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...tion of Earth Resources Survey
...ation and without liabil...
...ce made thereof."

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E83-10233 5QT
TM-85271

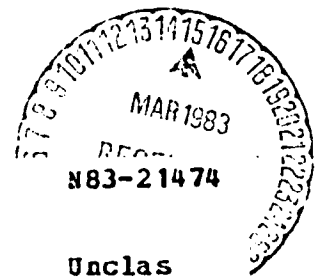
LANDSAT-D

Mission Operations Review
(MOR)

APRIL 6-7, 1982

GODDARD SPACE FLIGHT CENTER

Day 2



(E83-10233) LANDSAT-D MISSION OPERATIONS REVIEW (MOR) (NASA) 254 p HC A12/MF A01
CSCL 05A

N83-21474

Unclas
G3/43 00233

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V. Data Processing Operations

A. Data Processing Plan

B. Data Processing System Overview

C. Production Control

D. Standard MSS Processing

E. Operational Quality Assurance

F. Typical Day Schedule

G. External Interfaces

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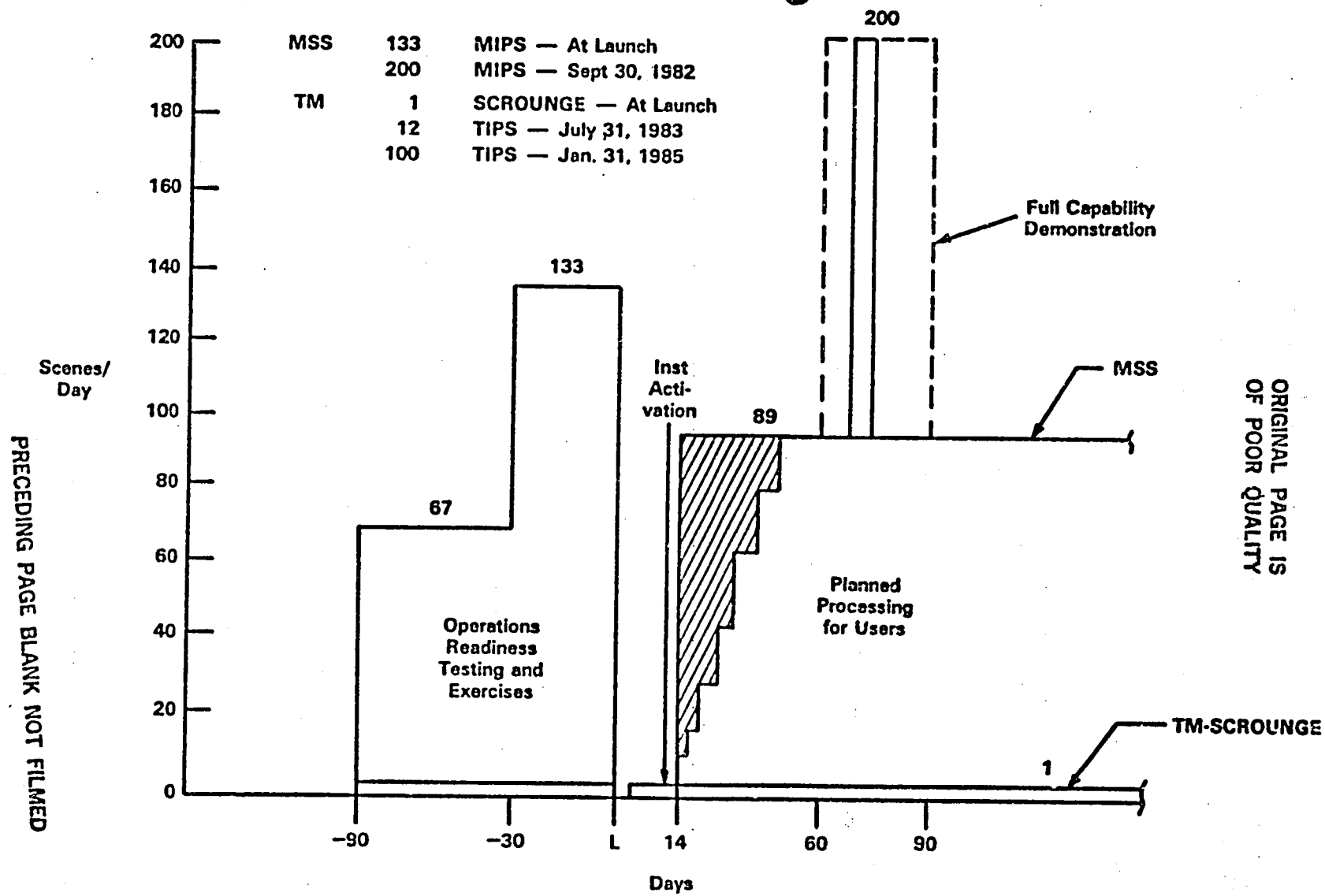
... under NASA sponsorship

Processing



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Data Processing System Overview

