SORTIE - 2.7

AFTN 211 TOTAL MANHOURS - 2.2

AVAILABLE MANHOURS - 3,139.0

AVG MANHOURS UTIL - .41

DATA DAYS DATE MONTH

FLYING - 10

AVAILABLE - 10

WORKING - 10

Fig. 27 -- Manpower utilization: summary

PROGRAM RT012: ANALYSIS OF VARIANCE (ANOVA)

Purpose

This general purpose program can be used to

1. Frequency count records: = "N" on the printout.
2. Accumulate a data field: = "TOTALS" on the printout.
3. Compute means (Total/N): = "MEANS" on the printout.
4. Compute break-rates, break averages and variances for samples and subsamples. Subsample means are tagged with asterisks to denote statistical significance.
5. Print a distribution of the subsamples grouped in half-sigma units from the sample means: = "FREQUENCY COUNTS" on the printout.

Method

1. The program processes either a card or unblocked tape input file sorted in a major (sample), minor (subsample) sequence.
2. Three title cards (format C21) may be used to describe the printout; however, only one title card is required. The remaining two cards are optional.
3. A field locator card (format C2) is required by the program to
 - a. Identify the high- and low-order addresses of the major and minor control fields.
 - b. Identify the high- and low-order address of the data field used in the computations. The program assumes the field to have one decimal place. Data sample that are whole numbers may be processed as one-position decimal numbers by punching any valid character in Col. 41 of this control card.
 - c. Tell the program the count of pages if the option to print a sample of the input data is being executed.
 - d. Tell the program the sortie count if break-rates or break averages are being computed for each subsample.
4. The program uses a work tape (on Unit 6) as intermediate storage; therefore, there is virtually no limit to sample or subsample size. As each record is read in it is frequency counted, summed, squared and summed (to get ΣX and ΣX^2), and written (stored) on the work tape.
5. When the program senses a change in the major control, it rewinds the work tape and proceeds to compute subsample means, N, raw score totals and variances, as well as a distribution of the subsamples.

6. Switch option allows
 - a. Punching the results of computations for input to chi-square.
 - b. Excluding zero data from the computations.
 - c. Printing break-rates or break averages.

Operation

This operation describes step 3 on the Analysis Sequence Flowchart.

1. Punch the title card (format C21):

Card	Column 1	Columns 2-80
1	H	(Use for Title)

2. Punch a field locator card (format C2):

Columns	Punch	Field Description
1-9	Leave Blank	
10-11	02	Major control--high-order position
12	"X" (11 Zone)	
13-14	02	Major control--high-order position
15-19	Leave Blank	
20-21	21	Minor control--low-order position
22	"X" (11 Zone)	
23-24	21	Minor control--low-order position
25-29	Leave Blank	
30-31	38	Data variable--high-order position
32	"X" (11 Zone)	
33-34	42	Data variable--low-order position

3. Place the title cards and control card behind the object program, Fig. 28.
4. Mount the input tape (tape T3) on unit 2.
5. Mount a scratch tape on unit 6.
6. Sense switches I/O, A, E--"on".
7. Load and go object program, title and control cards.
8. Program will
 - a. Read and block records from unit 2 and write them on unit 6.
 - b. Rewind unit 6 when a change in the major control field has been sensed.
 - c. Read unit 6; compute and print subsample means, N, raw score to totals and variances, and punch a summary card (format X) for each subsample, Fig. 29.

- d. Rewind unit 6 and repeat steps a, b and c until all data have been processed.
- e. Rewind and unload the tapes on units 2 and 6 after all data have been processed.
- f. Print end-of-job message.
- g. Halt at IC = 5936.

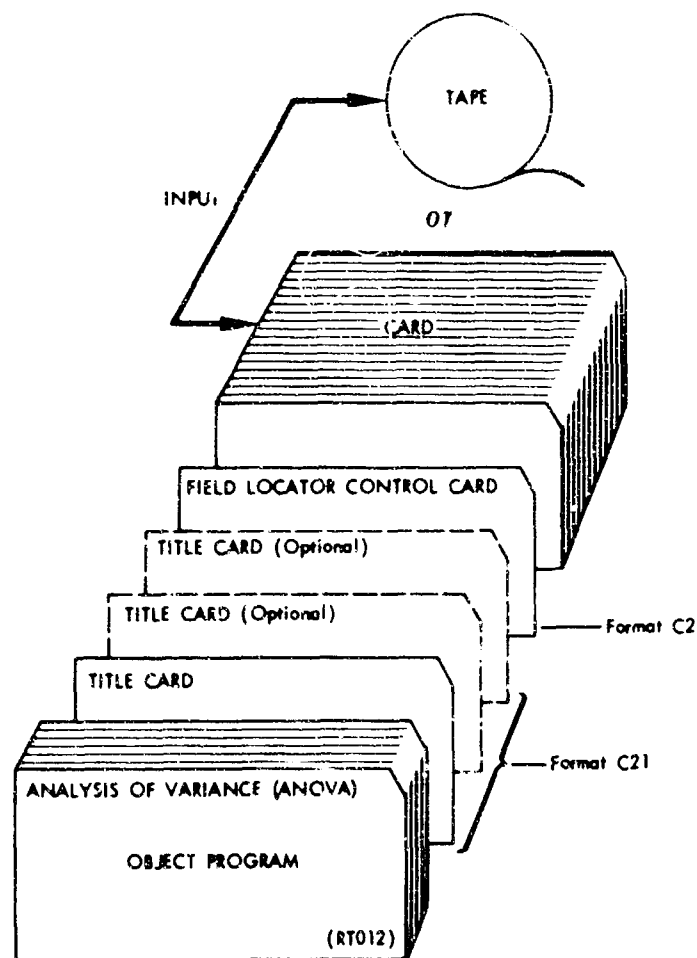


Fig. 28 -- Analysis of variance (ANOVA) program setup

SAMPLE 7 CARD - SINGLE/FIRST/LAST SORTIE COMPARISON									
02-02 21-21 38-42									
SAMPLE FREQUENCY DISTRIBUTION									
FREQUENCY COUNTS									
2--	1--	0	1	2	3	4	5		
SIGMA	13.2-	2.6-	0.0	18.6	29.3	39.9	50.5	61.1	
	7.9-	2.7	13.3	23.9	34.6	45.2	55.8	66.4	
SAMPLE 1--	F	190	41	6					
SAMPLE 2--	L	70	32	21	8	4	2	1	1
SAMPLE 3--	S	17	16	24	10	8	4	1	1
SAMPLE TOTALS		277	89	51	18	12	6	1	1
CUMULATIVE PERCENT		59	78	89	93	96	97	98	99
OUT OF BOUNDS DATA NONE BELOW AND 4 ABOVE NOT PLOTTED									
CODE--	7								
SWITCHES	A---C---E-----								
NO SORTIE COUNT	OM								
MEANS	N	TOTALS	VARIANCE						
4.08000	237	967.2	5.34						
10.130	142	1438.9	198.50						
15.42000	85	1310.7	168.59						
8.01	464	3716.8							

-57-

ANALYSIS OF VARIANCE			
SUM SQUARE	DF	MEAN SQUARE	F
BETWEEN	8965.8154	2	4482.9077
WITHIN	43611.0750	461	94.1672
TOTAL	52376.8904	463	113.1250

Fig. 29 -- Analysis of variance

PROGRAM RT013: CHI-SQUARE*

Purpose

This program is used to generate a printout showing statistical comparisons among frequency data. It computes

1. Chi-square for both dichotomous and nondichotomous data (under sense switch control).
2. An approximated probability (alpha) level.
3. Observed frequency means.

Method

1. The program requires a title card (format C15) and a field locator control card (format C16). Information punched in the control card locates the column positions of the base-line, observed frequency, category identification and major control. Data must be sorted by major; various sub-sortings are optional. These four elements of data are required to produce the Chi-square printout.
2. The program assumes the base-line and observed frequency to be equal to or less than six digits with no decimal position allowed. The category identifier is assumed to be three characters.
3. The program reads and stores the base-line, observed frequency and category identifier for each member in the sample (sample size is limited to 200 members). The mean for each record is computed when it is being processed. The mean for the record is stored for printing and summed for developing the unweighted grand mean. The base-line and observed frequencies are summed to obtain totals for the sample. When all records have been read and stored, the program
 - a. Computes the weighted mean for the sample.
 - b. Converts the mean of each member to Z-scores for plotting the category identifier.
 - c. Computes the theoretical frequency for each member in the sample.
 - d. Computes D^2/FT (observed minus theoretical squared).
 - e. Computes Chi-square for the sample.
 - f. Tests and identifies numbers that are statistically significant.

* A. Sweetland, Some Statistical Methods for Maintenance Analysis, The RAND Corporation, RM-4443-PR, April 1966.

Operation

This operation describes step 4 on the Analysis Sequence Flowchart.

1. Punch the title card (format C15) using Cols. 1-79. Col. 80 must contain a "12" zone punch.
2. Punch the field locator control card (format C16):

Columns	Punch	Field Identification
1-3	401	Base-line count--high-order position
4-6	404	Base-line count--low-order position
7-9	409	Observed count--high-order position
10-12	412	Observed count--low-order position
13-15	416	Category identifier--high-order position
16-18	418	Category identifier--low-order position
19-21	473	Major control--high-order position
23-24	477	Major control--low-order position
80	"11" Zone Punch	

3. Place the title card and control card behind the object program, Fig. 30.
4. Place the punched output (format X) from the Analysis of Variance program behind the control card.
5. Sense switches I/O, A--"on".
6. Load and go object program, title card, control card.
7. Program will read cards and load all data variables in core.
8. When reader stops, press start to process last cards.
9. Program will
 - a. Print the results of the Chi-square computation, Fig. 31.
 - b. Print an end-of-job message.
 - c. Halt at IC = 1483.

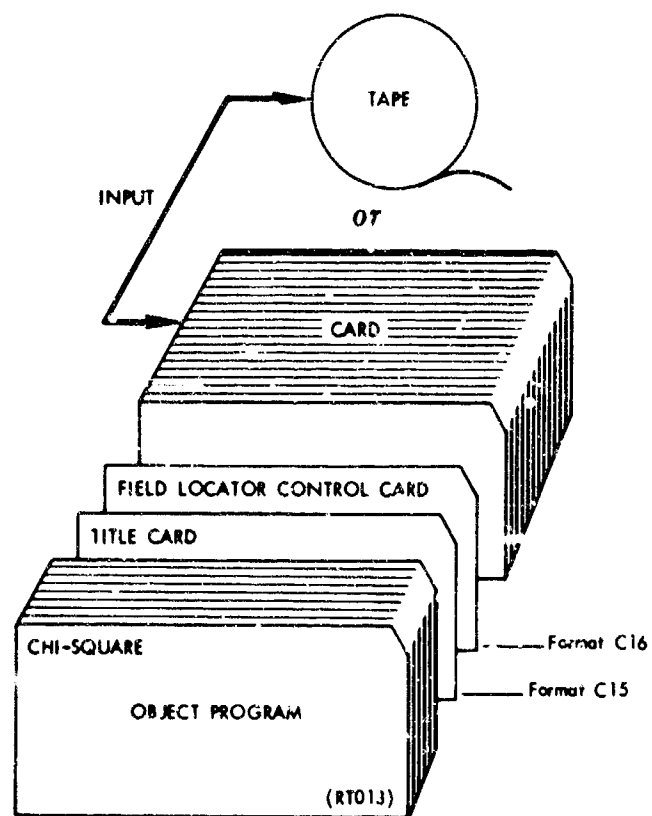


Fig. 30 -- Chi-square program setup

SAMPLE 7 CARD - SINGLE/FIRST/LAST SORTIE COMPARISON													
BASE-LINE	FO	FT	OZ/FT	MEANS	-3	-2	-1	0	1	2	3	4	5
242	237	234.42	.91	.979	.	.	.	.	.	.	.	.	.
143	142	138.52	2.79	.993	.	.	.	.	.	.	.	.	.
94	85	91.06	12.86***	.904*	.	.	.	.	.	.	.	.	.
TOTAL	479	464			.	.	.	.	.	.	.	.	.
WEIGHTED GRAND MEAN--				.969									
CHI-SQUARE--				16.56									
					</								

PROGRAM RT014: CORRELATION MATRIX

Purpose

This program will correlate 2 to 12 variables and will print an N x N matrix of Pearson product-moment correlation coefficients, Fig. 33c. The program also prints two sets of means and standard deviations, Fig. 33b: one based on all of the data records, and the other based on data greater than zero. If desired, a test for and printout of questionable independent variables may be generated, Fig. 33d.

Method

1. The program requires
 - a. A general title card (format C18) to describe the printout.
 - b. A field locator card (format C17) for each variable being processed. The card may also contain a title to describe the variable on the printout, Fig. 33a.
 - c. A stopper card (format C19) to indicate the loading of the field locator table has ended.
 - d. A dependent variable selector card (format C20) if the test for questionable independent variables is being made. This card is optional.
 - e. All input data to be one decimal place and all variables to be on the same record. Variables that are whole numbers will be handled as one-position decimal by the program if Col. 18 in the field locator card is punched with any valid character. (The computer left adjusts the data field by position when Col. 18 is punched.)
 - f. Sorting of the input file is unnecessary.
2. Calculation of the correlation coefficient, "r", is based on the following equation:

$$r_{xy} = \frac{\sum XY - \frac{(\sum X)(\sum Y)}{N}}{\sqrt{\left[\sum X^2 - \frac{(\sum X)^2}{N}\right]\left[\sum Y^2 - \frac{(\sum Y)^2}{N}\right]}}$$

3. As each record is read, the variables are transferred to a work area where
 - a. X-variables are summed.
 - b. X-variables are squared and summed.
 - c. Y-variables are summed.
 - d. Y-variables are squared and summed.
4. When all the data have been read in, the program computes and prints
 - a. Two sets of means and standard deviations--one based on all records, the other based on data greater than zero.
 - b. The correlation matrix, plus its mirror image.
 - c. If the switch is set, the results of the dependent variable test.

