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NASA TECHNICAL MEMORANDUM

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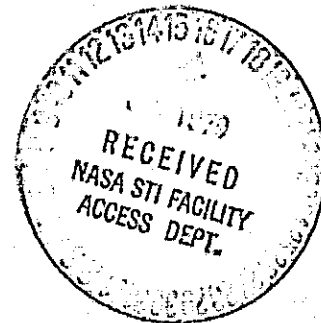
SCATS - SRB COST ACCOUNTING AND TRACKING SYSTEM HANDBOOK

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NASA



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FOREWORD

This system creates a management report reflecting "Weekly Shuttle Changes" and updates a master file data base. In addition, a special report can be produced from the master file data base for a specified time period.

The Weekly Shuttle Changes report is produced from transactions supplied by the system user. This process contains three functions. The first function performs a sort on Level, PCIN, and ECP/ECR. The second function is an edit process that searches for specific criteria in each transaction. The third function uses accepted transactions (see Appendix D, Figure D-2) to insert, modify, or delete records from the cumulative master file data base.

The special report program provides the capability of producing a selective data base listing (see Appendix C, Figure C-4). This function is accomplished through the use of parameter cards (see Appendix D, Figure D-3) permitting the selection range of a given time period.

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SCATS – SRB COST ACCOUNTING AND TRACKING SYSTEM HANDBOOK

INTRODUCTION AND BACKGROUND

As part of the assessment of Space Shuttle Solid Rocket Booster (SRB) changes, it is the practice of the Systems Analysis and Integration Laboratory of Marshall Space Flight Center (MSFC) to produce independent government estimates of Level II, III, and IV changes. These government estimates are used for the following purposes:

- 1) As an input to change boards.
- 2) To support negotiations.
- 3) To provide management with periodic reports that show the type, level, and cost magnitude of changes; and the weekly and semiannual flow of changes.

In mid-1977, it was recognized that the volume of Shuttle SRB Level II, III, and IV changes were going to be substantial, and that an automatic data processing system would be needed to provide weekly and semiannual cost summations and listing of changes. It was also envisioned that, eventually, graphic plots of numbers, types, and costs of changes would be needed to provide management with trend information from which to project anticipated change budgeting and change workload.

Basic features of the SRB Cost Accounting and Tracking System (SCATS) are:

- 1) A simplified run deck (Fig. 1).
- 2) Output reports of weekly changes and error listings (see Appendix C, Figs. C-2 and C-3).
- 3) A detailed "edit" procedure designed to identify and reduce, or eliminate input errors.

The SCATS system in the Marshall Information Retrieval and Display System (MIRADS) format is efficient from the standpoint of computer utilization (approximately 3 minutes of process time per run). A report processed on prime shift requires approximately 20 minutes elapsed time.

```
@RUN          3006AA,1HEL02D3006L,SCATSXBIN201,10,100
@ASG,T        INSCAT,F/1/POS/2
@ASG,TE       TXIN,30/////BCD,REEL NUMBER
@SYS$MSFC$.COPYMK TXIN.,INSCAT.
@ASG,T        SCATSTP,U9S,REEL NUMBER
@XQT         MIR*ADS.ASGFILS
STANDARD
@COPY,G       SCATSTP.,DIC.
@COPY,G       SCATSTP.,SAV.
@ADD          SAV.BUILDANDSAVE
@FIN
```

Figure 1. SCATS edit/update program run stream.

The SCATS system is written in American Standard Code for Information Interchange (ASCII) COBOL programming language for execution on a UNIVAC 1108 computer under the EXEC 8 Operating System. The minimum hardware configuration required for processing the SCATS system is one central processor, one card reader, two tape drives, disk mass-storage unit, and an on-line printer.

This handbook has been prepared to facilitate those not familiar with the SCATS system or with detailed automatic data processing techniques. Therefore, an attempt has been made to explain and be specific in all areas where actions are required to implement and activate the system.

CHANGE ESTIMATING PROCEDURE FOR SCATS SYSTEM

The Cost Analysis Office requested and is receiving copies of Change Control Board Directives (CCBD's), Engineering Change Requests (ECR's), Engineering Change Proposals (ECP's), and SRB Change Evaluations (see Appendix B, Fig. B-2 through B-5) for subsystems and projects within the Space Shuttle SRB project. The following types of changes are reviewed for cost impact and/or estimates:

1) Level II Changes — These are changes affecting more than one major Space Shuttle element (i.e., Shuttle Orbiter and SRB).

2) Level III Changes — These are changes affecting more than one SRB subsystem (i.e., Recovery System and Solid Rocket Motor).

3) Level IV Changes — These are changes made within an SRB subsystem that do not affect other SRB systems (i.e., change in tube-bend radii in TVC subsystem).

The methodology employed in developing government cost estimates for changes is the "ROUND-TABLE" or "DIRECT" estimating methodology. When it has been decided that the change has no cost impact or has a cost, the description of the change, its identifying numbers, and the estimated cost is entered on a "Key-To-Disk" Transaction Input Form (see Appendix B, Fig. B-1).

Information contained in Appendix B on MSFC Forms 2312 and 2327 addresses Engineering Changes that are required to be made on the SRB and the External Tank (ET). Only the cost of changes made to the SRB are presently being tracked on the SCAT system.

Form 2312, entitled Marshall Space Flight Center Control Board Directive, is issued for approving or disapproving the ECR. This CCBD assigns actions relative to change implementation. Information extracted from this form for use in the SCAT system is as follows:

- 1) Level of engineering change.
- 2) Program Change Identification Number (PCIN).
- 3) Title of engineering change.
- 4) Effectivity (used in estimating only).

Form 2327, entitled MSFC Engineering Change Request, is issued to describe the proposed Engineering Change. This change could affect hardware and documentation or documentation only. The ECR precedes the CCBD and is used in the review and evaluation of contractor-submitted Rough Order or Magnitude (ROM) Cost Proposal and/or in preparing a detailed Government Cost Estimate.