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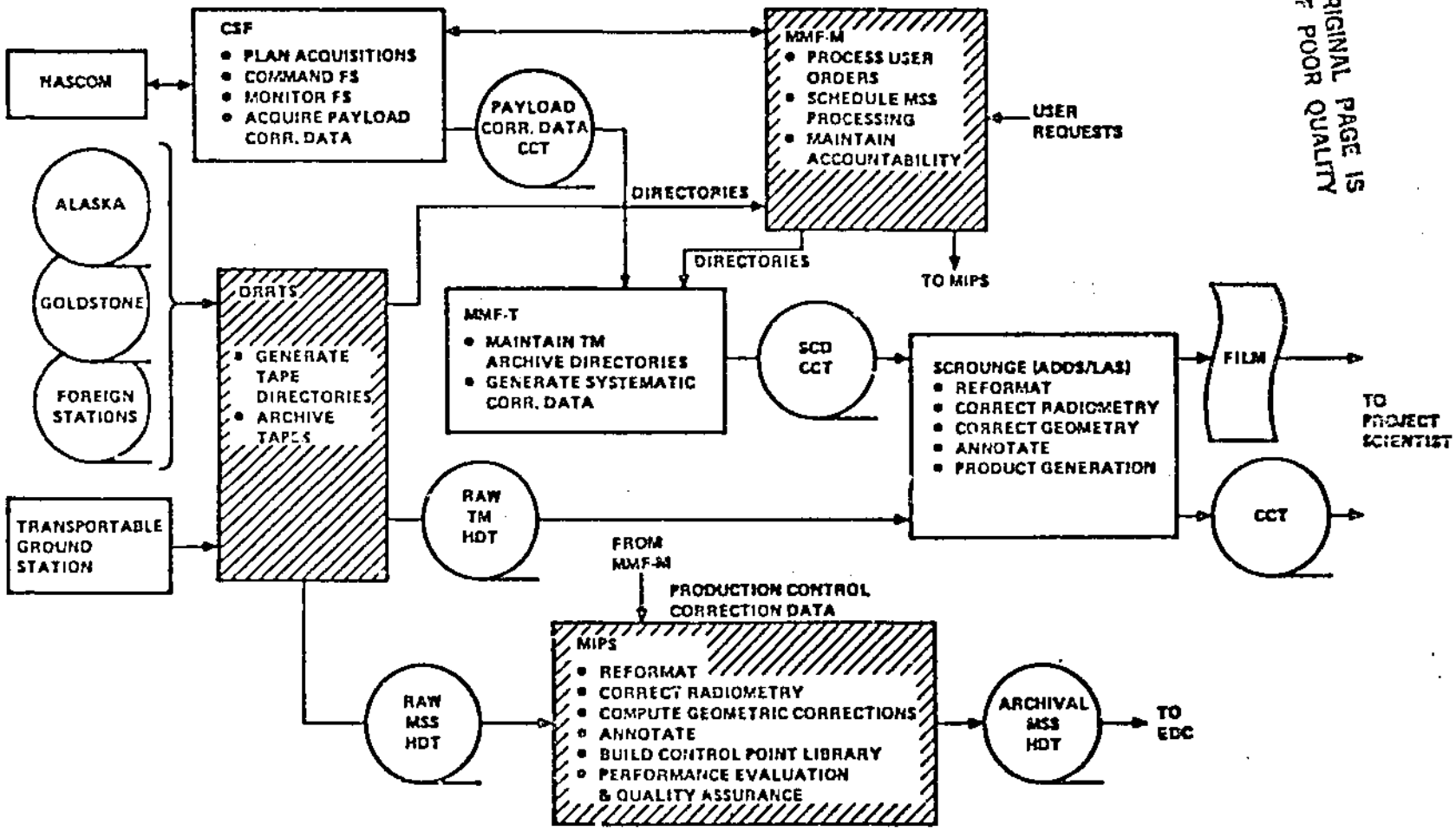
Initial Ground Data Flow



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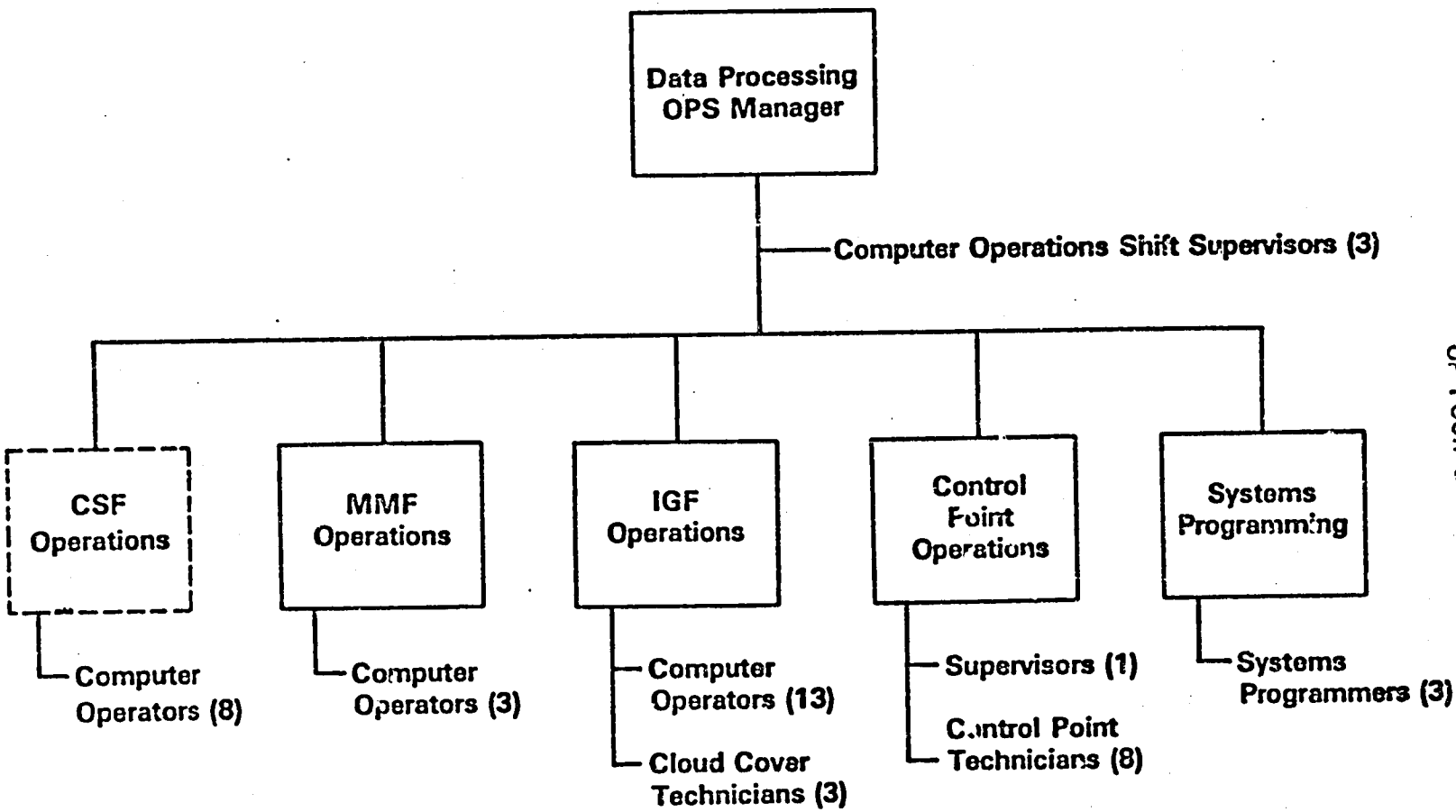
Data Processing Organization