Operation

This operation describes step 5 on the Analysis Sequence Flowchart.

1. Punch title card (format C18):

Column	Punch	Field Designation
1	","(0-3-8 Punch)	Card identity
2-80	(see below)	Title

SAMPLE 7-CARD SUMMARY FILE

2. Punch field locator control cards (format C17) as shown below.

VARIABLE NUMBER	MATRIX COLUMN HEADING	FIELD LOCATION		Whole number shift
		HIGH ORDER Position	LOW ORDER Position	
01 02	04 05 06 07 08 09	11 12 13	14 15 16	18 19 20 21 22 23 24 25 26
01	LAG	028	032	
02	DELAY	033	037	
03	NET	038	042	
04	GROSS	043	047	
05	NORS	048	052	
06	NORM	053	057	
07	UNITS	058	060	SHIFT 1
08	MAN HR	061	065	
09	FLY HR	066	068	

3. Punch table loading stopper card (format C19):

Columns	Punch	Field Description
1	*(11-4-8 Punch)	Card identity

4. Punch dependent variable selector card (format C20):

Columns	Punch	Field Description
1	"=" (3-8 Punch)	Card identity
2-3	03	First variable to test
4-5	08	Second variable to test

5. Place the title card, variable field selector cards, stopper card and dependent variable selector card, in the order listed, behind the object program, Fig. 32.
6. Mount input tape (tape T3) on unit 1.
7. Sense switches I/O, A, C, E--"on".
8. Load and go the object program and control cards.
9. Program will
 - a. Read the tape on unit 1 to end-of-file.
 - b. Print two sets of means and standard deviations for each variable.
 - c. Print the correlation matrix.
 - d. Print the results of the dependent variable test for each variable selected.
 - e. Rewind and unload the input tape.
 - f. Print an end-of-job message.
 - g. Halt at IC = 7400.

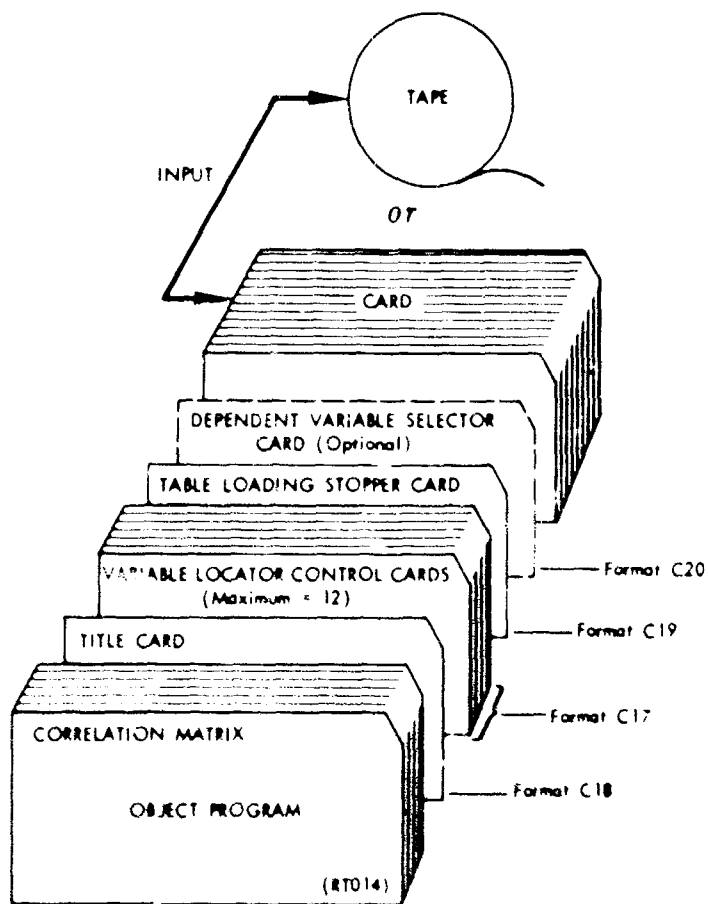


Fig. 32 -- Correlation matrix program setup

SAMPLE 7-CARD SUMMARY FILE

01 LAG	028-032
02 DELAY	033-037
03 NET	038-042
04 GROSS	043-047
05 MORS	048-052
06 NORM	053-057
07 UNITS	058-060
08 MAN HR	061-065
09 FLY HR	066-068

SHIFT 1

Fig. 33a -- Correlation matrix: field locator control cards

SAMPLE 7-CARD SUMMARY FILE

	01 LAG	02 DELAY	03 NET	04 GROSS	05 MOMS	06 NORM	07 UNITS	08 MAN HR	09 FLY HR
MEANS	.332	4.570	7.743	12.645	13.015	5.245	18.498	23.976	1.377
SIGMA	3.852	8.903	10.555	18.000	53.087	11.167	17.063	34.109	.424
N	480	480	480	480	480	480	480	480	480

COMPUTATION EXCLUDING VARIABLES = 0

MEANS	.482	4.918	8.010	13.081	41.373	9.544	19.116	24.803	1.409
SIGMA	4.641	9.144	10.636	18.152	88.423	13.637	16.999	34.396	.374
N	330	446	464	464	151	264	464	464	469

Fig. 33b -- Correlation matrix: means and standard deviations

SAMPLE 7-CARD SUMMARY FILE

	01 LAG	02 DELAY	03 NET	04 GROSS	05 NORS	06 MURM	07 UNITS	08 MAN HR	09 FLY HR
01									
02									
03									
04									
05									
06									
07									
08									
09									

Fig. 33c -- Correlation matrix: Pearson product moment correlation coefficients

SAMPLE 7-CARD SUMMARY FILE

DV = 03

R 03X08 = .938
 08X01 = .024-
 08X02 = .510
 08X04 = .794
 08X05 = .299
 08X06 = .624
 08X07 = .889
 08X09 = .002
 R 03X02 = .642
 02X01 = .018-
 02X04 = .869 *
 02X05 = .705
 02X06 = .541
 02X07 = .547
 02X08 = .510
 02X09 = .016

R 03X05 = .360
 05X01 = .071
 05X02 = .705 *
 05X04 = .576
 05X06 = .245
 05X07 = .291
 05X08 = .299
 05X09 = .203

R 03X09 = .199-
 09X01 = .175
 09X02 = .016
 09X04 = .104-
 09X05 = .203 *
 09X06 = .104-
 09X07 = .036-
 09X08 = .002
 09X09 = .

R 03X01 = .024-
 01X02 = .018-
 01X04 = .192 *
 01X05 = .071 *
 01X06 = .016-
 01X07 = .029- *
 01X08 = .024-
 01X09 = .175 *

SAMPLE 7-CARD SUMMARY FILE

DV = 03

R 03X08 = .938
 08X01 = .024-
 08X02 = .510
 08X04 = .794
 08X05 = .299
 08X06 = .624
 08X07 = .889
 08X09 = .002

R 03X04 = .900
 04X01 = .192
 04X02 = .869
 04X05 = .576
 04X06 = .726
 04X07 = .787
 04X08 = .794
 04X09 = .104-

R 03X07 = .896
 07X01 = .029-
 07X02 = .547
 07X04 = .787
 07X05 = .291
 07X06 = .621
 07X08 = .889
 07X09 = .036-

R 03X06 = .790
 06X01 = .016-
 06X02 = .541
 06X04 = .726
 06X05 = .245
 06X07 = .621
 06X08 = .624
 06X09 = .104-

Fig. 33d -- Correlation matrix: dependent variable test

PROGRAM RT015: AGE DISPLAY

Purpose

This program produces a printout designed to show flight-line AGE utilization (both active and standing). It is in a format similar to the tail number and work center displays; however, instead of using just a start and stop time, this program also uses a spot and remove time to compute standing or inactive time.

Method

1. This program processes one type of record, format S, with Col. 80=F.
2. The spot, start, stop and remove times are converted to quarter-hour segments, as in the tail number and work center displays, for plotting the status of equipment. The "A" printed on the display shows when AGE is being used. The dots show the time the equipment was standing by the aircraft not being used.
3. The summary line shows the count of the quarter-hour segments in which an "A" appears.

Operation

1. Punch control card (format C13):

Columns	Punch	Field Description
1-2	01	Count on input tapes
3	F	Card type to select and punch (code F is AGE utilization in detail, format S)
2. Place the control card behind the Compute Elapsed Time object program (RT003).
3. Mount tape T2 on unit 1.
4. Sense switches I/O, A, D--"on".
5. Load and go object program and control card.
6. Program will
 - a. Read unit 1.
 - b. Punch AGE utilization file.
 - c. Rewind and unload unit 1.
 - d. Clear the punch of all punched cards.
 - e. Print end-of-job message.
 - f. Halt at IC = 1473.

7. Sort the punched deck:

Major	Cols. 65-66	N	AGE code
	Cols. 11-12	N	start--month
	Cols. 9-10	N	--day
Minor	Cols. 13-16	N	--clock time

8. Place the sorted deck behind the AGE Utilization Display object program (RT015), Fig. 34.
9. Sense switches I/O, A, B--"on".
10. Load and go object program and data deck.
11. Program will
 - a. Read and print the data deck in display format, Fig. 35.
 - b. Print a summary line and eject to a new page on each change in AGE code or date.
12. When reader stops, press start to process last cards.
13. Program will
 - a. Print an end-of-job message.
 - b. Halt at IC = 2224.

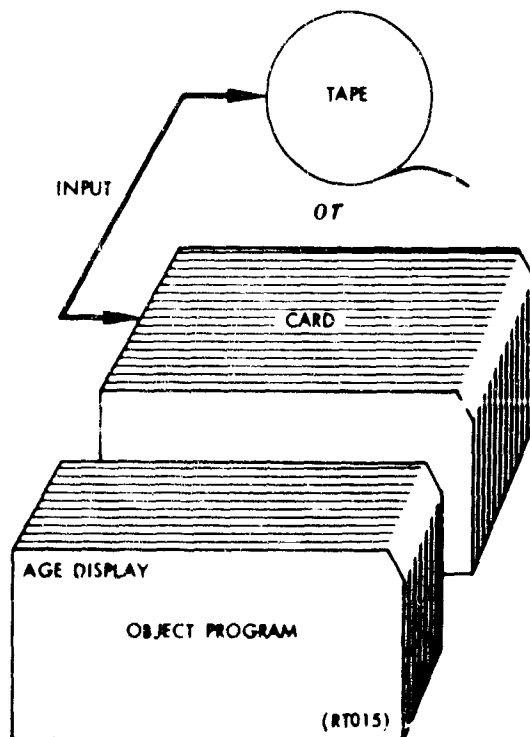


Fig. 34 -- AGE display program setup

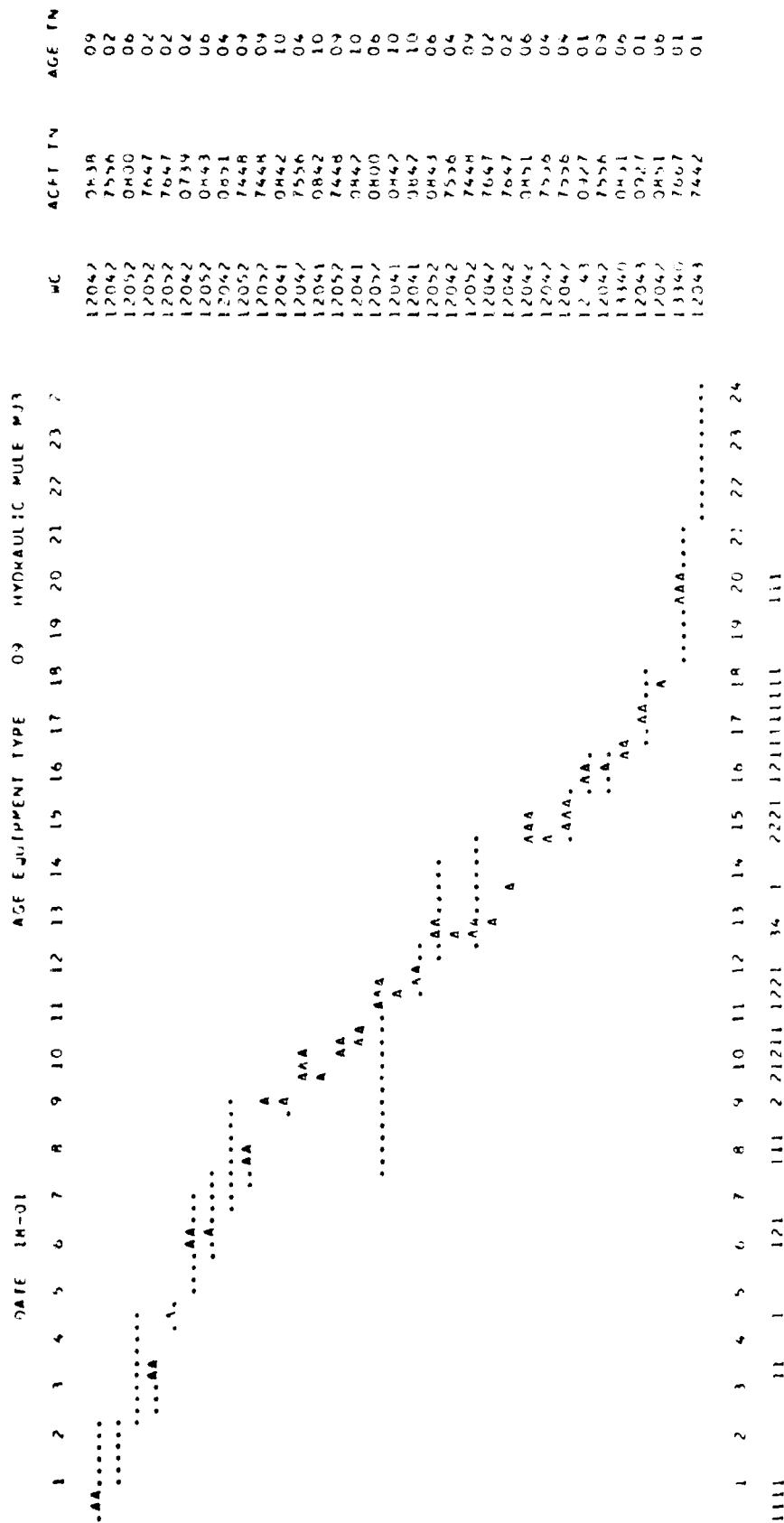


Fig. 35 -- AGE display

PROGRAM RT016: DEVIATION-DEGRADATION (DEVDEG)

Purpose

This program is used to list the edited output (Col. 80 = H, format U) of the form 308, showing in detail the call number, date, time, work unit code, deviation code, call sign and verbal comment. The program prints a frequency count when a change in control is sensed on the deviation code.