Form 516, entitled Solid Rocket Booster Project Change Evaluation, is submitted by each of the Engineering Change Evaluators and lists impacts and/or recommendations to the proposed change.

Form 2348, entitled MSFC Engineering Change Proposal, is issued to describe MSFC contractor's proposed Engineering Change. This change could affect hardware and documentation or documentation only. The ECP also precedes the MSFC-prepared CCBD and is used in the review and evaluation of contractor-submitted ROM Cost Proposal and/or in preparing a detailed Government Cost Estimate.

The estimated cost of Level II, III, and IV SRB Engineering Changes does not include MSFC man-hour cost. The estimated cost does, however, include cost of Engineering Changes made to SRB Ground Support Equipment (GSE) and also cost of new GSE that may be incurred as a result of changes made to the SRB flight hardware.

Input sheets for each week are supplied to the Key punch Facility in Building 4485 by close of business each Tuesday. After processing the SCATS edit/update run on Wednesday, the completed report is picked up from the computer facility prior to 11:00 a.m. each Thursday for inclusion in weekly notes to the Systems Analysis and Integration (SA&I) Laboratory Director. A semiannual report is compiled and made available to the SA&I Laboratory Director and the SRB Chief Engineer.

DESCRIPTION OF SCATS PROGRAM

Basic Operations

Figure 2 illustrates the general flow of the SRB Cost Accounting and Tracking System for the edit/update program which includes the necessary inputs to the system, the computer program phase of data manipulation, and the various reports generated by the system in the course of the computer run.

The purpose of the SCATS system is to list, retain, update, and report changes and their estimated costs.

1. Maintains a Data Base of SRB Changes. This data base is updated weekly and includes the following:

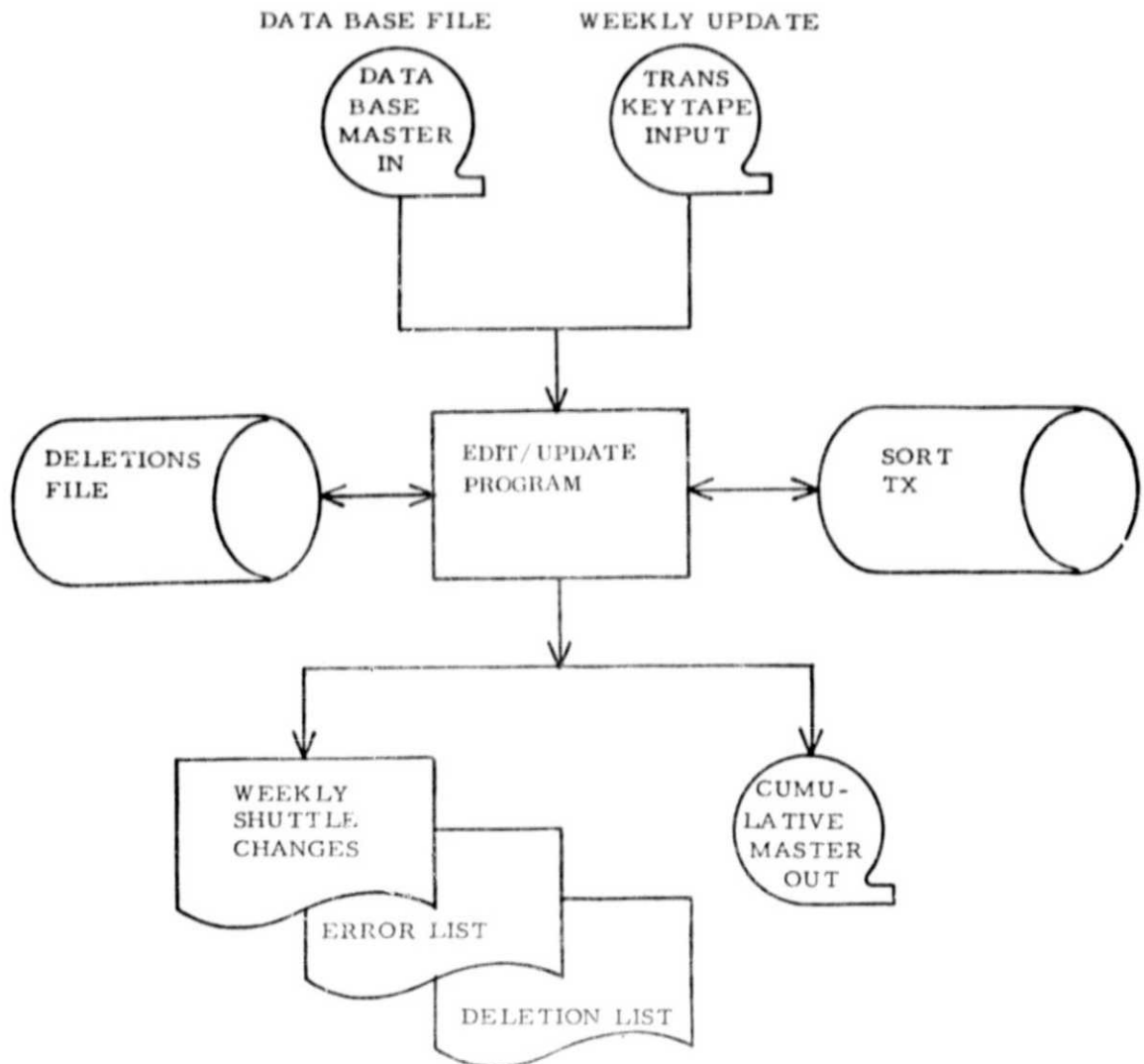


Figure 2. Flow chart of SCATS weekly edit/update.