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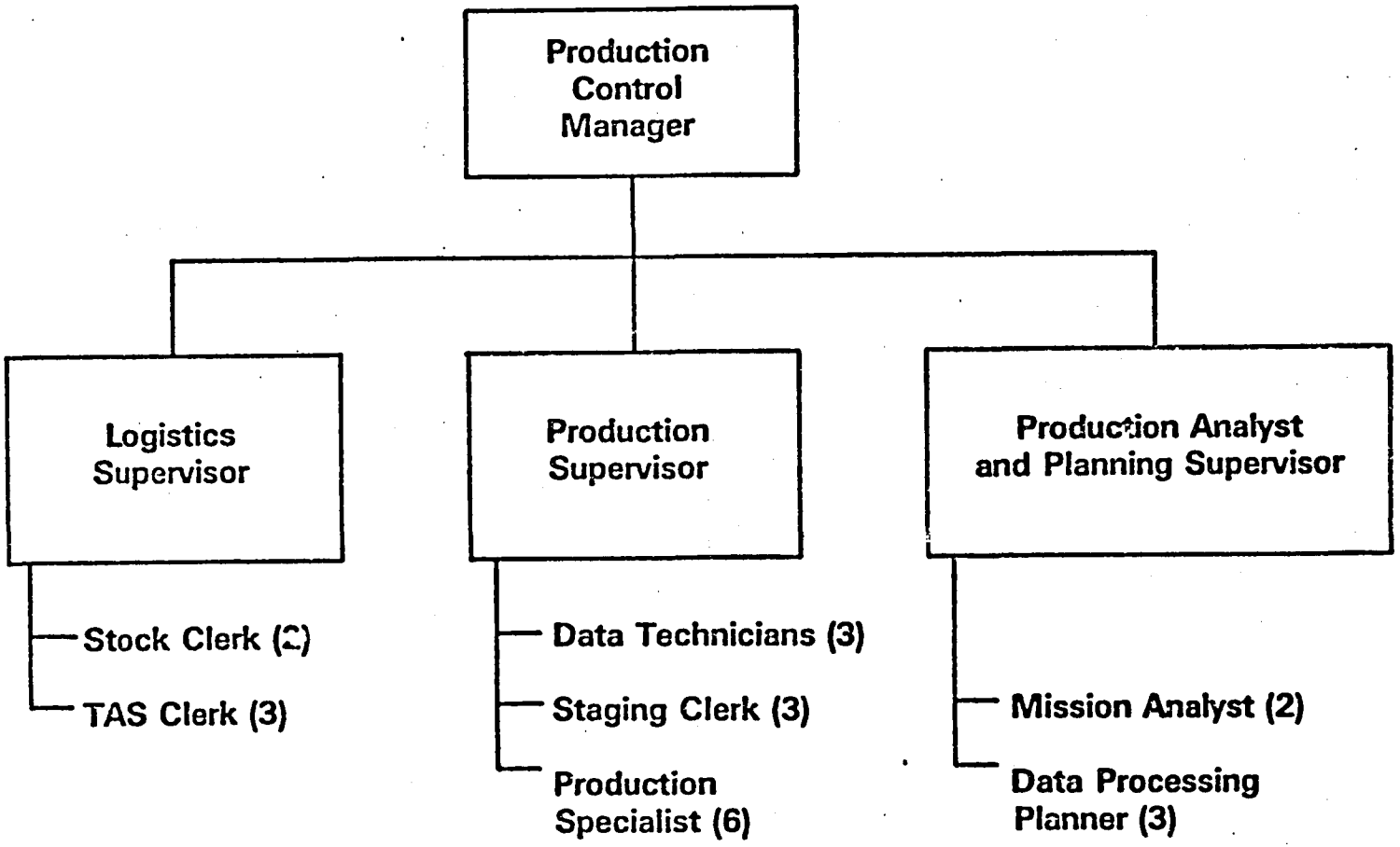
Production Control Organization