Method

The mission deviation-degradation file, Col. 80 = H, is sorted on deviation code (Cols. 7-8) and listed to produce a detailed print-out and frequency count by deviation code.

Operation

1. Punch control card (format C13):

Columns	Punch	Field Description
1-2	01	Count of input tapes
3	H	Card type to select and punch (code H is deviation/degradation comment, format U)

2. Place the control card behind the Compute Elapsed Time object program (RT003).
3. Mount tape T2 on unit 1.
4. Sense switches I/O, A, D--"on".
5. Load and go the object program and control card.
6. Program will
 - a. Read unit 1.
 - b. Punch deviation/degradation comment file.
 - c. Rewind and unload unit 1.
 - d. Clear the punch of all punched cards.
 - e. Print end-of-job message.
 - f. Halt at IC = 1473.
7. Sort the punched data deck:

Columns	Field Description
7-8	AN Deviation/degradation code
8. Place the sorted deck behind the DEVDEG object program, Fig. 36.

9. Sense switches I/O, A, B--"on".
10. Load and go the object program and data deck, Fig. 37.
11. Program will
 - a. Read and list the data deck.
 - b. Print a frequency count (card count) on each change in deviation/degradation code.
12. When reader stops, press start to process last cards.
13. Program will
 - a. Print an end-of-job message.
 - b. Halt at IC = 337.

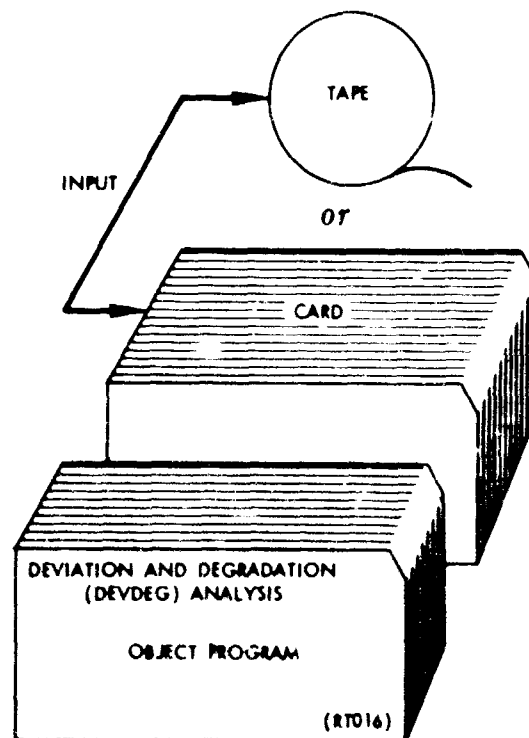


Fig. 36 -- Deviation and degradation (DEVDEG) analysis program setup

DEVIATION AND DEGRADATION ANALYSIS

TAIL	DATE	MEMO	#/C	SYM	-CALL-
0838	1201	1840	41544	AIR	WASP
0839	1801	2110	41500	AIR	MATE
7687	0109	1110	41000	AIR	MICRA2
7710	0909	1440	71400	AIR	CHICAG
0735	2010	0900	23000	AIR	KODAK
0814	0210	1415	14000	AIR	KWIFF
7500	1109	2020	45000	AIR	HUDSON
7645	1909	1850	11000	BUD	LOVER
7650	1908	2040	11000	BUD	KODAK
7650	1109	1940	11000	BUD	ROSCOF
7641	2008	2035	11000	BUD	MURRIC
7642	1808	2001	11000	BUD	FALCON
7586	2408	1730	11000	BUD	MUGGET
7522	0412	0230	21000	GND	ACORN
7642	1212	2035	51000	GND	BUTCH
7623	2212	1130	46000	GND	SHORO
7532	0310	0630	46000	GND	OMAHA
7496	2210	0740	23000	GND	DEVIL
7496	0810	1215	74000	GND	VEGAS
0720	1108	1305	14600	GND	HARBON
0720	0708	1240	12350	GND	RIG
0720	2308	0700	46000	GND	VESPA
0720	1009	1425	13250	GND	GATOR
0719	0909	0415	13440	GND	ZIPPER
0719	2109	2055	13000	GND	FRESNO
7650	1209	1245	11000	MMQ	CLIPPE
7645	2408	1720	11000	MMQ	ROSCOF
7642	0808	1445	11000	MMQ	VESPA
7642	1708	0550	11000	MMQ	MUSKRA
7641	1809	1935	11000	MMQ	ROSCOF
7680	1709	2030	11000	MMQ	DOSE
7640	2308	1750	46000	MMQ	BUCKSH
7624	1109	2010	23000	MMQ	CLIPPE
7643	2808	1125	41500	MMQ	SWORD
7686	2109	0410	74000	MMQ	WINDSO
7687	2408	2155	75000	MMQ	HUDSON
7642	0701	1145	11000	MMQ	OUTCH
0841	2312	1355	01480	MMQ	RIP
7710	1909	1450	74000	MMQ	LOVER
7659	1409	0430	11000	OPS	CLEVEL

T E FLAP HARDER POLFS AT 310 KNOTS
BLC LITE ON TAKE OFF
SMOKE IN COCKPIT
INS PROBLEM/MO SPARE
AUX AIR DOOR OPEN
FIGHT CONTROL VIBRATIONS
CENTER LINE TANK DOES NOT FEED

SYMPATHY WITH 7710
SYMPATHY FOR 7687
SYMPATHY WITH 7687
SYMPATHY ABORT
SYMPATHY ABORT
SYMPATHY ABORT

HIGH OIL PRESS MO #2 ENG 0927 SPARE
NO POWER TO ATTITUDE INDICATOR SPARED 7499
DUE TO C/L TANK LEAK SPARED BY 0842
NO BOOST PUMP PRESSURE
FUEL LEAK IN ENGINE COMPT
RADAR IMOP
LM BRAKE LOCKED ON TAXI ROLL
COULD NOT CLOSE AFT CANOPY
LT DROP TANK LEAKING
BLEW RT MAIN TIRE
LEFT BRAKE LOCKED ON TAXI
RUDDER FLUTTER

TAKE OFF TIME DELAY 20 MINUTES
TIME CMG DELAY 40MIN
CANCELLED BY HIGHER HEADQUARTERS
TIME READJUSTED TO 0630
LATE DUE TO CENTER LINE TANK LOOSE
LATE TAKE OFF DUE TO ABORT OF 7586

RT TANK MONT TAKE FUEL
OIL LEAK/MO SPARE
BLC LITE CAME ON
BOTH SCOPES BLANK
ACFT NOT LOADED
NO ACFT AVAILABLE
TANK CHANGE
CENTER LINE BREACH STRIPPED

CANX BY COL CLARK

Fig. 37 -- Deviation and degradation analysis

PROGRAM RT017: FORM 305 GENERATOR

Purpose

This program is used to generate form 305 (Manpower Availability). The program lists the 2-digit work center code, the 5-digit work center code, and the name of each work center involved.

Method

For each work center, a card is provided with the name of the work center and its corresponding 2-digit and 5-digit codes keypunched in Cols. 01-48.

Operation

1. Place the work center table (format M1) behind the form 305 Generator object program, Fig. 38.
2. Sense switches I/O, A--"on".
3. Load and go the object program and control cards.
4. Program will
 - a. Read cards
 - b. Print the form 305, Fig. 39.
5. When the reader stops, press start to process last card.
6. Program will halt at IC = 337.