- a) Level of Change: (Levels II, III, or IV)
- b) PCIN Number: The PCIN number is assigned by the Configuration Control Board and is a means of controlling and tracking engineering changes.
- c) ECR/ECP Numbers: An ECR is normally initiated by in-house organizations. An ECP is normally initiated by a contractor organization. One PCIN may contain multiples of ECR/ECP's.

d) **CCBD Number:** The directive approves or disapproves a change and assigns action relative to change implementation. Usually, a CCBD will approve only one PCIN. (See Appendix B, Figure B-4.)

e) **Description of Change (Title):** This is a narrative description of the change which can be up to 73 characters long.

f) **Government Estimated Cost:** This cost is arrived at by preparing a detailed government cost estimate and/or by a review and evaluation of contractor-submitted ROM Cost Proposal. In those instances where there are more than one ECP/ECR's against the same PCIN, a total cost for that PCIN is listed in the special report printout. This capability is not included in the weekly report because multiple ECP/ECR's under the same PCIN are seldom encountered on a weekly basis.

g) Space is available in the data base for entry of proposed costs, negotiated costs, and the dates of inputs of these costs.

h) The date of the government estimated cost is also included in the data base.

2. **Permits a Data Base Update.** The SRB Cost Accounting and Tracking System is programmed so that a change to the data base may be made any time.

a) A single PCIN ECP number and its associated information can be deleted from the data base if so desired.

b) Modifications can be made to the title, government estimated cost, CCBD number, proposed cost, negotiated cost, and related dates for any change record.

c) The level can be changed by deletion and reentry of a record as can the ECP/ECR numbers.

d) Inserts to the data base can be added at any time, and need not be inserted weekly (but would not show up on weekly report).

3. **Provides Various Types of Reports (Outputs).**

a) Permits weekly additions to data base and simultaneous printout of those entries in a weekly report.

b) Will provide a printout of all ECP/ECR's processed since program was first established (complete data base printout).

c) Provides printout of all changes between a specified start date and a specified end date.

4. Report Process. During the reporting process, the program:

a) Scans the data base.

b) Collects all changes in three categories (Levels II, III, and IV).

c) Adds dollar figures of all ECP's or ECR's within a PCIN to a total PCIN value (applicable to 3.b) and 3.c) above).

d) Adds all PCIN's within a level to give a "Level" total.

e) Adds "Level" totals to provide a grand total.

5. Error Listing. During the weekly input process, an error-listing that includes error messages (see Appendix A) is provided which automatically excludes any PCIN/ECP/ECR numbers which have previously been entered (unless entered as a modification).

Figure 3 illustrates the general flow of the SCATS Requested Reports program run. Figure 4 illustrates each report type.

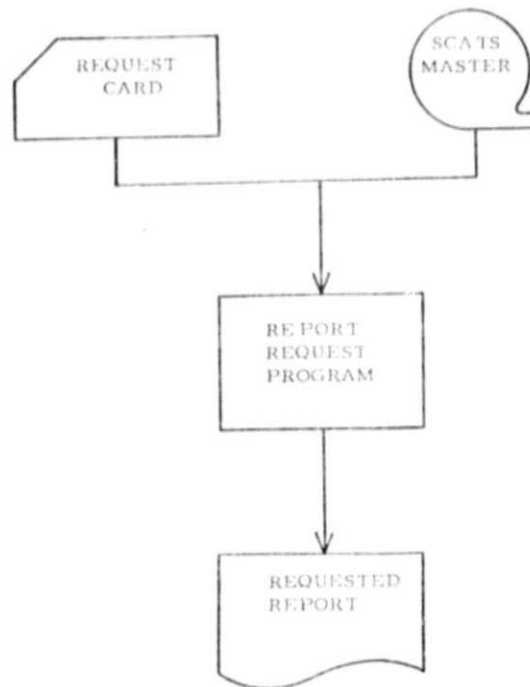


Figure 3. Flow chart of SCATS special request program.

1. Report of Shuttle Changes, entire data base.
2. Report of Shuttle Changes, starting YYMMDD by Government Estimated Date.
3. Report of Shuttle Changes, Starting YYMMDD by Batch Date.
4. Report of Shuttle Changes, through YYMMDD by Government Estimated Date.
5. Report of Shuttle Changes, through YYMMDD by Batch Date.
6. Report of Shuttle Changes, from YYMMDD to YYMMDD by Government Estimated Date.
7. Report of Shuttle Changes, from YYMMDD to YYMMDD by Batch Date.

Note: YYMMDD is a designator of the form of input cards used to extract a report from the data base. (year/month/day, i.e., 780930 is 78 September 30)

Figure 4. Requested report types.

1. Update Program, Input. Pertinent information originating on MSFC Forms 2327 (ECR), 2312 (CCBD), 2348 (ECP), and 516 (SRB Project Change Evaluation) is extracted and entered by the Cost Analysis Office to the Key-to-Disk Transaction Input Form (to be punched) and used as input data for the SCATS run. (An example of these forms is shown in Appendix B, Fig. B-1, B-2, B-3, and B-4.)

2. Update Program, Editing Phase. The editing phase ensures that the inputs conform to the specified requirements of the different types. All transactions with input errors are printed on the Error Report along with a diagnostic message (see Appendix A).

3. Update Program, Update Phase. As the transactions flow through the logic of the system, they are passed against the Master File data base based upon the Activity Code of D (Delete), I (Insert), or M (Modify).

4. Update Program, Report Phase. The data produced by the updating and editing phases comprise the inputs to the report phase. The reports are formatted and printed as (a) Weekly Report of Shuttle Changes and (b) Weekly Report of Shuttle Changes Error Transactions.

5. Request Program, Input. Parameter card and the current Master File data base (see Appendix D, Fig. D-3).

General Information for Processing Input Transaction Types

1. Insert Transaction Types. The following are insert transaction types:

a) All input information must pass the edit portion of the program before being sequentially inserted on the Master File data base.

b) New records inserted into the existing data base will have the current "BATCH DATE."

c) Two or more input transactions with the same Level, PCIN, ECP/ECR, and Activity Code must not be submitted within the same run. One transaction will be accepted while the other will be rejected. (This type action may result in the wrong transaction being accepted and would be reflected on the error list.)

d) A record that matches Level, PCIN, and ECP/ECR contained on the Master File data base will be rejected as a duplicate.

e) A record that has just been inserted may not be modified within the same run update.

f) A record may be deleted and a new record inserted with the same Level, PCIN, and ECP/ECR within the same run update.

g) Inserted records will be reported on the Weekly Report of Shuttle Changes (e.g., see Appendix C, Fig. C-1(d)).