TAS — Tape Archive Storage

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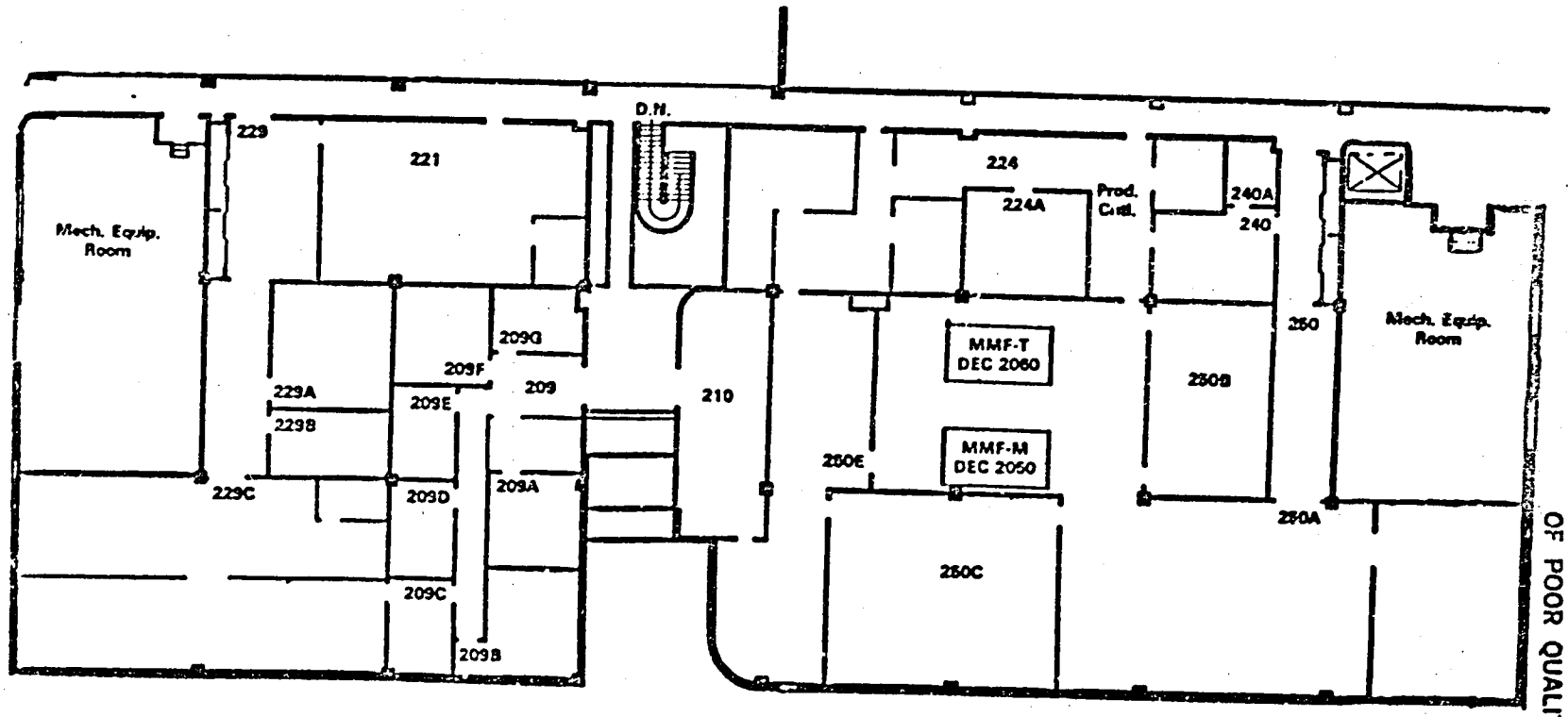
Second Floor Building 28