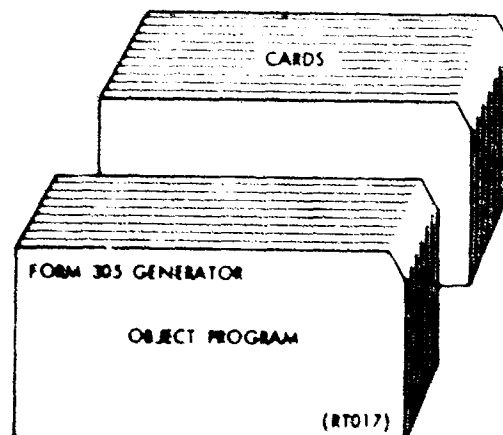


Fig. 38 -- Form 305 generator program setup

DAY- MONTH-	MANPOWER AVAILABILITY	DAY SHIFT OFF	NIGHT SHIFT OFF	ON	ON	GRAVE-YARD OFF
12 19410 FM REPAIR AGE	/	/	/	/	/	/
13 19411 FM REPAIR MAINTENANCE	/	/	/	/	/	/
14 19420 FM INSPECTION/REPAIR AGE	/	/	/	/	/	/
15 19421 FM DAILY INSPECTION	/	/	/	/	/	/
16 19430 FM REPAIR/DELIVERY AGE	/	/	/	/	/	/
17 19440 FM REPAIR FLT AND TRANSPORT ALERT SUPV	/	/	/	/	/	/
18 19450 FM REPAIR FLIGHT	/	/	/	/	/	/
19 19460 FM TRANSPORT MAINTENANCE	/	/	/	/	/	/
20 19470 FM COMMANDER	/	/	/	/	/	/
21 19480 FM SQUADRON ADMINISTRATION	/	/	/	/	/	/
22 19490 FM MAINTENANCE SUPERVISION	/	/	/	/	/	/
23 19500 FM DIAGNOSTICS	/	/	/	/	/	/
24 19510 FM COMMUNICATION/NAVIGATION BRANCH	/	/	/	/	/	/
25 19520 FM RADIO	/	/	/	/	/	/
26 19530 FM RADIO	/	/	/	/	/	/
27 19540 FM RADIO	/	/	/	/	/	/
28 19550 FM RADIO	/	/	/	/	/	/
29 19560 FM RADIO	/	/	/	/	/	/
30 19570 FM RADIO	/	/	/	/	/	/
31 19580 FM RADIO	/	/	/	/	/	/
32 19590 FM RADIO	/	/	/	/	/	/
33 19600 FM RADIO	/	/	/	/	/	/
34 19610 FM RADIO	/	/	/	/	/	/
35 19620 FM RADIO	/	/	/	/	/	/
36 19630 FM RADIO	/	/	/	/	/	/
37 19640 FM RADIO	/	/	/	/	/	/
38 19650 FM RADIO	/	/	/	/	/	/
39 19660 FM RADIO	/	/	/	/	/	/
40 19670 FM RADIO	/	/	/	/	/	/
41 19680 FM RADIO	/	/	/	/	/	/
42 19690 FM RADIO	/	/	/	/	/	/
43 19700 FM RADIO	/	/	/	/	/	/
44 19710 FM RADIO	/	/	/	/	/	/
45 19720 FM RADIO	/	/	/	/	/	/
46 19730 FM RADIO	/	/	/	/	/	/
47 19740 FM RADIO	/	/	/	/	/	/
48 19750 FM RADIO	/	/	/	/	/	/
49 19760 FM RADIO	/	/	/	/	/	/
50 19770 FM RADIO	/	/	/	/	/	/
51 19780 FM RADIO	/	/	/	/	/	/
52 19790 FM RADIO	/	/	/	/	/	/
53 19800 FM RADIO	/	/	/	/	/	/
54 19810 FM RADIO	/	/	/	/	/	/
55 19820 FM RADIO	/	/	/	/	/	/
56 19830 FM RADIO	/	/	/	/	/	/
57 19840 FM RADIO	/	/	/	/	/	/
58 19850 FM RADIO	/	/	/	/	/	/
59 19860 FM RADIO	/	/	/	/	/	/
60 19870 FM RADIO	/	/	/	/	/	/
61 19880 FM RADIO	/	/	/	/	/	/
62 19890 FM RADIO	/	/	/	/	/	/
63 19900 FM RADIO	/	/	/	/	/	/
64 19910 FM RADIO	/	/	/	/	/	/
65 19920 FM RADIO	/	/	/	/	/	/
66 19930 FM RADIO	/	/	/	/	/	/
67 19940 FM RADIO	/	/	/	/	/	/
68 19950 FM RADIO	/	/	/	/	/	/
69 19960 FM RADIO	/	/	/	/	/	/
70 19970 FM RADIO	/	/	/	/	/	/
71 19980 FM RADIO	/	/	/	/	/	/
72 19990 FM RADIO	/	/	/	/	/	/
73 20000 FM RADIO	/	/	/	/	/	/
74 20010 FM RADIO	/	/	/	/	/	/
75 20020 FM RADIO	/	/	/	/	/	/
76 20030 FM RADIO	/	/	/	/	/	/
77 20040 FM RADIO	/	/	/	/	/	/
78 20050 FM RADIO	/	/	/	/	/	/
79 20060 FM RADIO	/	/	/	/	/	/
80 20070 FM RADIO	/	/	/	/	/	/
81 20080 FM RADIO	/	/	/	/	/	/
82 20090 FM RADIO	/	/	/	/	/	/
83 20100 FM RADIO	/	/	/	/	/	/
84 20110 FM RADIO	/	/	/	/	/	/
85 20120 FM RADIO	/	/	/	/	/	/
86 20130 FM RADIO	/	/	/	/	/	/
87 20140 FM RADIO	/	/	/	/	/	/
88 20150 FM RADIO	/	/	/	/	/	/
89 20160 FM RADIO	/	/	/	/	/	/
90 20170 FM RADIO	/	/	/	/	/	/
91 20180 FM RADIO	/	/	/	/	/	/
92 20190 FM RADIO	/	/	/	/	/	/
93 20200 FM RADIO	/	/	/	/	/	/
94 20210 FM RADIO	/	/	/	/	/	/
95 20220 FM RADIO	/	/	/	/	/	/
96 20230 FM RADIO	/	/	/	/	/	/
97 20240 FM RADIO	/	/	/	/	/	/
98 20250 FM RADIO	/	/	/	/	/	/
99 20260 FM RADIO	/	/	/	/	/	/
100 20270 FM RADIO	/	/	/	/	/	/
101 20280 FM RADIO	/	/	/	/	/	/
102 20290 FM RADIO	/	/	/	/	/	/
103 20300 FM RADIO	/	/	/	/	/	/
104 20310 FM RADIO	/	/	/	/	/	/
105 20320 FM RADIO	/	/	/	/	/	/
106 20330 FM RADIO	/	/	/	/	/	/
107 20340 FM RADIO	/	/	/	/	/	/
108 20350 FM RADIO	/	/	/	/	/	/
109 20360 FM RADIO	/	/	/	/	/	/
110 20370 FM RADIO	/	/	/	/	/	/
111 20380 FM RADIO	/	/	/	/	/	/
112 20390 FM RADIO	/	/	/	/	/	/
113 20400 FM RADIO	/	/	/	/	/	/
114 20410 FM RADIO	/	/	/	/	/	/
115 20420 FM RADIO	/	/	/	/	/	/
116 20430 FM RADIO	/	/	/	/	/	/
117 20440 FM RADIO	/	/	/	/	/	/
118 20450 FM RADIO	/	/	/	/	/	/
119 20460 FM RADIO	/	/	/	/	/	/
120 20470 FM RADIO	/	/	/	/	/	/
121 20480 FM RADIO	/	/	/	/	/	/
122 20490 FM RADIO	/	/	/	/	/	/
123 20500 FM RADIO	/	/	/	/	/	/
124 20510 FM RADIO	/	/	/	/	/	/
125 20520 FM RADIO	/	/	/	/	/	/
126 20530 FM RADIO	/	/	/	/	/	/
127 20540 FM RADIO	/	/	/	/	/	/
128 20550 FM RADIO	/	/	/	/	/	/
129 20560 FM RADIO	/	/	/	/	/	/
130 20570 FM RADIO	/	/	/	/	/	/
131 20580 FM RADIO	/	/	/	/	/	/
132 20590 FM RADIO	/	/	/	/	/	/
133 20600 FM RADIO	/	/	/	/	/	/
134 20610 FM RADIO	/	/	/	/	/	/
135 20620 FM RADIO	/	/	/	/	/	/
136 20630 FM RADIO	/	/	/	/	/	/
137 20640 FM RADIO	/	/	/	/	/	/
138 20650 FM RADIO	/	/	/	/	/	/
139 20660 FM RADIO	/	/	/	/	/	/
140 20670 FM RADIO	/	/	/	/	/	/
141 20680 FM RADIO	/	/	/	/	/	/
142 20690 FM RADIO	/	/	/	/	/	/
143 20700 FM RADIO	/	/	/	/	/	/
144 20710 FM RADIO	/	/	/	/	/	/
145 20720 FM RADIO	/	/	/	/	/	/
146 20730 FM RADIO	/	/	/	/	/	/
147 20740 FM RADIO	/	/	/	/	/	/
148 20750 FM RADIO	/	/	/	/	/	/
149 20760 FM RADIO	/	/	/	/	/	/
150 20770 FM RADIO	/	/	/	/	/	/
151 20780 FM RADIO	/	/	/	/	/	/
152 20790 FM RADIO	/	/	/	/	/	/
153 20800 FM RADIO	/	/	/	/	/	/
154 20810 FM RADIO	/	/	/	/	/	/
155 20820 FM RADIO	/	/	/	/	/	/
156 20830 FM RADIO	/	/	/	/	/	/
157 20840 FM RADIO	/	/	/	/	/	/
158 20850 FM RADIO	/	/	/	/	/	/
159 20860 FM RADIO	/	/	/	/	/	/
160 20870 FM RADIO	/	/	/	/	/	/
161 20880 FM RADIO	/	/	/	/	/	/
162 20890 FM RADIO	/	/	/	/	/	/
163 20900 FM RADIO	/	/	/	/	/	/
164 20910 FM RADIO	/	/	/	/	/	/
165 20920 FM RADIO	/	/	/	/	/	/
166 20930 FM RADIO	/	/	/	/	/	/
167 20940 FM RADIO	/	/	/	/	/	/
168 20950 FM RADIO	/	/	/	/	/	/
169 20960 FM RADIO	/	/	/	/	/	/
170 20970 FM RADIO	/	/	/	/	/	/
171 20980 FM RADIO	/	/	/	/	/	/
172 20990 FM RADIO	/	/	/	/	/	/
173 21000 FM RADIO	/	/	/	/	/	/
174 21010 FM RADIO	/	/	/	/	/	/
175 21020 FM RADIO	/	/	/	/	/	/
176 21030 FM RADIO	/	/	/	/	/	/
177 21040 FM RADIO	/	/	/	/	/	/
178 21050 FM RADIO	/	/	/	/	/	/
179 21060 FM RADIO	/	/	/	/	/	/
180 21070 FM RADIO	/	/	/	/	/	/
181 21080 FM RADIO	/	/	/	/	/	/
182 21090 FM RADIO	/	/	/	/	/	/
183 21100 FM RADIO	/	/	/	/	/	/
184 21110 FM RADIO	/	/	/	/	/	/
185 21120 FM RADIO	/	/	/	/	/	/
186 21130 FM RADIO	/	/	/	/	/	/
187 21140 FM RADIO	/	/	/	/	/	/
188 21150 FM RADIO	/	/	/	/	/	/
189 21160 FM RADIO	/	/	/	/	/	/
190 21170 FM RADIO	/	/	/	/	/	/
191 21180 FM RADIO	/	/	/	/	/	/
192 21190 FM RADIO	/	/	/	/	/	/
193 21200 FM RADIO	/	/	/	/	/	/
194 21210 FM RADIO	/	/	/	/	/	/
195 21220 FM RADIO	/	/	/	/	/	/
196 21230 FM RADIO	/	/	/	/	/	/
197 21240 FM RADIO	/	/	/	/	/	/
198 21250 FM RADIO	/	/	/	/	/	/
199 21260 FM RADIO	/	/	/	/	/	/
200 21270 FM RADIO	/	/	/	/	/	/
201 21280 FM RADIO	/	/	/	/	/	/
202 21290 FM RADIO	/	/	/	/	/	/
203 21300 FM RADIO	/	/	/	/	/	/
204 21310 FM RADIO	/	/	/	/	/	/
205 21320 FM RADIO	/	/	/	/	/	/
206 21330 FM RADIO	/	/	/	/	/	/
207 21340 FM RADIO	/	/	/	/	/	/
208 21350 FM RADIO	/	/	/	/	/	/
209 21360 FM RADIO	/	/	/	/	/	/
210 21370 FM RADIO	/	/	/	/	/	/
211 21380 FM RADIO	/	/	/	/	/	/
212 21390 FM RADIO	/	/	/	/	/	/
213 21400 FM RADIO	/	/	/	/	/	/
214 21410 FM RADIO	/	/	/	/	/	/
215 21420 FM RADIO	/	/	/	/	/	/
216 21430 FM RADIO	/	/	/	/	/	/
217 21440 FM RADIO	/	/	/	/	/	/
218 21450 FM RADIO	/	/	/	/	/	/
219 21460 FM RADIO	/	/	/	/	/	/
220 21470 FM RADIO	/	/	/	/	/	/
221 21480 FM RADIO	/	/	/	/	/	/
222 21490 FM RADIO	/	/	/	/	/	/
223 21500 FM RADIO	/	/	/	/	/	/
224 21510 FM RADIO	/	/	/	/	/	/
225 21520 FM RADIO	/	/	/	/	/	/
226 21530 FM RADIO	/	/	/	/	/	/
227 21540 FM RADIO	/	/	/	/	/	/
228 21550 FM RADIO	/	/	/	/	/	/
229 21560 FM RADIO	/	/	/	/	/	/
230 21570 FM RADIO	/	/	/	/	/	/
231 21580 FM RADIO	/	/	/	/	/	/
232 21590 FM RADIO	/	/	/	/	/	/
233 21600 FM RADIO	/	/	/	/	/	/
234 21610 FM RADIO	/	/	/	/	/	/
235 21620 FM RADIO	/	/	/	/	/	/
236 21630 FM RADIO	/	/	/	/	/	/
237 21640 FM RADIO	/	/	/	/	/	/
238 21650 FM RADIO	/	/	/	/	/	/
239 21660 FM RADIO	/	/	/	/	/	/
240 21670 FM RADIO	/	/	/	/	/	/
241 21680 FM RADIO	/	/	/	/	/	/
242 21690 FM RADIO	/	/	/	/	/	/

PROGRAM RT018: MANPOWER MATRIX

Purpose

This program prints a frequency distribution of hourly events for a 24-hour period. The pictorial display, Fig. 41, is a useful tool for assisting management in determining preferred distributions of resources over a 24-hour period. Distributions are displayed vertically to show the ebb and flow of daily events.

Although this program was designed to display manpower data, its use was extended with the development of the Hourly Frequency Accumulate Select program (RT010). The inputs to the Manpower Matrix program are the summary cards created by program RT010; therefore, a variety of types of data can be selected from the file (i.e., the reformatted or Oxnard format file) and pictorially displayed. The data displayed in the sample printout, Fig. 41, are the manpower utilization data displayed in Fig. 25.

Method

1. The program requires a title card (format C5) to define the data sample.
2. The program accepts as input the 24-hour spread summary card (format W) generated by the Hourly Frequency Accumulate Select program (RT010). The input deck must be ordered on Cols. 1-5.
3. The program is constructed of a 45 by 48 array (45 rows for an item value range of 0 to 44; 24 columns of 2 positions each for frequency counting the hourly number of occurrences). Counts are made in the appropriate item and hour cell of the array by selecting an hourly field from the input card and multiplying its value by 48. The product is then used as the index value to locate the cell in the array.
4. When a change in control is sensed (Cols. 1-5) the contents of the array are printed and cleared (Fig. 41).

Operation

This operation describes steps 8 and 9 on the Manpower Utilization Sequence Flowchart.

1. Maintain the sequence of the Manpower and Sortie summary deck and sort Col. 80 (AN).

2. Hold aside cards not punched with Col. 80=N.
3. Call Col. 80=N cards deck M1.
4. Punch a title card (format C5) as follows:

Columns	Punch	Field Description
1	\$(11-3-8 punch)	Card identity
2-29	(See below)	Title
2	—————→	29
9 JANUARY THROUGH 18 JANUARY		

5. Place data deck M1 (from step 3 above) behind the title card.
6. Place the deck behind the Manpower Matrix object program, Fig. 40.
7. Sense switches I/O, A--"on".
8. Load and go object program and data deck.
9. Program will
 - a. Read cards.
 - b. Develop frequency counts based on the value contained in each of the 24-hourly fields on the card.
 - c. Card count the cards to show how many days are in the sample.
 - d. Print and clear the array when a change in work center code (Cols. 1-5) is sensed, Fig. 41.
10. When the reader stops, press start to process the last cards.
11. Program will
 - a. Print an end-of-job message.
 - b. Halt at IC = 1041

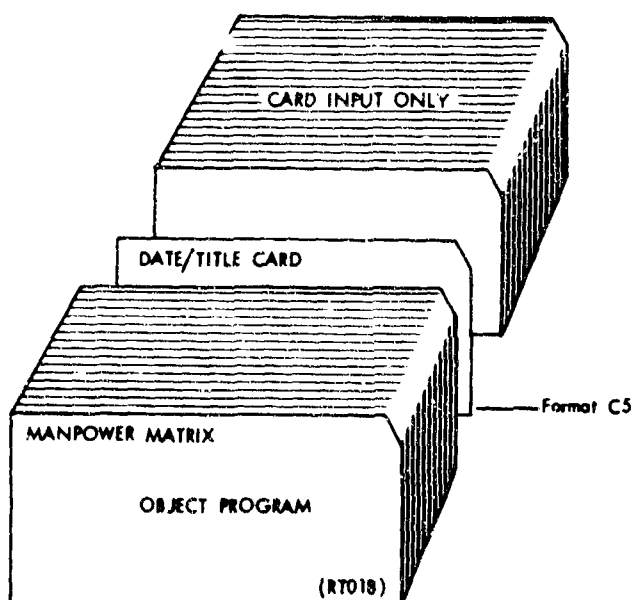


Fig. 40 -- Manpower matrix program setup

[illegible]

Fig. 41 -- Manpower matrix: manpower utilization

Appendix A

KEYPUNCH FORMATS AND LIST OF FORMS AVAILABLE FOR RAND/TAC SYSTEM

For the reader's convenience, this appendix lists the forms included in Appendixes B through G of Volume I for the RAND/TAC system. Also included in this appendix are the Keypunch Formats.