2. Delete Transaction Types. The following are delete transaction types:

a) A record must currently exist on the Master File data base to be deleted.

b) To encode a "DELETE" transaction, the Level, PCIN, ECP/ECR, and the Activity Code must be filled in on the Key-to-Disk Transaction Input Forms.

c) Any transaction deleted within the weekly update run will be listed on the last page of the error report (e.g., see Appendix C, Fig. C-3).

d) A record may be deleted and a new record inserted with the same Level, PCIN, and ECP/ECR within the same run update.

3. Modification Types. The following are modification types:

a) Two or more input transactions with the same Level, PCIN, ECP/ECR, and Activity Code must not be submitted within the same run. One transaction will be accepted while the other will be rejected. (This type action may result in the wrong transaction being accepted and would be reflected on the error list.)

b) A record must exist on the data base before it may be modified.

c) A "MODIFY" record will overlay the existing data with new data replacing the original.

d) Modification to a record will change the existing "BATCH DATE" to the "CURRENT BATCH DATE."

e) A modification that reflects a change in the Government Estimated Cost is shown on the Weekly Report of Shuttle Changes reflecting the increase or decrease of the transaction. The line following shows the value before and after the change.

f) An "*" appearing on the Weekly Report of Shuttle Changes preceding the "Level" indicates the record was a modification without any change to the Government Estimated Cost. The amount printed will be zero (see copy of report, Appendix C, Fig. C-1).

Input Preparation for Weekly Edit/Update Run

The Cost Analysis Office codes the changes occurring for the week on the "Key-to-Disk Transaction Form" (see Appendix B, Fig. B-1) in the following format.

CARD 1

<u>Columns</u>	<u>Item</u>	<u>Content</u>
1	Level	Must be 1, 2, 3, or 4.
2-6	PCIN Number	5 digits, alphanumeric.
7-15	Engineering Change Request	9 alphanumeric characters.
16	Activity Code	D = Delete I = Insert M = Modify.
17	Card Code	Must be 1.
18-28	Change Control Board Directive	11 alphanumeric characters.
29-38	Government Estimated Cost	Must contain at least one numeric character, right justified. If cost is negative, a "-" is placed in column 29.
39-44	Government Estimated Date	6 digits, numeric (MMDDYY)*.
45-54	Proposed Estimated Cost	Must contain at least one numeric character, right justified. If cost is negative, a "-" is placed in column 45.
55-60	Proposed Estimated Date	6 digits, numeric (MMDDYY)*.
61-70	Negotiated Value	Must contain at least one numeric character, right justified. If cost is negative, a "-" is placed in column 61.
71-76	Negotiated Date	6 digits, numeric (MMDDYY)*.
77-125	Not Used	

* "MMDDYY" is a designation of MM = month, DD = day, and YY = year, i.e., 010279.

CARD 2

<u>Columns</u>	<u>Item</u>	<u>Content</u>
1	Level	Must be the same as Card 1.
2-6	PCIN Number	Must be the same as Card 1.
7-15	Engineering Change Request	Must be the same as Card 1.
16	Activity Code	Must be the same as Card 1.
17	Card Code	Must be 2.
18-90	Nomenclature	73 free form characters.
91-125	Not Used	

Each copy of the transaction input form is delivered to the Key punch Department. Upon keypunch completion, the keytape is sent to Production Control for submittal to the edit/update program. The edit/update run is prepared per set-up instructions (for run stream see Fig. 1). Upon run completion, the output listings are returned to the programmer for distribution.

Editing of Transaction Input Data

To improve the reliability and validity of the transaction input data before it becomes an integral part of the permanent data base, it is a policy of good automatic data processing practices to provide accuracy tests in the early flow of processing, which is commonly referred to as "EDITING." The editing procedures executed within the SCATS system are accomplished during the first phase of the execution flow. This phase includes sorting, sequencing, formatting, and validating input transactions for sequential updating of the Master File data base.

When a data error is detected in an input transaction, an image of the transaction is printed on an error listing accompanied by a message with asterisks printed under each card column which is in error. Any transaction shown on the error listing report will not affect the data base and may be resubmitted with the next update run (refer to Appendix A for a listing of transaction error messages).

Special Request Report Parameter Card Format/ Instructions

<u>Column</u>	<u>Item</u>	<u>Content</u>
1-6	Ending Date	Numeric, formatted in year, month, day sequence (i.e., 780630 or blank)
7	Not Used	Blank
8-13	Starting Date	Numeric, formatted in year, month, day sequence or blank
14	Type Report	One character (G or space), G indicates the report is to be printed by the Government Estimated Date. A space generates a report keyed on the Batch Date.

By using the preceding card, the user may request and receive a selected or complete report of records on the data base master file. Figure 4 shows the requested report types and Figure 5 shows the placement of data cards in run deck.

Future Enhancements

Future enhancements envision a graphics output capability allowing the plotting of the number of Level II, III, and IV changes (and total) which have been reviewed within a specified calendar period, the costs of changes reviewed within a specified calendar period, or both. This capability would provide management with trend information from which to project anticipated Change Budgeting and Change Workload and would provide data that would be helpful in predicting change traffic for future programs.

```

@RUN          3006AB,1HEL02D3006L,SCATSXBIN431,15,1000
@ASG,T        SCATSTP,U9S,REEL  NUMBER
@XQT          MIR*ADS.ASGFILS
STANDARD
@COPY,G       SCATSTP.,DIC.
@COPY,G       SCATSTP.,SAV.
@ASG,T        OLDMAS,F/10/POS/20
@COPY,G       SCATSTP.,OLDMAS.
@FREE         SCATSTP.
@DELETE,C     3006AB01P01
@ASG,CP       3006AB01P01,F/1/POS/10
@XQT          SAV.REPORT
**PARAMETER CARD**
@PMD,E
@FREE         3006AB01P01
@SYM          3006A301P01,,MHSP
@FIN

```

Figure 5. SCATS special request program run stream.