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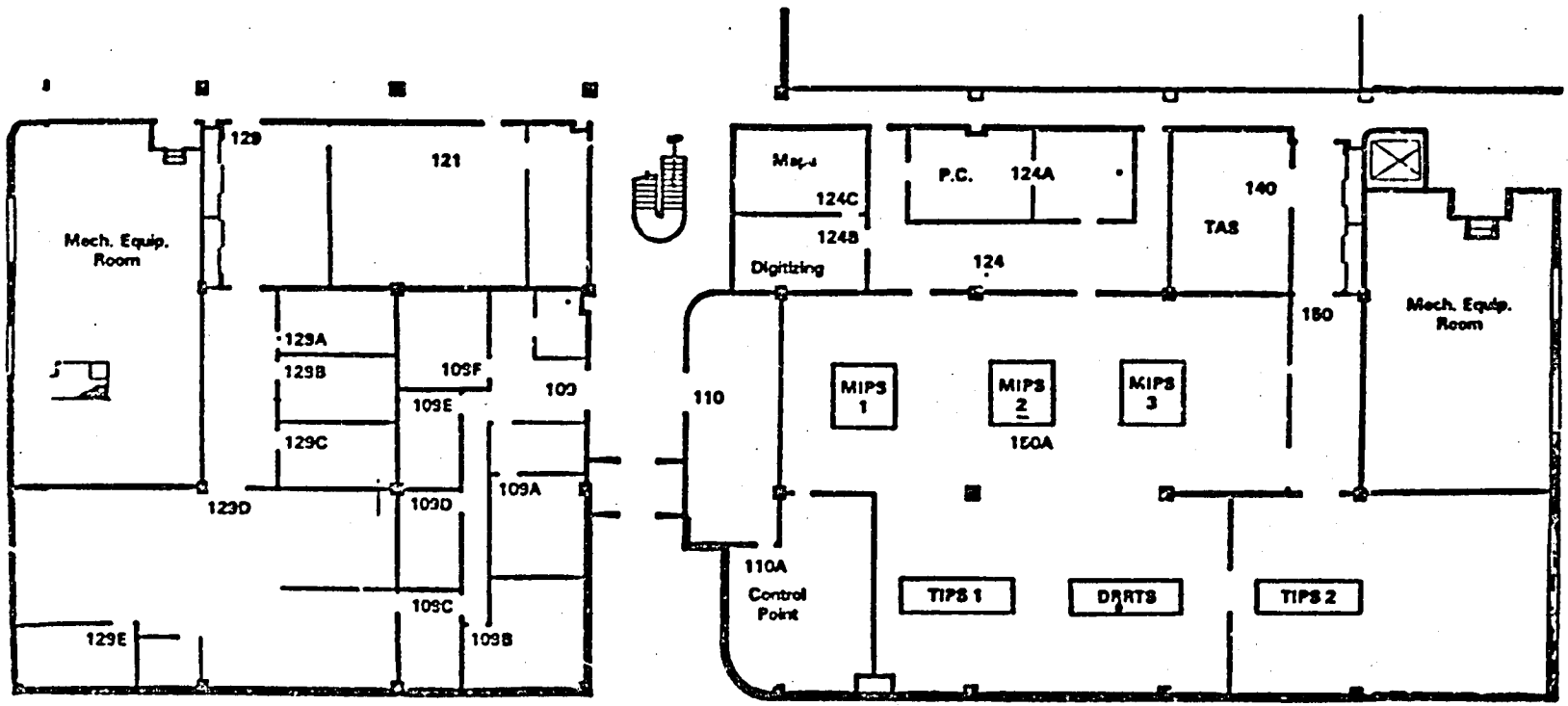
First Floor Building 28



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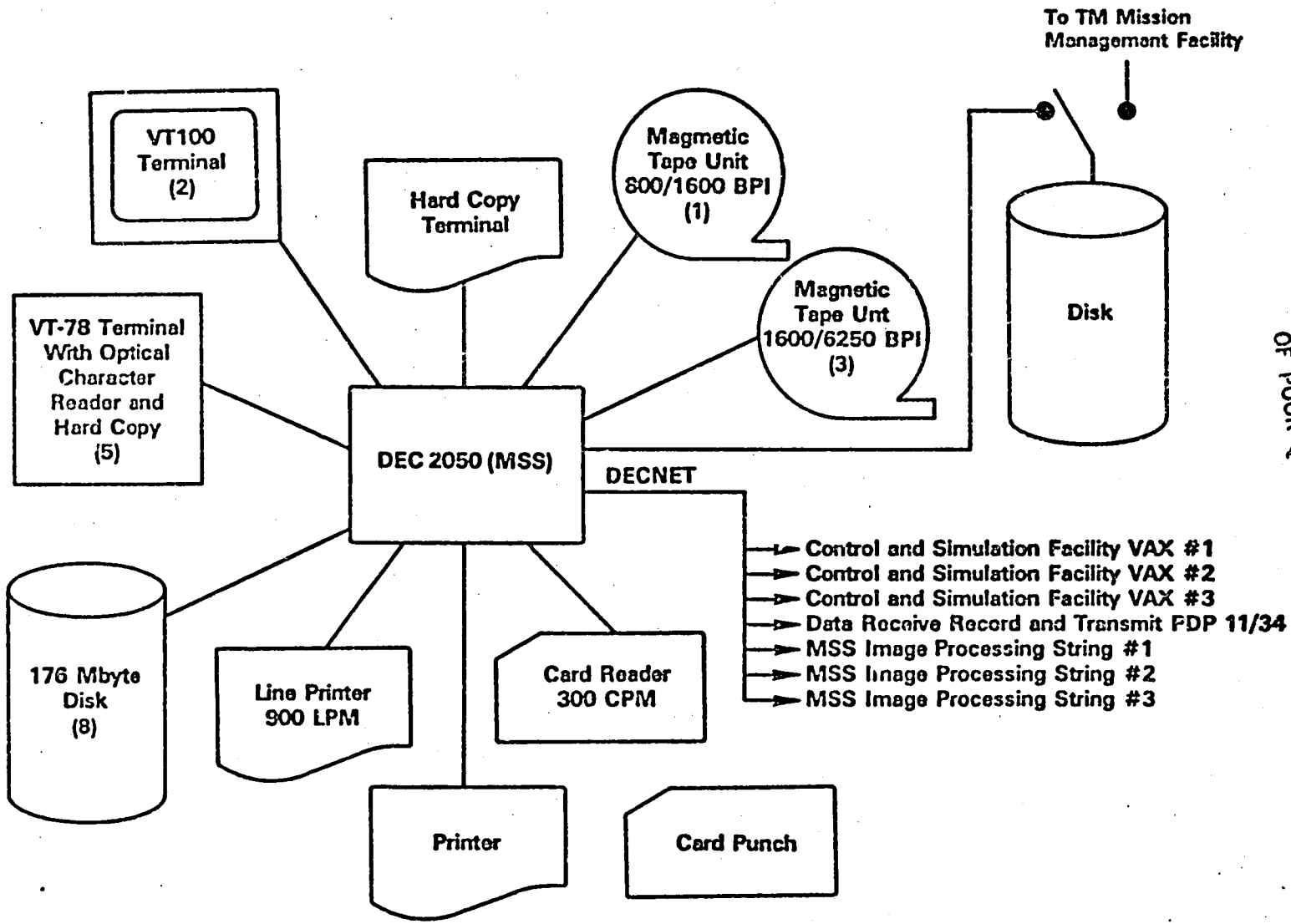
MSS Mission Management Facility Hardware