Operations Forms

CD form 101	Sortie Debriefing
CD form 101	Debriefing of Combat
CD form 101	Degradation Factors During Flight to and from Target
CD form 101	Degradation Factors During Combat
CD form 101	Combat Crewmembers' Comments and Recommendations
CD form 101	BDA
CD form 102	Joint Services Anti-Aircraft Fire Incident and Damage Report
CD form 103	FAC Poststrike Debriefing Checklist

Maintenance Forms

MIP form 305 test/	
RR form 300 test	Maintenance Data Collection Record
RAND form 300	Maintenance Data Collection Record
RAND form 302	Sorties Flown, Scheduled or Scrambled
RAND form 303	Aircraft Status Summary
RAND form 305	Manpower Availability
RAND form 306	AGE Utilization
RAND form 307	Mission Go
RAND form 308	Deviations/Degradations
RAND form 309	General Purpose Information Record
RAND form 30D	F-4C

Supply Forms

CD form 303	Record of Cannibalization
CD form 401 (Part A)	Demand Register
CD form 401 (Part B)	Demand Register
CD form 402	Receipt or Cancellation Register
CD form 403	NORS Register

Personnel Forms

CD form 200	Personnel Data Worksheet
CD form 201	Personnel Information Data
CD form 202	Supervisor's Information Data
CD form 204	Aircrew Experience Record

Facilities Forms

Form F-1	Airfield Facilities Survey--Monthly
Form F-2	Airfield Operations, Safety and Weather Survey--Daily
Form F-3	Motor Pool Survey--Weekly
Form F-4	Electrical Power Generation Survey--Monthly
Form F-5	POL Facilities Survey--Monthly
Form F-6	Munitions Facilities Survey--Monthly
Form F-7	Supply Facilities Survey--Monthly
Form F-8	Maintenance Facilities Survey--Weekly

Keypunch Formats

Edit Program Input

F Format A	Debrief Summary
Format B	Form 300 (On-aircraft maintenance)
Format C	Sortie-Scheduled and/or Flown
Format D	Status Card
Format E	Manpower Available
Format F q	AGE Utilization
Format G	Mission Go
Format H	Deviation/Degradation
Format I	General Purpose Comment

Edit Program Output

Format J	Debrief Summary
Format K	On-Aircraft Maintenance
Format L	On-Aircraft Work Delay
Format M	Sortie Flown
Format N	Sortie Scheduled, Not Flown
Format P	Sortie Comment
Format Q	Aircraft Status
Format R	Manpower Available
Format S	AGE Utilization
Format T	Mission Go
Format U	Deviation/Degradation Comment
Format V	General Purpose Comment

Program Output Summary Cards

Format W	24-hour Spread
Format X	Analysis of Variance
Format Y	RECSUM
Format Z	Frequency Count
Format AA	Off-Equipment (AFTO 211) Manhour

Program Control Cards

Format C1	Lag/Delay
Format C2	Analysis of Variance
Format C3	Aircraft Histogram
Format C4	Table Loading Stopper
Format C5	Manpower Utilization Title Card

Keypunch Instructions and Formats (Continued)

Program Control Cards (Continued)

Format C6	Edit Program Gangpunch Master Card
Format C7	Display Program Date Select
Format C8	Display Program Tape Output
Format C9	Tape Input
Format C10	General Title Card
Format C11	Histogram Title Card
Format C12	Field Selector
Format C13	Compute Elapsed Time Program--Code Selector
Format C14	Frequency Count (FREQ) Field Locator Card
Format C15	Chi-Square Title Card
Format C16	Chi-Square Field
Format C17	Correlation Field Designation
Format C18	Correlation General Title Card
Format C19	Correlation Field Designation Table Stopper Card
Format C20	Correlation Independent Variable Test Control Card
Format C21	Analysis of Variance Header Card

Master Tables

Format M1	Work Center Master
Format M2	Tail Number Master
Format M3	2-Digit System Table
Format M4	Edit Program AGE Table

Clint Program Summary Records

Format R1	Aircraft
Format R2	2-Digit System
Format R3	Work Center

Combat Dragon Card Form 101 Operations Cards

Format CD1	Sortie Debriefing
Format CD2	Debriefing of Combat
Format CD3	En Route Degradation Factors
Format CD4	Degradation Factors on Target
Format CD5	Flight Crew Comments and Recommendations
Format CD6	BDA
Format CD7	Battle Damage Assessment Remarks

Combat Dragon Supply Edit Output Cards

Format CD8	Demands, Receipts, and Cancellations
Format CD9	Cannibalization Tape Format
Format CD10	NORS

Combat Dragon Supply Edit Input Cards

Format CD11	Demands, Receipts, and Cancellations
Format CD12	Cannibalization Card Format
Format CD13	NORS

MASTER TABLES

WORK CENTER MASTER		FORMAT M1	
1 - WORK CENTER CODE	6-DIGIT WORK CENTER CODE	WORK CENTER NAME	CARD CODE
01	01		01
02	02		02
03	03		03
04	04		04
05	05		05
06	06		06
07	07		07
08	08		08
09	09		09
10	10		10
11	11		11
12	12		12
13	13		13
14	14		14
15	15		15
16	16		16
17	17		17
18	18		18
19	19		19
20	20		20
21	21		21
22	22		22
23	23		23
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87	87		87
88	88		88
89	89		89
90	90		90
91	91		91
92	92		92
93	93		93
94	94		94
95	95		95
96	96		96
97	97		97
98	98		98
99	99		99
00	00		00

[illegible]

2-DIGIT SYSTEM TABLE		FORMAT M3	
2-DIGIT	SYSTEM CODE	SYSTEM CONTROL	SYSTEM ALPHA
0-9	0-9	0-9	0-9
10-19	10-19	10-19	10-19
20-29	20-29	20-29	20-29
30-39	30-39	30-39	30-39
40-49	40-49	40-49	40-49
50-59	50-59	50-59	50-59
60-69	60-69	60-69	60-69
70-79	70-79	70-79	70-79
80-89	80-89	80-89	80-89
90-99	90-99	90-99	90-99
100-109	100-109	100-109	100-109
110-119	110-119	110-119	110-119
120-129	120-129	120-129	120-129
130-139	130-139	130-139	130-139
140-149	140-149	140-149	140-149
150-159	150-159	150-159	150-159
160-169	160-169	160-169	160-169
170-179	170-179	170-179	170-179
180-189	180-189	180-189	180-189
190-199	190-199	190-199	190-199
200-209	200-209	200-209	200-209
210-219	210-219	210-219	210-219
220-229	220-229	220-229	220-229
230-239	230-239	230-239	230-239
240-249	240-249	240-249	240-249
250-259	250-259	250-259	250-259
260-269	260-269	260-269	260-269
270-279	270-279	270-279	270-279
280-289	280-289	280-289	280-289
290-299	290-299	290-299	290-299
300-309	300-309	300-309	300-309
310-319	310-319	310-319	310-319
320-329	320-329	320-329	320-329
330-339	330-339	330-339	330-339
340-349	340-349	340-349	340-349
350-359	350-359	350-359	350-359
360-369	360-369	360-369	360-369
370-379	370-379	370-379	370-379
380-389	380-389	380-389	380-389
390-399	390-399	390-399	390-399
400-409	400-409	400-409	400-409
410-419	410-419	410-419	410-419
420-429	420-429	420-429	420-429
430-439	430-439	430-439	430-439
440-449	440-449	440-449	440-449
450-459	450-459	450-459	450-459
460-469	460-469	460-469	460-469
470-479	470-479	470-479	470-479
480-489	480-489	480-489	480-489
490-499	490-499	490-499	490-499
500-509	500-509	500-509	500-509
510-519	510-519	510-519	510-519
520-529	520-529	520-529	520-529
530-539	530-539	530-539	530-539
540-549	540-549	540-549	540-549
550-559	550-559	550-559	550-559
560-569	560-569	560-569	560-569
570-579	570-579	570-579	570-579
580-589	580-589	580-589	580-589
590-599	590-599	590-599	590-599
600-609	600-609	600-609	600-609
610-619	610-619	610-619	610-619
620-629	620-629	620-629	620-629
630-639	630-639	630-639	630-639
640-649	640-649	640-649	640-649
650-659	650-659	650-659	650-659
660-669	660-669	660-669	660-669
670-679	670-679	670-679	670-679
680-689	680-689	680-689	680-689
690-699	690-		

AGE	CODE	MOON
EDIT PROGRAM AGE TABLE FORMAT M4		

PROGRAM CONTROL CARDS

LAG/DELAY CONTROL CARD

LAG/DELAY CONTROL CARD		FILE IDENTIFICATION	
LAG CONSTANT	DELAY CONSTANT	FILE IDENTIFICATION	
HOURS	HOURS		
TENTHS	TENTHS		
00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00

FORMAT C1

CARD CODE

11 PUNCH

ANALYSIS OF VARIANCE CONTROL CARD

ANALYSIS OF VARIANCE CONTROL CARD		DATA		MINOR CONTROL		MAJOR CONTROL		PAGE COUNT	
SORTIE COUNT		HIGH Order	LOW Order	HIGH Order	LOW Order	HIGH Order	LOW Order	HIGH Order	LOW Order
00 00 00 00		00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00

FORMAT C2

ANY CHARACTER

WHOLE NUMBER DECIMAL SHIFT

AIRCRAFT HISTOGRAM CONTROL CARD

AIRCRAFT HISTOGRAM CONTROL CARD		FIELD		FIELD		FIELD		FIELD	
MAJOR CONTROL	MINOR CONTROL	MAJOR CONTROL	MINOR CONTROL	MAJOR CONTROL	MINOR CONTROL	MAJOR CONTROL	MINOR CONTROL	MAJOR CONTROL	MINOR CONTROL
HIGH ORDER	LOW ORDER	HIGH ORDER	LOW ORDER	HIGH ORDER	LOW ORDER	HIGH ORDER	LOW ORDER	HIGH ORDER	LOW ORDER
00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00

FORMAT C3

CARD CODE

11-3-8 PUNCH

PROGRAM CONTROL CARDS

TABLE LOADING STOPPER

11-4-8 PUNCH

11-4-8 PUNCH

FORMAT C4

CARD CODE

MANPOWER UTILIZATION TITLE CARD

11-5-8 PUNCH

11-5-8 PUNCH

FORMAT C5

CARD CODE

TITLE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61

EDIT PROGRAM GANGPUNCH MASTER CARD

11-6-8 PUNCH

11-6-8 PUNCH

FORMAT C6

CARD CODE

1000 00000000

1000 00000000

PROGRAM CONTROL CARDS

-87-

DISPLAY PROGRAM DATE SELECT CONTROL CARD

FORMAT C7

DATE	DAY	MO
0000	00	00

11-4-8 PUNCH

DISPLAY PROGRAM TAPE OUTPUT CONTROL CARD

FORMAT C8

11-4-8 PUNCH

TAPE INPUT CONTROL CARD

FORMAT C9

DEPT	TAM
0000	00

PROGRAM CONTROL CARDS

[illegible]

FREQUENCY COUNT (FREQ) FIELD LOCATOR CARD										FORMAT C14																			
LOCATION FIELD 1		LOCATION FIELD 2		LOCATION FIELD 3		TITLE																							
HIGH END BR	LOW END BR	HIGH END BR	LOW END BR	HIGH END BR	LOW END BR																								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