APPENDIX A
ERROR MESSAGES

LISTING OF ERROR MESSAGES AND THEIR CAUSE

<u>Error Message</u>	<u>Displayed Under the Following Conditions</u>
Level not 1, 2, 3, or 4	During the edit process when a character other than 1, 2, 3, or 4 is punched in the first position of the transaction record.
PCN/PCIN in error	During the edit process when columns 2 through 6 contain all spaces.
ECR/ECP in error	During the edit process when columns 7 through 15 contain all spaces.
CCBD-NO in error	During the edit process when columns 18 through 28 contain all spaces.
Government Estimated Cost not numeric	During the edit process when columns 29 through 38 contain all spaces. Must contain at least one numeric character.
Government Estimated Data in error	During the edit process when the month is not 01 thru 12, or the day of the month is not 01 through 31, or when the year is not greater than 77.
Proposed Estimated Cost not numeric	During the edit process when columns 45 through 54 do not contain at least one numeric character.
Proposed Estimated Data in error	During the edit process when columns 56 through 60 do not meet the same criteria as established for Government Estimated Date.
Negotiated Value not numeric	During the edit process when columns 61 through 70 do not contain at least one numeric character.
Negotiated Date in error	During the edit process when columns 71 through 76 do not meet the criteria as established for Government Estimated Date.

Error Messages

Displayed Under the Following Conditions

Card code 1 error

During the edit process when creating a new record and the incoming transaction does not contain a card code of 1 in column 17.

Card code 2 error

During the edit process when building a new record and the card code 1 has been accepted but the succeeding card does not contain a card code of 2 in column 17.

Activity code not D, I, or M

Occurs during the edit process: transaction is rejected if column 16 does not contain one of the following transaction codes (I = Insert, D = Delete, or M = Modify).

Card code not 1 or 2

During the edit process when the input transaction card code contains something other than 1 or 2 in column 17.

Card 2 missing

During the edit process when card code 1 was accepted and card code 2 was not present.

Level, PCN or ECP mismatch

During the edit process where Level, PCN or ECP of card code 2 does not match the same fields of card code 1.

Activity codes do not match

During the edit process where the activity codes in card codes 1 and 2 do not match.

Cannot insert, on master

Occurs during the update process while trying to add a record that is already established on the master.

Modify error, not on master

Occurs during the update process — a modification transaction is being processed for a record that is not established on the data base.

Error Messages

Displayed Under the Following Conditions

Cannot delete, not on master

Occurs during the update process — trying to delete a record not established on the master data base file.

NOTE: Any transaction producing errors does not affect the data base.

APPENDIX B

WORK SHEETS

SCATS

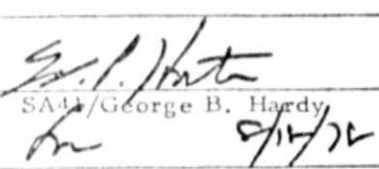
COMPUTER INPUT AND WORK SHEET										DATE:	PAGE NO.
SCATS										PREPARED BY:	
PCIN /PCN	ECR/ECP NUMBER	A/C T/D	CCBD NUMBER	GOVERNMENT ESTIMATED COST	GOVT ESTIM'D DATE	PROPOSED ESTIMATED COST	PROPOSED ESTIMATED DATE	NEGOTIATED VALUE	NEGOT'D DATE		
		C/C D/D								X	
		1									
		A/C T/D	NOMENCLATURE								
		C/C D/D								X	
		2									
		A/C T/D	NOMENCLATURE								
		C/C D/D								X	
		1									
		A/C T/D	NOMENCLATURE								
		C/C D/D								X	
		2									
		A/C T/D	NOMENCLATURE								
		C/C D/D								X	
		1									
		A/C T/D	NOMENCLATURE								
		C/C D/D								X	
		2									

1. NUMBER: EC14-0802	2. FCN: 17861	MSFC ENGINEERING CHANGE REQUEST <i>(See Instructions on reverse)</i>	3. DATE: 8/1/78	4. PAGE: 1 OF 1	
5. TO: A41/George B. Hardy	6. THRU: EE11/Mr. Horton	7. FROM: EC14/S. F. Boyle			
8. TITLE OF CHANGE: Add Series Regulator to the SRB & ET Range Safety Distributors					
9. RECOMMENDED PRIORITY: <input type="checkbox"/> Emergency <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> Routine			10. NEED DATE:		
11. PROGRAM(S)/PROJECT(S) AFFECTED: SRB and ET Range Safety System			12. END ITEM(S) AFFECTED BY NOMENCLATURE: SRB and ET		
13. RECOMMENDED EFFECTIVITY: All			14. BASELINE DOCUMENTATION AFFECTED (Specs, ICD, etc.): SRB R. S. Distributor 16A10310-1 ET R. S. Distributor 16A10625-1 and related drawings.		
15. RELATED CHANGES (ECR, ECP, CR, etc.) BY NUMBER: ECR#EC14 - 0615, CCBD SB3 - 00 - 2290 FCIN 17861					
16. JUSTIFICATION FOR CHANGE (Include effect if not incorporated) (if necessary, continue on MSFC - Form 2327-1, continuation sheet): The shunt regulator approved on CCBD SB3-00-2290 causes checkout constraints that are undesirable. In addition the series regulator will dissipate less power.					
17. EFFECTS ON: <input checked="" type="checkbox"/> Hardware <input type="checkbox"/> Facility <input type="checkbox"/> Schedule (See Enclosure _____ for impact) <input type="checkbox"/> Other (Specify) <input type="checkbox"/> Software <input checked="" type="checkbox"/> Requirements Documentation <input type="checkbox"/> Cost (Estimated cost included in Enclosure _____)					
18. DESCRIPTION OF CHANGE (Include reference to enclosures) (if necessary, continue on MSFC - Form 2327-1, continuation sheet): Add series regulators to both R. S. Distributors (one for SRB and two for ET) in lieu of shunt regulators.					
19. SIGNATURE OF ORIGINATOR: S. F. Boyle <i>S.F. Boyle</i>		DATE: 8-2-78	TELEPHONE NUMBER: 453-4468	OFFICE SYMBOL: EC14	
20. CONCURRENCE					
SIGNATURE & ORGANIZATION		DATE	SIGNATURE & ORGANIZATION		DATE
<i>Joe H. Benson</i> EC14		8/2/78			
<i>James B. Stutz</i> EC14		8/2/78			
21. TECHNICAL APPROVAL					
SIGNATURE & ORGANIZATION		DATE	SIGNATURE & ORGANIZATION		DATE