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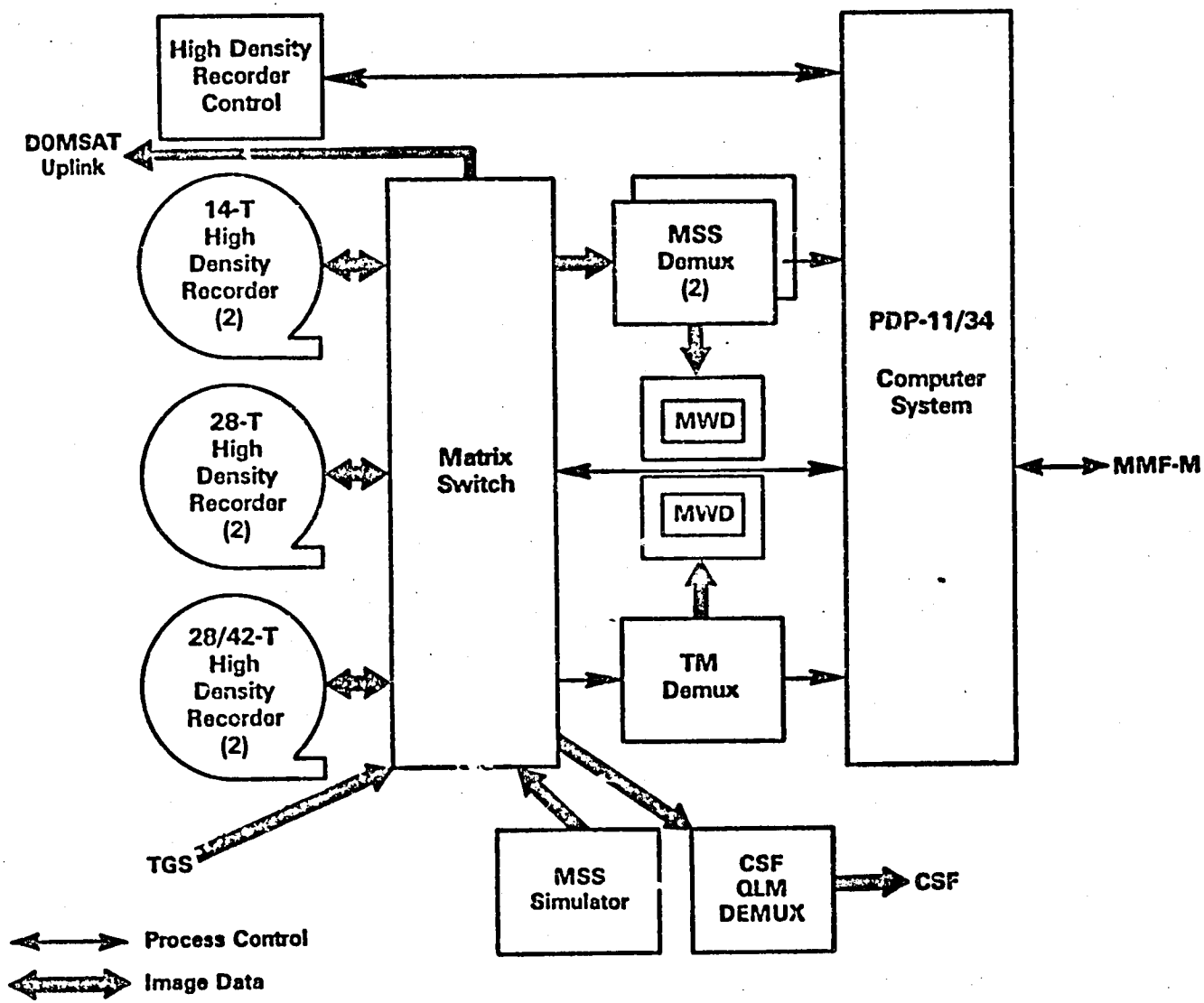
Data Receive, Record, Transmit System Hardware