C15	C14	C13	C12	C11	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1	C0	C-1	C-2	C-3	C-4	C-5	C-6	C-7	C-8	C-9	C-10	C-11	C-12	C-13	C-14	C-15	C-16	C-17	C-18	C-19	C-20	C-21	C-22	C-23	C-24	C-25	C-26	C-27	C-28	C-29	C-30	C-31	C-32	C-33	C-34	C-35	C-36	C-37	C-38	C-39	C-40	C-41	C-42	C-43	C-44	C-45	C-46	C-47	C-48	C-49	C-50	C-51	C-52	C-53	C-54	C-55	C-56	C-57	C-58	C-59	C-60	C-61	C-62	C-63	C-64	C-65	C-66	C-67	C-68	C-69	C-70	C-71	C-72	C-73	C-74	C-75	C-76	C-77	C-78	C-79	C-80	C-81	C-82	C-83	C-84	C-85	C-86	C-87	C-88	C-89	C-90	C-91	C-92	C-93	C-94	C-95	C-96	C-97	C-98	C-99	C-100	C-101	C-102	C-103	C-104	C-105	C-106	C-107	C-108	C-109	C-110	C-111	C-112	C-113	C-114	C-115	C-116	C-117	C-118	C-119	C-120	C-121	C-122	C-123	C-124	C-125	C-126	C-127	C-128	C-129	C-130	C-131	C-132	C-133	C-134	C-135	C-136	C-137	C-138	C-139	C-140	C-141	C-142	C-143	C-144	C-145	C-146	C-147	C-148	C-149	C-150	C-151	C-152	C-153	C-154	C-155	C-156	C-157	C-158	C-159	C-160	C-161	C-162	C-163	C-164	C-165	C-166	C-167	C-168	C-169	C-170	C-171	C-172	C-173	C-174	C-175	C-176	C-177	C-178	C-179	C-180	C-181	C-182	C-183	C-184	C-185	C-186	C-187	C-188	C-189	C-190	C-191	C-192	C-193	C-194	C-195	C-196	C-197	C-198	C-199	C-200	C-201	C-202	C-203	C-204	C-205	C-206	C-207	C-208	C-209	C-210	C-211	C-212	C-213	C-214	C-215	C-216	C-217	C-218	C-219	C-220	C-221	C-222	C-223	C-224	C-225	C-226	C-227	C-228	C-229	C-230	C-231	C-232	C-233	C-234	C-235	C-236	C-237	C-238	C-239	C-240	C-241	C-242	C-243	C-244	C-245	C-246	C-247	C-248	C-249	C-250	C-251	C-252	C-253	C-254	C-255	C-256	C-257	C-258	C-259	C-260	C-261	C-262	C-263	C-264	C-265	C-266	C-267	C-268	C-269	C-270	C-271	C-272	C-273	C-274	C-275	C-276	C-277	C-278	C-279	C-280	C-281	C-282	C-283	C-284	C-285	C-286	C
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PROGRAM CONTROL CARDS

CHI-SQUARE FIELD CONTROL CARD

LOCATION OF BASE-LINE COUNT		LOCATION OF OBSERVED FREQUENCY COUNT		LOCATION OF CATEGORY IDENTIFICATION		LOCATION OF MAJOR CONTROL		INPUT TAP	INPUT COUNT
HIGH ORDER	LOW ORDER	HIGH ORDER	LOW ORDER	HIGH ORDER	LOW ORDER	HIGH ORDER	LOW ORDER		
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26									

FORMAT C16

11 PUNCH

CORRELATION FIELD DESIGNATION CONTROL CARD

VARIABLE NUMBER		FIELD POSITION		ANY CHARACTER
HIGH ORDER	LOW ORDER	HIGH ORDER	LOW ORDER	
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26				

FORMAT C17

WHOLE NUMBER DECIMAL SHIFT

CORRELATION GENERAL TITLE CARD

CARD CODE	TITLE
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	

FORMAT C18

11 PUNCH

PROGRAM CONTROL CARDS

CORRELATION FIELD DESIGNATION TABLE STOPPER CARD

FORMAT C19

CARD CODE

11-4-8 PUNCH

CORRELATION DEPENDENT VARIABLE TEST CONTROL CARD

FORMAT C20

DEPENDENT VARIABLE TESTED

CARD CODE	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
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3-8 PUNCH

ANALYSIS OF VARIANCE HEADER CARD

FORMAT C21

TITLE

CARD CODE

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
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-92-

[illegible]

AIRCRAFT TAIL NUMBER	SUFFIX		DATE		BASIC WORK CENTER	REPORT		START TIME		STOP TIME		CREW SIZE	WORK UNIT CODE	ACTION TAKEN	WHEN DISCOVERED	HOW MADE FUNCTION	UNITS PRODUCED	ASSISTING WORK CENTER	ATO 211 ACTION	AIRFRAME HOURS	SYMBOL	MISSION DAY	MISSION NUMBER	LOCAL USE																																																																																																																																																																																																																																																																																																																																																																																																																																																											
	DAY	MO.	NUMBER	LINE		HR.	MIN.	HR.	MIN.																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
51-10-33-24	0	38	2	08	5	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71

[illegible]

EDIT PROGRAM INPUT

STATUS CARD

AIRCRAFT TAIL NUMBER		STATUS CODE		INTO STATUS		OUT OF STATUS		WORKS UNIT CODE		JULIAN DATE		CARD CODE
01-20-0000		0000		HRS.		HRS.		0000		YEAR DAY		00

FORMAT D

MANPOWER AVAILABLE

DATE	DAY	MO.	YEAR	AVAILABLE												THIRD SHIFT	THIRD SHIFT	THIRD SHIFT	THIRD SHIFT														
				FIRST SHIFT			SECOND SHIFT			THIRD SHIFT			FIRST SHIFT							SECOND SHIFT			THIRD SHIFT										
				SKILL LEVEL			SKILL LEVEL			SKILL LEVEL			SKILL LEVEL			SKILL LEVEL			SKILL LEVEL			SKILL LEVEL			SKILL LEVEL								
				0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2			
01-20-0000				0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2

FORMAT E

AGE UTILIZATION

DATE	DAY	MO.	YEAR	BOL- MENT	AIRCRAFT TAIL NUMBER	USING CENTER	SPOT TIME	START TIME	STOP TIME	REMOVE TIME	THIRD SHIFT	THIRD SHIFT	THIRD SHIFT	THIRD SHIFT
01-20-0000														

FORMAT F

EDIT PROGRAM INPUT

MISSION GO

DATE		AIRCRAFT		TIME	
DAY	MO	TAIL NUMBER	HL	MIN.	
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
10	10	10	10	10	10
11	11	11	11	11	11
12	12	12	12	12	12
13	13	13	13	13	13
14	14	14	14	14	14
15	15	15	15	15	15
16	16	16	16	16	16
17	17	17	17	17	17
18	18	18	18	18	18
19	19	19	19	19	19
20	20	20	20	20	20
21	21	21	21	21	21
22	22	22	22	22	22
23	23	23	23	23	23
24	24	24	24	24	24
25	25	25	25	25	25
26	26	26	26	26	26
27	27	27	27	27	27
28	28	28	28	28	28
29	29	29	29	29	29
30	30	30	30	30	30
31	31	31	31	31	31
32	32	32	32	32	32
33	33	33	33	33	33
34	34	34	34	34	34
35	35	35	35	35	35
36	36	36	36	36	36
37	37	37	37	37	37
38	38	38	38	38	38
39	39	39	39	39	39
40	40	40	40	40	40
41	41	41	41	41	41
42	42	42	42	42	42
43	43	43	43	43	43
44	44	44	44	44	44
45	45	45	45	45	45
46	46	46	46	46	46
47	47	47	47	47	47
48	48	48	48	48	48
49	49	49	49	49	49
50	50	50	50	50	50
51	51	51	51	51	51
52	52	52	52	52	52
53	53	53	53	53	53
54	54	54	54	54	54
55	55	55	55	55	55
56	56	56	56	56	56
57	57	57	57	57	57
58	58	58	58	58	58
59	59	59	59	59	59
60	60	60	60	60	60
61	61	61	61	61	61
62	62	62	62	62	62
63	63	63	63	63	63
64	64	64	64	64	64
65	65	65	65	65	65
66	66	66	66	66	66
67	67	67	67	67	67
68	68	68	68	68	68
69	69	69	69	69	69
70	70	70	70	70	70
71	71	71	71	71	71
72	72	72	72	72	72
73	73	73	73	73	73

[illegible][illegible]

EDIT PROGRAM OUTPUT

[illegible][illegible]

START TIME				STOP TIME				BASIC WORK CENTER	WORK ORDER NUMBER	TAIL NUMBER	WORK ORDER SUFFIX	WORK UNIT CODE	DISPLAY CODE	ASSISTING WORK CENTER	REPORT NUMBER	SQUADRON	CARD CODE
DAY	MO.	HR.	MIN.	DAY	MO.	HR.	MIN.										
29-12	11-17	13-14	15-16	17-18	19-20	21-22	23-24	25-26	27-28	29-30	31-32	33-34	35-36	37-38	39-40	41-42	43-44

-96-

SCHEDULED TAKEOFF				ACTUAL TAKEOFF				LANDING				SCHED. FLY TIME		TAIL NUMBER	DIVIATION CODE	CREW		LOAD CONFIGURATION	MISSION	SQUADRON	CARD CODE	
DAY	MO.	HR.	MIN.	DAY	MO.	HR.	MIN.	DAY	MO.	HR.	MIN.	HR.	MIN.			1	2					
09	10	11	17	11	16	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34

SCHEDULED TAKEOFF				SCHEDULED TAKEOFF				FORMAT N																															
DAY	MO.	HR.	MIN.	DAY	MO.	HR.	MIN.	SCHED. FLY TIME	TAIL NUMBER	DEVIATION CODE	CREW	LOAD CONFIGURATION	MISSION	SQUADRON	CADD CODE	S																							
																	HR.	MIN.																					
14	06	00	00	14	06	00	00	72:28	7300	41	2	1	2	16	4	49	40	57	51	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0

[illegible]

EDIT PROGRAM OUTPUT

AIRCRAFT STATUS

INTO STATUS				OUT OF STATUS				STATUS CODE				TAIL NUMBER				NORS WORK UNIT CODE				SQUADRON											
DAY	MO.	HR.	MIN.	DAY	MO.	HR.	MIN.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
06	03	10	00	07	03	10	00	07	03	10	00	07	03	10	00	07	03	10	00	07	03	10	00	07	03	10	00	07	03	10	00

FORMAT Q

MANPOWER AVAILABLE

DATE		MANPOWER AVAILABLE BY HOUR																								
WORK CENTER	DAY MO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
01	07	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27

FORMAT R

AGE UTILIZATION

START TIME				STOP TIME				REMOVE TIME				TAIL NUMBER				NOUN				WORK CENTER				NOUN (cont.)				AGE CODE				SQUADRON			
DAY	MO.	HR.	MIN.	DAY	MO.	HR.	MIN.	DAY	MO.	HR.	MIN.	DAY	MO.	HR.	MIN.	DAY	MO.	HR.	MIN.	DAY	MO.	HR.	MIN.	DAY	MO.	HR.	MIN.	DAY	MO.	HR.	MIN.				
01	07	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32				

FORMAT S

MISSION GO

FORMAT 1

[illegible]

DEVIATION/DEGRADATION COMMENT

FORMAT U

MISSION CODE	Date & digits of Deviation Code			TIME			Over. Code last digit	COMMENTS (1)		TAIL NUMBER	COMMENTS (cont.)		WORK UNIT CODE	COMMENTS (cont.)		BOARDING CAMP CODE	H																																																																	
	DAY	MO.	HR.	MIN.																																																																														
01-07-01-02-03-04-05-06-07-08-09-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80	01	07	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

GENERAL PURPOSE COMMENT

FORMAT V

COMMENTS (1)			TIME		TAIL NUMBER	COMMENTS (cont.)	WORK UNIT CODE	COMMENTS (cont.)	SQUADRON	CARD CODE	6
DAY	MO.	HR.	MIN.								
20	27	09	04	00	07	02	00	00	00	00	00
21	07	09	04	00	07	02	00	00	00	00	00
22	07	09	04	00	07	02	00	00	00	00	00
23	07	09	04	00	07	02	00	00	00	00	00
24	07	09	04	00	07	02	00	00	00	00	00
25	07	09	04	00	07	02	00	00	00	00	00
26	07	09	04	00	07	02	00	00	00	00	00
27	07	09	04	00	07	02	00	00	00	00	00
28	07	09	04	00	07	02	00	00	00	00	00
29	07	09	04	00	07	02	00	00	00	00	00
30	07	09	04	00	07	02	00	00	00	00	00
31	07	09	04	00	07	02	00	00	00	00	00
32	07	09	04	00	07	02	00	00	00	00	00
33	07	09	04	00	07	02	00	00	00	00	00
34	07	09	04	00	07	02	00	00	00	00	00
35	07	09	04	00	07	02	00	00	00	00	00
36	07	09	04	00	07	02	00	00	00	00	00
37	07	09	04	00	07	02	00	00	00	00	00
38	07	09	04	00	07	02	00	00	00	00	00
39	07	09	04	00	07	02	00	00	00	00	00
40	07	09	04	00	07	02	00	00	00	00	00
41	07	09	04	00	07	02	00	00	00	00	00
42	07	09	04	00	07	02	00	00	00	00	00
43	07	09	04	00	07	02	00	00	00	00	00
44	07	09	04	00	07	02	00	00	00	00	00
45	07	09	04	00	07	02	00	00	00	00	00
46	07	09	04	00	07	02	00	00	00	00	00
47	07	09	04	00	07	02	00	00	00	00	00
48	07	09	04	00	07	02	00	00	00	00	00
49	07	09	04	00	07	02	00	00	00	00	00
50	07	09	04	00	07	02	00	00	00	00	00
51	07	09	04	00	07	02	00	00	00	00	00
52	07	09	04	00	07	02	00	00	00	00	00
53	07	09	04	00	07	02	00	00	00	00	00
54	07	09	04	00	07	02	00	00	00	00	00
55	07	09	04	00	07	02	00	00	00	00	00
56	07	09	04	00	07	02	00	00	00	00	00
57	07	09	04	00	07	02	00	00	00	00	00
58</											