MSFC - Form 2327 (Rev. March 1974)

FIGURE B-2

**MARSHALL SPACE FLIGHT CENTER
CONFIGURATION CONTROL BOARD DIRECTIVE**

1. CCB NO. SB3-00-2421		2. CONFIGURATION CONTROL BOARD SRB LEVEL III		3. DATE 08-18-78	
4. CHANGE NO. EC14-0802				5. PAGE 1 of 2	
6. PROGRAM CONTROL NO. 17861		7. RESPONSIBLE INDIVIDUAL(S)/ORGANIZATION(S) EL42/J. A. Roach			
8. CHANGE TITLE: Add Series Regulator to the SRB and ET Range Safety Distributors			9. END ITEM NUMBER AND NOMENCLATURE: SRB and ET		
10. EFFECTIVITY: A07 thru A18, A27, A28, A30 A37 ZA31 (ET)			11. BASELINE DOCUMENTATION AFFECTED (Specs., ICOS., ET. I): 16A10241 16A10625-1 ET RS Distributor 16A10302 16A10622 16A10310-1 SRB RS Distributor		
12. CHANGE DISPOSITION: <p align="center"><u>HARDWARE CHANGE</u></p> <p>1. This CCB cancels and supersedes CCB No. SB3-00-2290 and disapproves ECR No. EC14-0615.</p> <p>2. ECR EC14-0802 is approved with the following change: Add drawing numbers 16A10241, 16A10302, and 16A10622 to block 11 entitled "Baseline Documentation Affected." NOTE: All other information specified in this block shall remain as it is presently called out.</p> <p>3. EC14/S. Boyle shall release the following documentation to the MSFC Repository via EL55/C. Martin.</p> <p>a. 16A10310-Rev. E</p> <p>b. 16A10625-Rev. J</p> <p>c. 16A10302-Rev. E</p> <p>d. 16A10622-Rev. C</p> <p>Due date: September 28, 1978</p> <p>4. Upon completion of the action specified in item 3, EC14/S. Boyle shall submit an ECR to identify "related drawings" which are effected by the approval of ECR EC14-0802, but are not identified in item 3. Due date: September 29, 1978</p> <p>5. EC14/J. Lewis shall release drawing no. 16A10241-Rev. E to the MSFC Repository via EL55/C. Martin. Due date: September 28, 1978</p> <p>6. EC14/S. Boyle shall take the necessary action to ensure that documentation, as indicated above in items 3 and 5, is imposed on Bendix upon receipt from the MSFC Repository. NOTE: A copy of the RCA shall be provided to EE11/J. Robinson to close this action. Due date: October 13, 1978</p>					
13. CCB MEMBERS		CONCUR		14. CCB CHAIRMAN	
		YES NO			
EC14/J. Stulting				 SA42/George B. Hardy 8/14/78	
EC11/P. Aden					
EC14/E. Beck					

**MARSHALL SPACE FLIGHT CENTER
CCB DIRECTIVE - DATA AMPLIFICATION SHEET**

1. CCB NO.: SB3-00-2421	2. CCB: EC14-0802	3. PCN: 17861	4. PAGE 2 OF 2
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12. CHANGE DISPOSITION - Continued (Refer to Item Number and Title Block on CCB Form):

7. SA43/J. Igou shall direct USBI to review the Range Safety Systems Documentation and incorporate as required, those requirements depicted by drawing numbers: 16A10310-Rev. E, 16A10625-Rev. J, 16A10302-Rev. E, 16A10622-Rev. O, and 16A10241-Rev. E. If the 30A90506 document requires update as a result of requirements depicted in the above drawings, USBI shall submit an ECR (no SCITTING required). A copy of Mr. Igou's contractual direction shall be provided to EE11/J. Robinson. Due date: 10-13-78

8. All future correspondence shall reference PCIN 17861

1	NAME OF CONTRACTOR:		MARSHALL SPACE FLIGHT CENTER ENGINEERING CHANGE PROPOSAL		PCN:	DATE:
	PAGE 1 OF					
ECP DESIGNATION						
2	CONTRACT END ITEM NO.:	MFG CODE	SYS. DESIGNATION	ECP NO.:	SUI FIX:	REV.:
3	RECOMMENDED PRIORITY: <input type="checkbox"/> Emergency <input type="checkbox"/> Urgent <input type="checkbox"/> Routine					
4	CONTRACT NO.:	CEI NOMENCLATURE:	PART OR LOWEST ASSEMBLY AFFECTED			
			PART NO. OR TYPE DESIG.:	NAME:		
5	TITLE OF CHANGE:					
6	JUSTIFICATION FOR CHANGE (include consequence if not incorporated):					
	<p>REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR</p> <input type="checkbox"/> Requested <input type="checkbox"/> Directed by Procuring Activity per Ref: _____					
7	DESCRIPTION OF CHANGE (Alternate solutions included <input type="checkbox"/> Yes <input type="checkbox"/> No):					
8	CHANGE CATEGORY: _____					
	DATE BY WHICH CONTRACTUAL AUTHORITY IS NEEDED:					
EFFECTIVITY AND MANDATORY CHANGE PERIODS FOR INCORPORATION:						
9	VEHICLE/SITE & CEI SERIAL NO.	CHANGE PERIOD	MOD. KIT DELIVERY DATE	EST. M/H FOR MOD. KIT INSTL.	OUT-OF-SERVICE TIME	
YES NO					ENCL. PARA.	
<input type="checkbox"/> <input type="checkbox"/> Previously issued modification instructions affected (Explain)					_____	
<input type="checkbox"/> <input type="checkbox"/> Proofing of modification instructions and kit installation required (Explain)					_____	
Proofing location: _____					_____	
<input type="checkbox"/> <input type="checkbox"/> Retest required (Identify test invalidated by change)					_____	
<input type="checkbox"/> <input type="checkbox"/> Requalification required (Include description of test plan for requalification)					_____	