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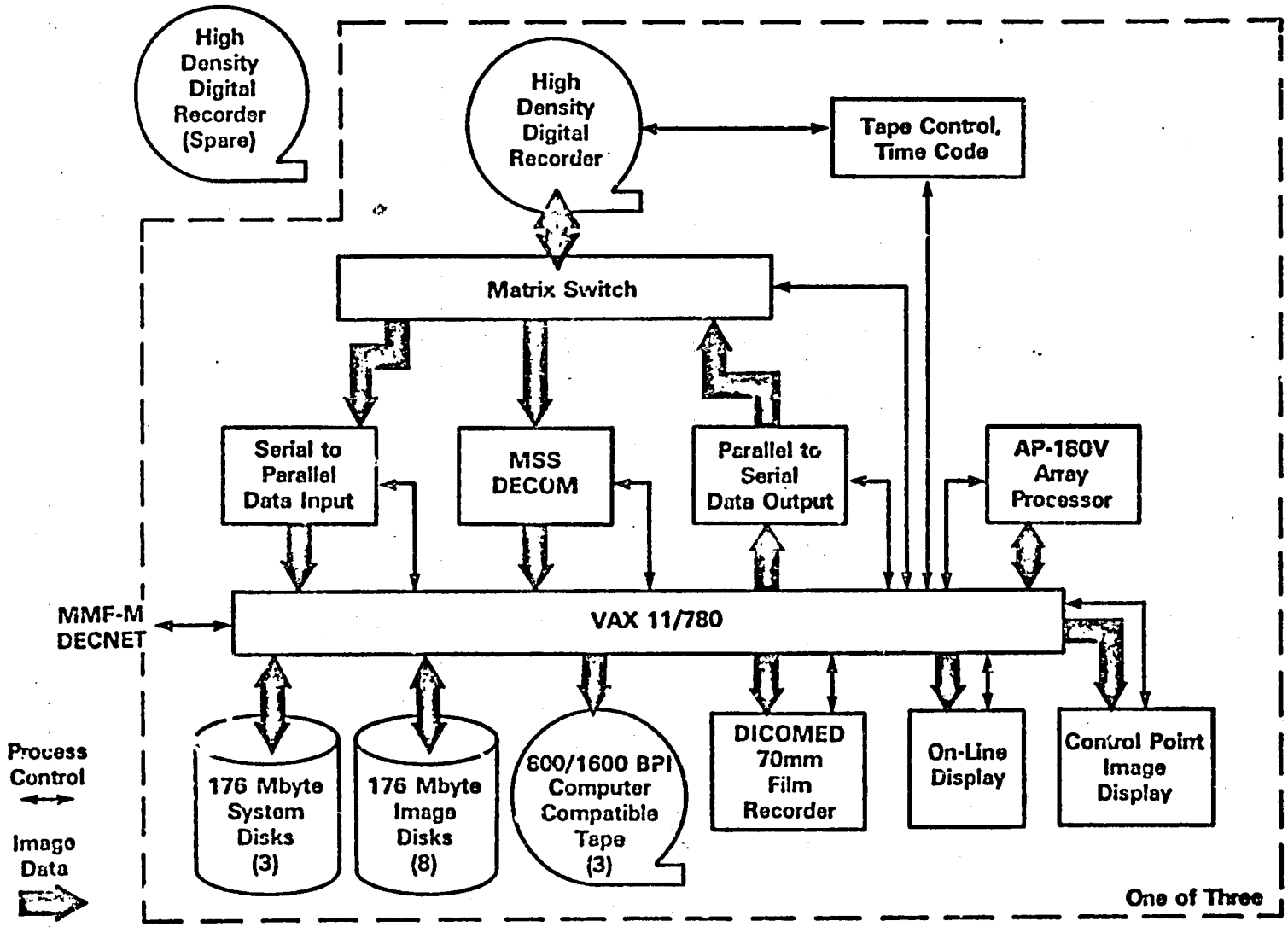
MSS Image Processing System Hardware