24-HOUR SPREAD SUMMARY CARD

[illegible]

ANALYSIS OF VARIANCE OUTPUT SUMMARY

WTE	QTY	MAJOR CONTROL CODE	MAJOR CONTROL CODE
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30
31	31	31	31
32	32	32	32
33	33	33	33
34	34	34	34
35	35	35	35
36	36	36	36
37	37	37	37
38	38	38	38
39	39	39	39
40	40	40	40
41	41	41	41
42	42	42	42
43	43	43	43
44	44	44	44
45	45	45	45
46	46	46	46
47	47	47	47
48	48	48	48
49	49	49	49
50	50	50	50
51	51	51	51
52	52	52	52
53	53	53	53
54	54	54	54
55	55	55	55
56	56	56	56
57	57	57	57
58	58	58	58
59	59	59	59
60	60	60	60
61	61	61	61
62	62	62	62
63	63	63	63
64	64	64	64
65	65	65	65
66	66	66	66
67	67	67	67
68	68	68	68
69	69	69	69
70	70	70	70
71	71	71	71
72	72	72	72
73	73	73	73
74	74	74	74
75	75	75	75
76	76	76	76
77	77	77	77
78	78	78	78
79	79	79	79
80	80	80	80
81	81	81	81
82	82	82	82
83	83	83	83
84	84	84	84
85	85	85	85
86	86	86	86
87	87	87	87
88	88	88	88
89	89	89	89
90	90	90	90
91	91	91	91
92	92	92	92
93	93	93	93
94	94	94	94
95	95	95	95
96	96	96	96
97	97	97	97
98	98	98	98
99	99	99	99
100	100	100	100

RECSUM PROGRAM SUMMARY

[illegible]

PROGRAM OUTPUT SUMMARY CARDS

FREQUENCY COUNT (FREQ) SUMMARY OUTPUT				FORMAT Z	
PERCENT OF TOTAL COUNT	FREQUENCY COUNT	COUNT (FIELD 3)			
1	1	1			
2	2	2			
3	3	3			
4	4	4			
5	5	5			
6	6	6			
7	7	7			
8	8	8			
9	9	9			
10	10	10			
11	11	11			
12	12	12			
13	13	13			
14	14	14			
15	15	15			
16	16	16			
17	17	17			
18	18	18			
19	19	19			
20	20	20			
21	21	21			
22	22	22			
23	23	23			
24	24	24			
25	25	25			
26	26	26			
27	27	27			
28	28	28			
29	29	29			
30	30	30			
31	31	31			
32	32	32			
33	33	33			
34	34	34			
35	35	35			
36	36	36			
37	37	37			
38	38	38			
39	39	39			
40	40	40			
41	41	41			
42	42	42			
43	43	43			
44	44	44			
45	45	45			
46	46	46			
47	47	47			
48	48	48			
49	49	49			
50	50	50			
51	51	51			
52	52	52			
53	53	53			
54	54	54			
55	55	55			
56	56	56			
57	57	57			
58	58	58			
59	59	59			
60	60	60			
61	61	61			
62	62	62			
63	63	63			
64	64	64			
65	65	65			
66	66	66			
67	67	67			
68	68	68			
69	69	69			
70	70	70			
71	71	71			
72	72	72			
73	73	73			
74	74	74			
75	75	75			
76	76	76			
77	77	77			
78	78	78			
79	79	79			
80	80	80			
81	81	81			
82	82	82			
83	83	83			
84	84	84			
85	85	85			
86	86	86			
87	87	87			
88	88	88			
89	89	89			
90	90	90			
91	91	91			
92	92	92			
93	93	93			
94	94	94			
95	95	95			
96	96	96			
97	97	97			
98	98	98			
99	99	99			
100	100	100			

[illegible]

CLINT PROGRAM SUMMARY RECORDS

[illegible]

2-DIGIT SYSTEM										FORMAT R2									
TAIL NUMBER		ROUTE TOX. CODE				LOAD	POLYMERIZATION	LAG	DELAY	FIX	RECOVERY	UNITS	MAN HOURS		FLY TIME		RUN IDENTIFICATION		
													HOURS	TENTHS	HRS.	TENTHS			
1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0

WORK CENTER										FORMAT R3											
TALL NO. MEMBERS		MONTHLY WORKHOURS				LOAD CAPACITY	WORK CENTER	LAG HOURS	DELAY		FIX		RECOVERY		UNITS	MANHOURS		FLY TIME		RUN IDENTIFICATION	
		YEAR	MO.	DAY	WEEK				HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES		HOURS	MINUTES	HOURS	MINUTES		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	

Appendix B

COMBAT DRAGON OPERATIONS AND SUPPLY EDIT PROGRAMS

This appendix describes two programs required to edit data punched from Combat Dragon form 100 (operations) and forms 303, 401, 402 and 403 (supply). The forms are described in Volume 1 of this series.

This documentation was extracted from Volume IV of the Combat Dragon exercise final report.

Although not shown in the program deck setup, each program should be preceded by the TAC conventional self-loading date card.

PROGRAM A9C02: CD FORM 101 Z CARD EDIT

Purpose

This program audits the data keypunched from the Combat Dragon Form 101 (Col. 80=Z, Col. 79=N through T) and provides a listing of all input data cards with applicable field headings.

Erroneous records are denoted by the word "ERROR" printed to the right with asterisks printed below the individual fields containing errors. The program checks the validity of the following data entries: mission number, tail number, dates, times, mission types, target types, ordnance codes, weather, air speeds, altitude, scores, and so on.

Method

The program requires that the input data be sorted in the sequence listed in the operating procedure. Sense switch settings allow for the following options:

1. Audit only (switches I/O, A and C "on")--generates printout of all data cards.
2. Audit current data and generate new data tape (switches I/O, A, B--"on")--generates printout of all data cards and writes all error free records on tape.
3. Audit current data and update previous cumulative tape (switches I/O, A--"on")--generates printout of all data cards and updates the previous cumulative data tape. The cumulative data tape, mounted on unit 2, is copied onto the tape on unit 1 before auditing and writing of the current day's data.

All code tables required for the audit are built into the program.

Operation

1. Sort the Col. 80=Z, Col. 79=N through T daily input cards:

Major	9-10	N	month
	7-8	N	day
	1-2	N	CDM number
	3-6	N	tail number
	79	AN	card code
	26	N	(varies by card type)
Minor	78	AN	sequence code

2. Sense switches I/O, A, B, D--"on".

3. Mount a tape on unit 1.
4. Place input data behind object program.
5. Load and go program and data deck.
6. Program will
 - a. Read cards.
 - b. Perform edit of each card.
 - c. Print all cards with applicable field headings.
 - d. Print a line containing asterisks locating a column or field in error.
 - e. Write all error-free records on the tape on unit 1.
7. When the reader stops, press start to process last card.
8. Program will
 - a. Write an end-of-file on the tape on unit 1.
 - b. Rewind and unload unit 1.
 - c. Print end-of-job message.
 - d. Halt at IC = 2907.

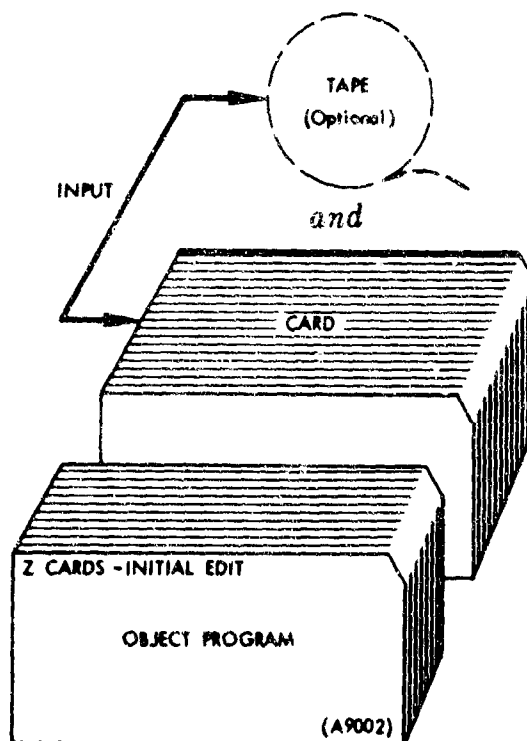


Fig. 42 -- CD101 Z cards (initial edit) program setup

CDM	TAIL	DATE	FRAGN	CALL....	P/	A/G-ABORT	RECOVER	DIVERTO	--ENROUTE--	CT	OPS	S	--ORD--JETTISONED...	CARD															
				--SIGN /I		RSN TIME	RSN TIME	MT	NR	CT	CR	SUPPORT	C	NDIC	HOC	NOC	HOC	NOC											
01	4510	1508	00001	COM0001	11	A	WX 1400	**	****		*	*	*	*	*	*	*	*											
01	4510	1508	00001	COM0001	11	A	WX 1400	NO	1100	BORDER	T	R	U	F	POTLUCK	N	H	ICA											
01	4510	1508	00001	COM0001	11	TYPE-REMARKS OF DEGRADING FACTORS DURING FLIGHT TO AND FROM TARGET													ICA										
						12	GROUND																						
						UTM. COORDINATES..... RF CT FC TA TR TU OA CM AC T T T																							
						PDS	1ST-TGT.	2ND-TGT.	3RD-TGT.		01	02	03	04	05	06	07	08	09	A	*	*							
						SOP	01000200	*****																					
						**																							
01	4510	1508	00001	COM0001	11	TYPE-REMARKS OF DEGRADATION FACTORS DURING COMBAT																							
						11	CLOUD COVER																						
01	4510	1508	00001	COM0001	11	TYPE-PILOTS COMMENTS AND RECOMMENDATIONS																							
						10	IMPAIRED VISIBILITY ON ROLL																						
01	4510	1508	00001	COM0001	11	N	TV	C	--ORD--EXPENDED.	STRUCTS	SAMPANS	TARGET	SEC	...DUOS....	TOT	TGT	80MROC--HANG												
						1	MT	1	61	5W	4H	3V	2K	05	10	00	00	085	098	01	000	000	000	02	020	00	00	00	00
01	4510	1508	00001	COM0001	11	0	PB	0	61	5W	4H	3V	2K																
						0	**	*	653 1WV ABC																				
						**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
01	4510	1508	00001	COM0001	11	OTHER BATTLE DAMAGED ASSESSMENT REMARKS																							
						MISSION SUCCESSFUL																							

READ
FOUND
READ
NOTE

END OF JOB

Figure 43

PROGRAM D9001: SUPPLY U/X/W CARD EDIT

Purpose

This program audits the data keypunched from COMBAT DRAGON forms 303 (col 80=W), 401 and 402 (col 80=U) and 403 (col 80=X) and provides a listing of all input data cards with applicable field headings. Erroneous records are denoted by the word "ERR" printed to the right with mnemonics printed below the individual fields containing errors. The program checks the validity of the following data entries: FSN, stock number, unit of issue, account number, shops, Julian dates, tail numbers, AGE equipment, engines, work unit codes, document numbers, time of demand, dates, and times received or canceled. In addition, the program computes elapsed times for all items received, canceled or on suspense and, on and off time for NORS. "From" and "to" actions are checked on cannibalization records.

Method

The program requires that each type of data be sorted in the sequence listed in the operating procedure. Only error-free non-suspense records are written on the tape output file. Sense switch options are the same as listed for program A9001.

1. Audit only (switches I/O, A and C "on")--generates printout of all data cards.
2. Audit current data and generate new data tape (switches I/O, A, B--"on")--generates printout of all data cards and writes all error free records on tape.
3. Audit current data and update previous cumulative tape (switches I/O, A--"on")--generates printout of all data cards and updates the previous cumulative data tape. The cumulative data tape, mounted on unit 2, is copied onto the tape on unit 1 before auditing and writing of the current day's data.

As with program A9001, all code tables required for the audits are built into the program.

Operation

1. Order each input data type as follows:

Column 80	Sort	
U	23-36	AN
W	31-44	AN
X	23-36	AN

2. Combine the 3 decks in this order: U, W, X.
3. Sense switches I/O, A, B--"on".
4. Mount a tape on unit 1.
5. Place input data behind object program.
6. Load and go program and data deck.
7. Program will
 - a. Read cards.
 - b. Perform edit of each card.
 - c. Print all cards with applicable field headings.
 - d. Print a line containing asterisks locating a field or column in error.
 - e. Write all error-free records on the tape on unit 1.
8. When the reader stops, press start to process last card.
9. Program
 - a. Write an end-of-file on the tape on unit 1.
 - b. Rewind and unload unit 1.
 - c. Print an end-of-job message.
 - d. Halt at IC = 2630.