MSFC - Form 2348 (Rev. February 1974)

FIGURE B-4

PCIN	SRB PROJECT CHANGE EVALUATION	PAGE ____ OF ____
CHG. NO.		OFFICE
TITLE		
CHANGE IMPACTS:		
<input type="checkbox"/> SAFETY <input type="checkbox"/> PERFORMANCE <input type="checkbox"/> RELIABILITY <input type="checkbox"/> MAINTAINABILITY <input type="checkbox"/> PRODUCIBILITY	<input type="checkbox"/> GSE <input type="checkbox"/> SPARES <input type="checkbox"/> FACILITIES <input type="checkbox"/> FLIGHT OPERATIONS <input type="checkbox"/> GROUND OPERATIONS	<input type="checkbox"/> SOFTWARE <input type="checkbox"/> TEST <input type="checkbox"/> TURNAROUND <input type="checkbox"/> ICD'S <input type="checkbox"/> OTHER (SPECIFY)
WEIGHT IMPACT:	SCHEDULE IMPACT:	COST PER FLIGHT IMPACT:
RDT&E COST IMPACT:	FY	FY
	FY	FY
	REMAINDER	TOTAL
EXISTING HARDWARE REWORK REQUIRED? YES <input type="checkbox"/> NO <input type="checkbox"/> . IF YES, ARE DELIVERED ARTICLES AFFECTED? YES <input type="checkbox"/> NO <input type="checkbox"/> . ATTACH BRIEF DESCRIPTION OF REQUIRED REWORK UNLESS APPARENT IN CHANGE PROPOSAL.		
ACTION REQUIRED OF YOU IF CHANGE IS APPROVED:		
1. CONTRACT CHANGES (IDENTIFY): _____ _____		
2. DOCUMENTATION (SPECS., DWGS., DRL/EPL'S, ETC.) CHANGES (IDENTIFY): _____ _____ _____ _____		
3. OTHER: _____ _____ _____		
RECOMMENDATION: <input type="checkbox"/> NOT APPLICABLE TO THIS OFFICE <input type="checkbox"/> ACCEPTABLE AS WRITTEN <input type="checkbox"/> ACCEPTABLE WITH CHANGES (DESCRIBE CHANGES BELOW) <input type="checkbox"/> UNACCEPTABLE (STATE REASONS BELOW)		
_____ _____ _____ _____ _____		
SIGNATURE _____	PHONE _____	DATE _____

FIGURE B-5

MSP Form 516 (Rev. September 1978)

APPENDIX C

REPORTS

- A. Weekly Reports
 - 1. Weekly Report of Shuttle Changes.
 - 2. Error Transactions.
- B. Special Request Reports.

EXPLANATION FOR
WEEKLY REPORT OF SHUTTLE CHANGES**

- A. DATE — This date is the Current Date and also the Batch Date within the data base record. The format for the record has been changed to YYMMDD sequence (780614).
- B. An "***" appearing before the Level indicates the record was a modification without any change to the Government Estimated Cost. The dollar amount printed should be zero.
- C. Modifications that reflect a change in the Government Estimated Cost. The printed value reflects the INCREASE or DECREASE of the transaction. The line following shows the value before and after the change.
- D. Indicates a record that was inserted in the data base master file.
- E. Indicates a Level sub-total.
- F. Indicates a Grand Total of the "Changes" for the current update.

** See attached report.

TRANSACTION IMAGE	780606	200011ECP-123	31
LEVEL NOT 1 2 3 OR 4	780606	200011ECP-123	31
CARD 2 MISSING	780606	200011ECP-123	31
ACTIVITY CODES DO NOT MATCH	780606	200011ECP-123	31
203557503576 SB3-00-2096+00000000051278+000000000	780606	200011ECP-123	31
CANNOT INSERT ALREADY ON MAST	780606	200011ECP-123	31
203557503576 SB3-00-2096	780606	200011ECP-123	31
CARD 2 MISSING	780606	200011ECP-123	31
203557503576 M2ADD PROT FAIRING AT ET/SRB TOP STRUT + FITTING + CLOSEOUT TBDS. IRN 0033	780606	200011ECP-123	31
CARD CODE 1 ERROR	780606	200011ECP-123	31
204374504374 SB3-00-2104+00000000051278+000000000	780606	200011ECP-123	31
CANNOT INSERT ALREADY ON MAST	780606	200011ECP-123	31
204451504451 SB3-00-2110+00000000051278+000000000	780606	200011ECP-123	31
CANNOT INSERT ALREADY ON MAST	780606	200011ECP-123	31
207988003-JONES5877-68-999	780606	200011ECP-123	31
CANNOT DELETE NOT ON MASTER	780606	200011ECP-123	31
207999RISE-0127584-10-1622	780606	200011ECP-123	31
ACTIVITY CODE NOT 0 1 OR M	780606	200011ECP-123	31
234567P13-111 IZONE AND TWO CARDS DO NOT MATCH	780606	200011ECP-123	31
CARD CODE 1 ERROR	780606	200011ECP-123	31
307565SRH0163	780606	200011ECP-123	31
MODIFY ERROR NOT ON MASTER	780606	200011ECP-123	31
307909651	780606	200011ECP-123	31
MODIFY ERROR NOT ON MASTER	780606	200011ECP-123	31
41017APU-0033 SB4-10-1149+00000000092977+000000000	780606	200011ECP-123	31
MODIFY ERROR NOT ON MASTER	780606	200011ECP-123	31

FIGURE C-3

LEV	PCIN	SCR/ECR	CCRD-NO	TITLE	GOVT EST COST
2	7494	SC0946		BASELINE VOLUME 1 OF FILE V OMS	\$0
2	7495		SB3-CO-2355	UPDATE ICD INTERFACE RQMTS FOR NOZZLE FWD SECTION COMPONENTS + PINGER	\$0
2	7496		SB3-CO-2415	BASELINE OF VOLUME II OF FILE V SSB OMSD	\$0
2	7497		SB3-CO-2417	SPECIFY LOW LIMIT FOR SSB SCP SOLT. PINN BO-0075 TO ICD-2-24001.	\$0
2	7498		SB3-CO-2432	ADD CON. INSULATION TO SSB PINN BO-0074 TO ICD-2-24001	\$0
2	7499		SB3-CO-2437	PCARD-ON STRAY VOLTAGE REQUIREMENTS	\$0
2	7500		SB3-CO-2466	BASELINE SUBMITTAL TO LEVEL II OF VOL. III. SSB OMSD (SE-019-006-24)	\$0
2	7501		SB3-CO-2545	CONFIGURATION CHANGES IMPACTING MATH MODELS	\$0
2	7502		SB3-CO-2545	UPDATE JSC-18220. GET PNL WITH MSCR B104	\$0
2	7503		SB3-CO-2545	REF. B. SPEC. SHUTTLE LIGHTNING PROTECTION CRITERIA DOCUMENT JSC 07636	\$0
2	7504		SB3-CO-2529	SPACE SHUTTLE TECHNICAL MANUAL PUBLICATION NUMBERS	\$0
2	7505		SB3-CO-2529	ENLARGE HOLES ON SEPARATION PING	\$19,000
2	7506		SB3-CO-2520	FRACTURE CONTROL OF AFT ATTACH STRUTS	\$0
				LEVEL TOTAL	\$12,527,919

LEV	PCIN	SCR/ECR	CCRD-NO	TITLE	GOVT EST COST
1	27130		SB3-CO-2610	BASELINE SRE SUPPURT EQUIPMENT WORK UNIT CODE MANUAL	\$0
1	27131		SB3-CO-2617	BASE SRO/SRM AIRBORNE EQUIPMENT WORK UNIT CODE MANUAL	\$0
1	27141		SB3-CO-2569	MOTOR CASE STRIP PANG HOLES OUT OF TOLERANCE	\$0
1	27144		SB3-CO-2621	CHANGE VSR + CIRCULARITY OF PS ANTENNA ELEMENT SCREWS	\$0
1	27146		SB3-CO-2601	INCORPORATION OF NEW IFA PART NUMBER DEFINITION	\$7,500
1	27146		SB3-CO-2502	CELL REMOVAL OF LT ATTACH RING FROM STA	\$0
1	27151		SB3-CO-2560	FEED THRU COVER IDENTIFICATION	\$0
1	27152		SB3-CO-2573	REV. TO RANGE SAFETY CROSSOVER COMPONENT	\$1,500
1	27159		SB3-CO-2564	SB SEPARATION RUL CORROSION RESISTANCE TEST (MIL-STD-753)	\$500
1	27159		SB3-CO-2566	ADDITION OF AKE MEASUREMENTS, PIN, SHOULDER, FRUSTUM	\$5,000
1	27161		SB3-CO-2598	SSC NOSE CAP THRUSTER	\$0
1	27167		SB3-CO-2625	MODIFICATION OF AFT SHIRT PROTECTIVE COVERS. A77-0166	\$9,000
1	27178		SB3-CO-2625	REVISICK TO REQUIREMENTS FOR AFT SHIRT HOLLOWDOWN POINTS	\$0
				LEVEL TOTAL	\$8,863,147

LEV	PCIN	SCR/ECR	CCRD-NO	TITLE	GOVT EST COST
4	F1632		SB8-C6-1900	ACCEPTANCE TEST PROCEDURE CALLOUT	\$0
4	F1633		SB8-10-1900	CLARIFICATION OF DRILL TEMPLET	\$0
4	F1634		SB8-10-1901	CLARIFY RADIOU' CALLOUTS	\$1,400
4	F1637		SB8-10-1902	TO CLARIFY DRAWING	\$0
4	F1638		SB8-10-1903	TO FACILITATE MFG BY USING A STD GROOVE WELD ANGLE	\$0
4	F1640		SB8-10-1908	TEMPORARY FIX FOR WELDING PROBLEM AREAS	\$0
4	F1645		SB8-C3-1907	RELEASE OF ED	\$8,000
				LEVEL TOTAL	\$5,393,874
				GRAND TOTAL	\$26,788,940

FIGURE C-4

APPENDIX D

RECORD FORMATS

- A. Master File Record Format.
- B. Weekly Transaction Record Format.
- C. Special Report Request — Parameter card format.

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

BLOCKED 125 CHARACTERS
 CARD 1 AND CARD 2 PROVIDED FOR COMPLETE RECORD

CARD AND / OR TAPE LAYOUTS

S. R. B. COST ACCOUNTING TRACKING SYSTEM
 KEY TAPE LAYOUT FOR INPUT TRANSACTIONS

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	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
FCIN	ECP/FCR	CCBD NO	GOV EST DATE	PROP EST CST	PROP EST DATE	NEGO VALUE	NEGO VAL DATE	NOT USED																																																																																											

CARD 1

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	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
FCIN	ECP/FCR	NONINCLATURE	NOT USED																																																																																																

CARD 2

FIGURE D-2

MIFC - Form 488 (F - June 1974)

APPROVAL

SCATS – SRB COST ACCOUNTING AND TRACKING SYSTEM HANDBOOK

By Ross B. Zorn, Rodney D. Stewart, Gary Coley,
and Marie Higginbotham

The information in this report has been reviewed for technical content. Review of any information concerning Department of Defense or nuclear energy activities or programs has been made by the MSFC Security Classification Officer. This report in its entirety, has been determined to be unclassified.



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Integration Laboratory



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