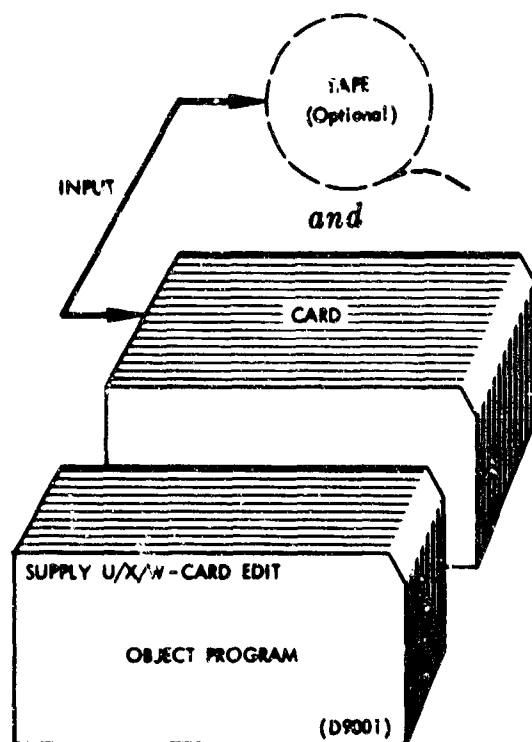


Fig. 44 -- Supply U/X/W (card edit) program setup

DEMAND REGISTER / RECEIPT OR CANCELLATION / ON-NORS OR OFF-NORS / CANNIVALIZATION * U/A/W EDIT PROCESSED ON															PAGE	1
....STOCK NUMBER....	QTY	U/	-SUPPLY DOCUMENT NUMBER-	DEL	TAIL	EQUP	MX-DOC	W/U/C	MSN-NUMBER	FF	TIME	A	RCT/CANX	C	ELAPS	
FSC. PR FIM... ADD.	REQ	/I	SVS ACC SHOP JULIAN S-N.	PRI	NR.	TYPE-	NUMBER		BY MO CDM	/K	DFMA	V	JULI	TIME	T...	
1560 0277020 SE	001	EA	X 465 PF 7282 0010 03	03	4504	A37A	129956	11227	09 10 74	0925	0	7336	1200	F	5...	
1560 P4 0116004	001	EA	X 465 PF 7282 0076 03	03	4504	A37A	12494A	11319	09 10 74	0830	0	7336	2400	P	111.5	
5821 2170457	002	EA	X 465 MX 7275 0146 02	02	4514	A37A	15181J	63.11	02 10 09	1120	M	7336	2400	I	076.6	
2915 0242716	001	EA	X 465 PF 7282 0092 03	03	4504	A37A	12994C	46733	09 10 74	0450	0	7336	1200	C	599.1	
....STOCK NUMBER....	QTY	W-U-C	PART FOR	-SUPPLY DOCUMENT NUMBER-	PART	NR	MX-CTL-ACTION		-FOR-			CANX	EQUP			
FSC. PR FIM... ADD.	REQ	FOR	TAIL NR.	SVS ACC SHOP JULIAN S-N.	TAIL	N	JULIAN TIME		APT NR	S-...	TYPE-					
5895 9001196 FA	01	EEEE	674522	X 465 MX 7219 0064	674527	7234	2230	15219A	15323F	07.5	A37					
5895 9001196 FA	01	65111	674522	X 465 MX 7219 0064	674527	7234	2230	15219A	15323F	07.5	A37					
6115 MC 405144P SE	01	42111	674520	X 465 MX 72.3 0142	248062	7234	1800	14591P	676123	02U	JPS					
....STOCK NUMBER....	QTY	-SUPPLY DOCUMENT NUMBER-	SVS ACC SHOP JULIAN S-N.	TAIL	NR.	EQUP	W/U/C		-ON-NORS-							
FSC. PR FIM... ADD.	REQ	SVS ACC SHOP JULIAN S-N.	7216 0122	EE	4520	A37A	EEEE		JULIAN TIME	7216	1345					
6680 6635732	001	X 465	7216 0122	EE	4520	A37A	EEEE									
6680 6635732	001	X 465	7216 0122	EE	4520	A37A	63211	7216	1345	7224	0930					
2995 9417436 PL	001	X 465 ES	7216 0172	EE	4622	A37A	2388H	7214	1000	7233	1130					
2995 9417436 PL	001	X 465 ES	7216 0172	EE	4522	A37A	2388H	7214	1000	7233	1130					
2915 8422574	001	X 465 MX	7218 0019	EE	4518	A37A	46211	7220	1600	7224	0930					
2915 8422574	001	X 465 MX	7218 0019	EE	4518	A37A	46211	7220	1600	7224	0930					

READ 13 CARDS
FOUND 6 CARDS IN ERROR
READ RECORDS FROM TAPE 2
WROTE 7 RECORDS TO TAPE 1

END OF JOB

Figure 45

COMBAT DRAGON CARD FORM 101 OPERATIONS CARDS

DATE		TAC NUMBER	PRAC NUMBER	CALL SIGN	PILOT	ABORT REASON		TIME OF ABORT		RECOVERY DIVISION	TIME OF DIVERSION		DIVERTED LOCATION	NAV TO TARGET		COMA RETURN		COMA TO TARGET		OPERATION SUPPORTED	GUN CAMERA		STROBE CAMERA		ORDNANCE JETTISONED												CARD CODE																																																																																																																																																																																																																																																																																																																																																																																																																																
DAY	MO.					HR.	MIN.	HR.	MIN.		HR.	MIN.		HR.	MIN.	HR.	MIN.	HR.	MIN.		HR.	MIN.	HR.	MIN.	HR.	MIN.	HR.	MIN.	HR.	MIN.	HR.	MIN.	HR.	MIN.	HR.	MIN.																																																																																																																																																																																																																																																																																																																																																																																																																																	
01	07	03	05	08	27	09	10	11	07	13	12	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57

DEFINING OF COMBAT

CDM	TAIL NUMBER	DATE		PRAG NUMBER	CALL SIGN	PILOT	UTM COORDINATES			RECEIVED WITH FAC	COMMUNICATION WITH FAC	FAC CONTROL	TARGET ACQUISITION	TARGET RETENTION	TACTICS USED	ADVANCE ADVISORY	COMMUNICATIONS	AIRCRAFT PERFORMANCE	TACTIC TARGET 1	TACTIC TARGET 2	TACTIC TARGET 3																																								
		DAY	MO.				FIRST TARGET	SECOND TARGET	THIRD TARGET																																																				
610701040526	07060910	11	17	13	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72

EN ROUTE DEGRADATION FACTORS

CDM	TAIL NUMBER	DATE		FLAG NUMBER	CALL SIGN	PILOT	IDENTIFICATION NUMBER	COMMENTS	SOURCE CODE	CARD CODE	QZ																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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01	04-03	07	08	13	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01</

DE GRADATION FACTORS ON TARGET

FORMAT CD4

CD#		DATE		FRAG NUMBER	CALL SIGN	PILOT	LOCATION	COMMENTS	SOURCE CODE	CARD CODE																																																										
TAIL NUMBER	DAY	MO.																																																																		
6107	23	04	05	3	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
6107	23	04	05	3	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
6107	23	04	05	3	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
6107	23	04	05	3	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
6107	23	04	05	3	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
6107	23	04	05	3	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
6107	23	04	05	3	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
6107	23																																																																			

FLIGHT CREW COMMENTS AND RECOMMENDATIONS

FORMAT CD5

TAIL NUMBER		DATE		FRAG NUMBER	CAL. SIZE	IDENTIFICATION NUMBER	COMMENTS	SOURCE CODE		CARD CODES
DAY MO.		YEAR						78	79	80
27	23	04	65	4	2	28				RZ
				7	3	4				
				6	5	2				
				3	2	2				
				3	6	3				
				4	1	3				
				3	6	3				
				3	7	8				
				3	8	3				
				3	9	4				
				4	0	4				
				4	1	4				
				4	2	4				
				4	3	4				
				4	4	4				
				4	5	4				
				4	6	4				
				4	7	4				
				4	8	4				
				4	9	4				
				5	0	5				
				5	1	5				
				5	2	5				
				5	3	5				
				5	4	5				
				5	5	5				
				5	6	5				
				5	7	5				
				5	8	5				
				5	9	5				
				6	0	6				
				6	1	6				
				6	2	6				
				6	3	6				
				6	4	6				
				6	5	6				
				6	6	6				
				6	7	6				
				6	8	6				
				6	9	6				
				7	0	7				
				7	1	7				
				7	2	7				
				7	3	7				
				7	4	7				
				7	5	7				
				7	6	7				
				7	7	7				
				7	8	7				
				7	9	7				
				8	0	8				
				8	1	8				
				8	2	8				
				8	3	8				
				8	4	8				
				8	5	8				
				8	6	8				
				8	7	8				

DOA

FORMAT CD6

[illegible]

BATTLE DAMAGE ASSESSMENT REMARKS

FORMA⁺ CD7[illegible]

COMBAT DRAGON SUPPLY EDIT OUTPUT CARDS

DEMANDS, RECEIPTS, AND CANCELLATIONS: CD Form 401, 402, June 1967

STOCK NUMBER		QUANTITY		SUPPLY DOCUMENT NUMBER				TAIL NUMBER	EQUIPMENT TYPE	MAINTENANCE DOCUMENT NUMBER	WORK UNIT CODE	MISSION NUMBER		TIME IN DEMAND	AVAILABILITY	RECEIPT OR CANCEL		CODE																																																													
PS	FILE	ADDITIONAL	QUANTITY	INVENTORY	DATE	SERIAL NUMBER	DAY					MO	CDM			JULIAN DATE	CLOCK TIME																																																														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

FORMAT CD8

CANNIBALIZATION TAPE FORMAT

STOCK NUMBER		QUANTITY		SUPPLY DOCUMENT NUMBER				TAIL NUMBER	EQUIPMENT TYPE	TAIL NUMBER PART FROM	WORK UNIT CODE	MAINTENANCE REPORT NUMBER FOR TO AIRCRAFT	MAINTENANCE REPORT NUMBER FOR FROM AIRCRAFT	TIME IN MAINTENANCE CONTROL ACTION		CODE																																																															
PS	FILE	ADDITIONAL	QUANTITY	INVENTORY	DATE	SERIAL NUMBER	DAY							MO	CDM		JULIAN DATE	CLOCK TIME																																																													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

FORMAT CD9

MOBS: CD Form 403, June 1967

STOCK NUMBER		QUANTITY		PRELIMINARY DOCUMENT NUMBER				TAIL NUMBER	EQUIPMENT TYPE	WORK UNIT CODE	IN NOB	MOBS		CODE																																																																	
PS	FILE	ADDITIONAL	QUANTITY	INVENTORY	DATE	SERIAL NUMBER	JULIAN DATE					CLOCK TIME																																																																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

FORMAT CD10

COMBAT DRAGON SUPPLY EDIT INPUT CARDS

MEMORANDUM, RECEIPTS, AND CANCELLATIONS CLOSING 401, 402, June 1967

[illegible]

ANALYTICAL AND CATIONIC FORMAT

FORMAT CD12

[illegible]

Paul's C. Barnhart, June 1968.

FORMAT CD13

[illegible]

Appendix C

DESCRIPTION OF TAPES AVAILABLE

The Autocoder source and object programs described in this volume are available on tape and can be obtained by sending a request for the "RAND/TAC Program Package" to: The RAND Corporation, 1700 Main Street, Santa Monica, California, 90406, Attention--Program Librarian, Computer Sciences Department. The request should be accompanied by a 2400 foot reel of magnetic tape. Specify the desired track and tape density. If not specified, a 556BPI 7-track tape will be returned. Appropriate information for retrieving the program decks from the tape file will also be furnished.

The following is a complete list of the RAND/TAC programs cataloged on the tape:

RT001	Maintenance, Operations, AGE and Manpower Data Edit
RT002	Daily Tail Number and Work Center Displays
RT003	Compute Elapsed Time
RT004	Single/First/Last Sortie
RT005	Recombine
RT006	Frequency Counter
RT007	Clint (generate 7 and 8 cards)
RT008	Clint (generate 9 cards)
RT009	Recovery Histogram
RT010	Hourly Frequency Accumulate and Select
RT011	Manpower Utilization
RT012	Analysis of Variance
RT013	Chi-square
RT014	Correlation Matrix
RT015	AGE Display
RT016	Deviation-Degradation
RT017	Form 305 Generator
RT018	Manpower Matrix
A9001	Combat Dragon Operations Edit
D9001	Combat Dragon Supply Edit

DOCUMENT CONTROL DATA

1. ORIGINATING ACTIVITY THE RAND CORPORATION		2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	
		2b. GROUP	
3. REPORT TITLE THE RAND/TAC INFORMATION AND ANALYSIS SYSTEM: VOLUME IV--THE SYSTEM SOFTWARE			
4. AUTHOR(S) (Last name, first name, initial) Finnegan, Fred and Anders Sweetland			
5. REPORT DATE January 1969		6a. TOTAL No. OF PAGES 130	
		6b. No. OF REFS. ---	
7. CONTRACT OR GRANT No. F44620-67-C-0045		8. ORIGINATOR'S REPORT No. RM-5669-PR	
9a. AVAILABILITY/LIMITATION NOTICES DDC-1		9b. SPONSORING AGENCY United States Air Force Project RAND	
10. ABSTRACT A description of the Rand/Tactical Air Command system for the collection, processing, and analysis of data, as implemented on an IBM 1401 computer, in the management and evaluation of aircraft operations and support at base level. The fourth volume in the series documenting the system presents the eighteen computer programs written for the system, with detailed outlines of the purpose, method, operation, program setup, and sample printout of each of the programs. The descriptions are intended to assist the programmer to identify procedures and in general to understand the analyst's intent, as reflected by the functions of the programs. Companion volumes in the series are Vol. I: <u>Data Collecting and Editing</u> (RM-5666-PR); Vol. II: <u>The Analysis Programs and Procedures</u> (RM-5667-PR); and Vol. III: <u>The Analysis Design and Methods</u> (RM-5668-PR).		11. KEY WORDS Aircraft Tactical Air Command (TAC) Operations analysis Maintenance Materials Information systems Information processing Evaluation methods Rand/TAC Information and Analysis System	