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Software Structure

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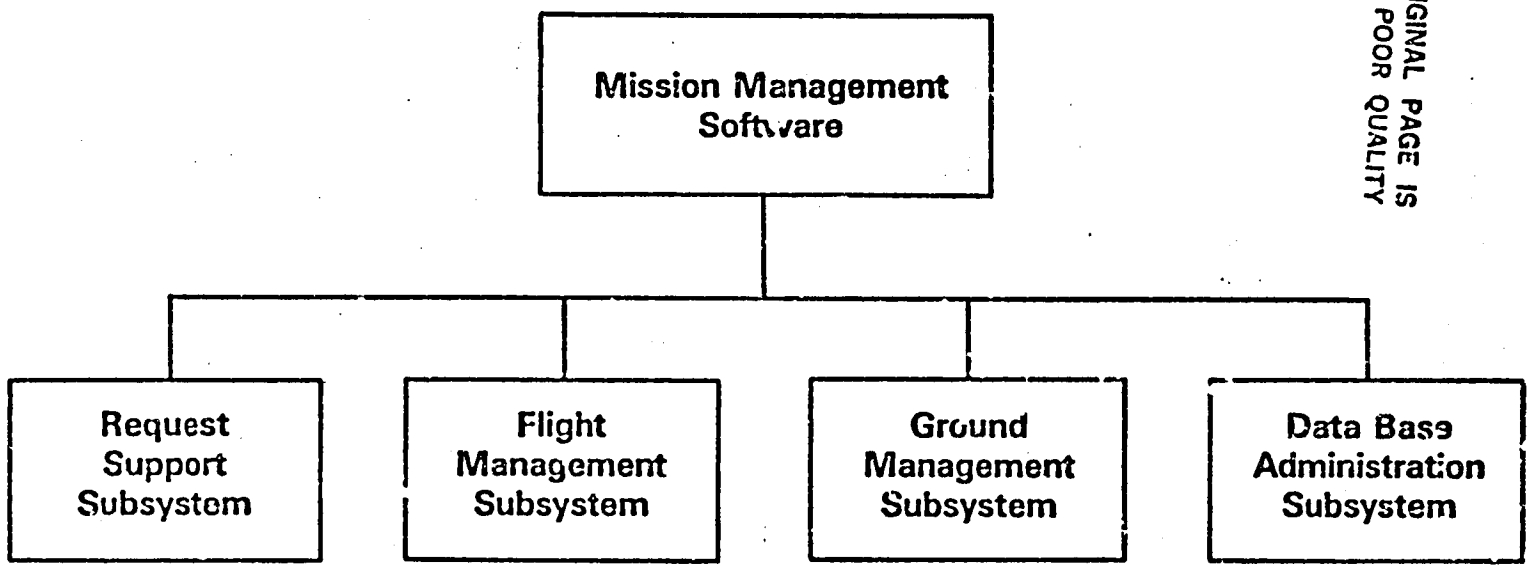
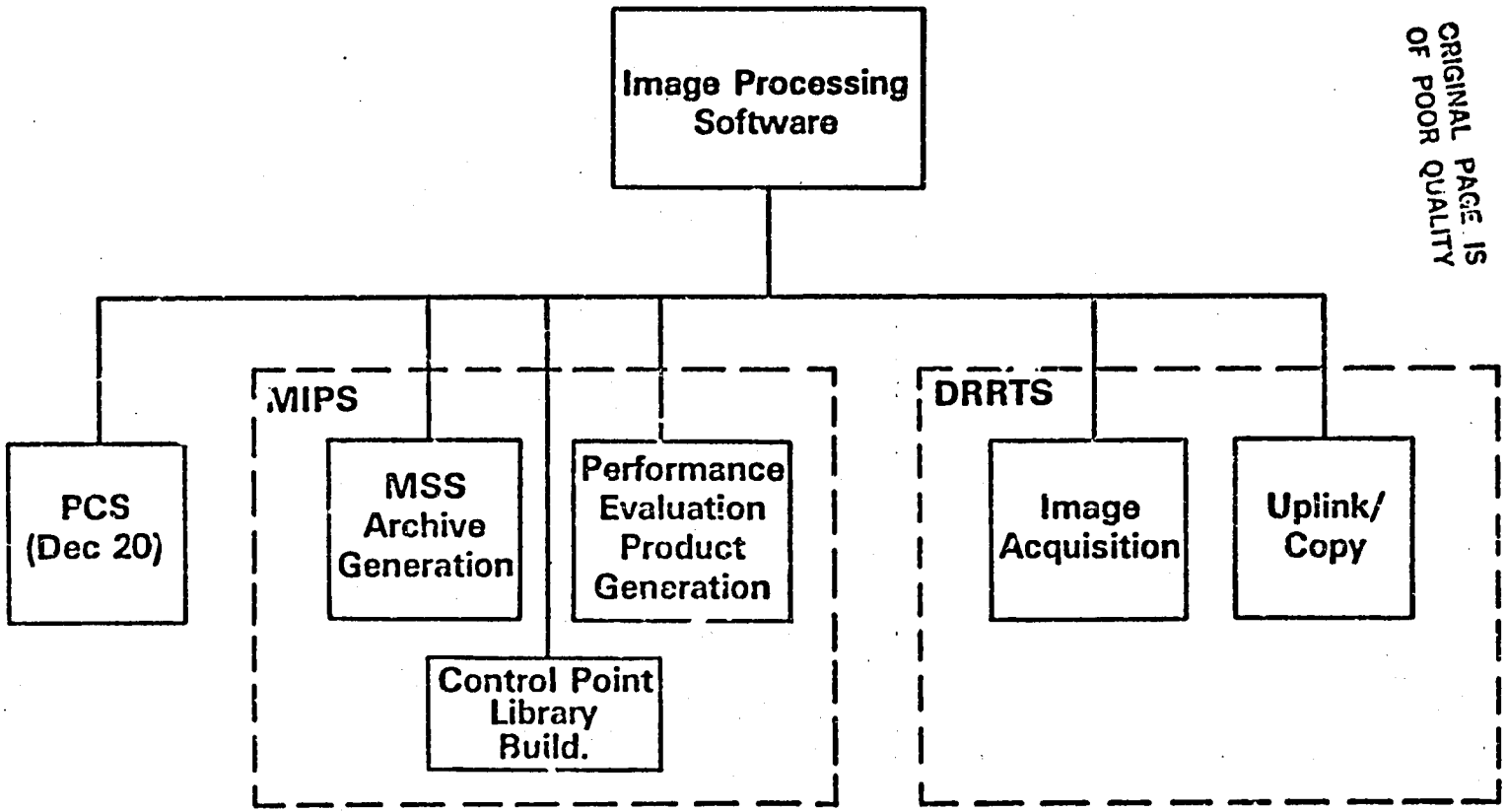


Software Organization



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PCS = Payload Correction Subsystem

Ground Segment Scheduled Operations

	HOURS PER DAY	DAYS PER WEEK
Mission Management Facility (MMF)	16	7
Data Receive Record and Transmit System (DRRTS)	16	7
MSS Image Processing System (MIPS)	16	7

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Operational Procedures

Production Control

- User Processing
- Spacecraft Scheduling Support
- Payload Correction Processing
- Archive Scheduling/Completion Processing
- PEPG Scheduling/Completion Processing
- Archive Dissemination
- Data Base Support Activity
- Problem Defect Reporting
- Control Point Support
- Accounting Procedures
- Management Reporting
- Product Tracking
- Inventory Control

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Operational Procedures (Continued)

Data Processing Operations

- CSF Operator Preventive Maintenance
- MMF Operator Preventive Maintenance
- MIPS Operator Preventive Maintenance
- DRRTS Operator Preventive Maintenance
- MSS Archive Generation
- PEPG Generation
- Cloud Cover Assessment
- Control Point Library Build
- Data Acquisition
- HDT-AM Uplink
- Tape Copy

Quality Assurance

- System Performance Evaluation
- Product Standards
- Film Product Evaluation
- Digital Product Verification
- Process Verification
- Software Configuration Control
- Hardware Configuration Control
- Library
- Problem/Defect Reporting
- Equipment Service Reporting

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Production Control

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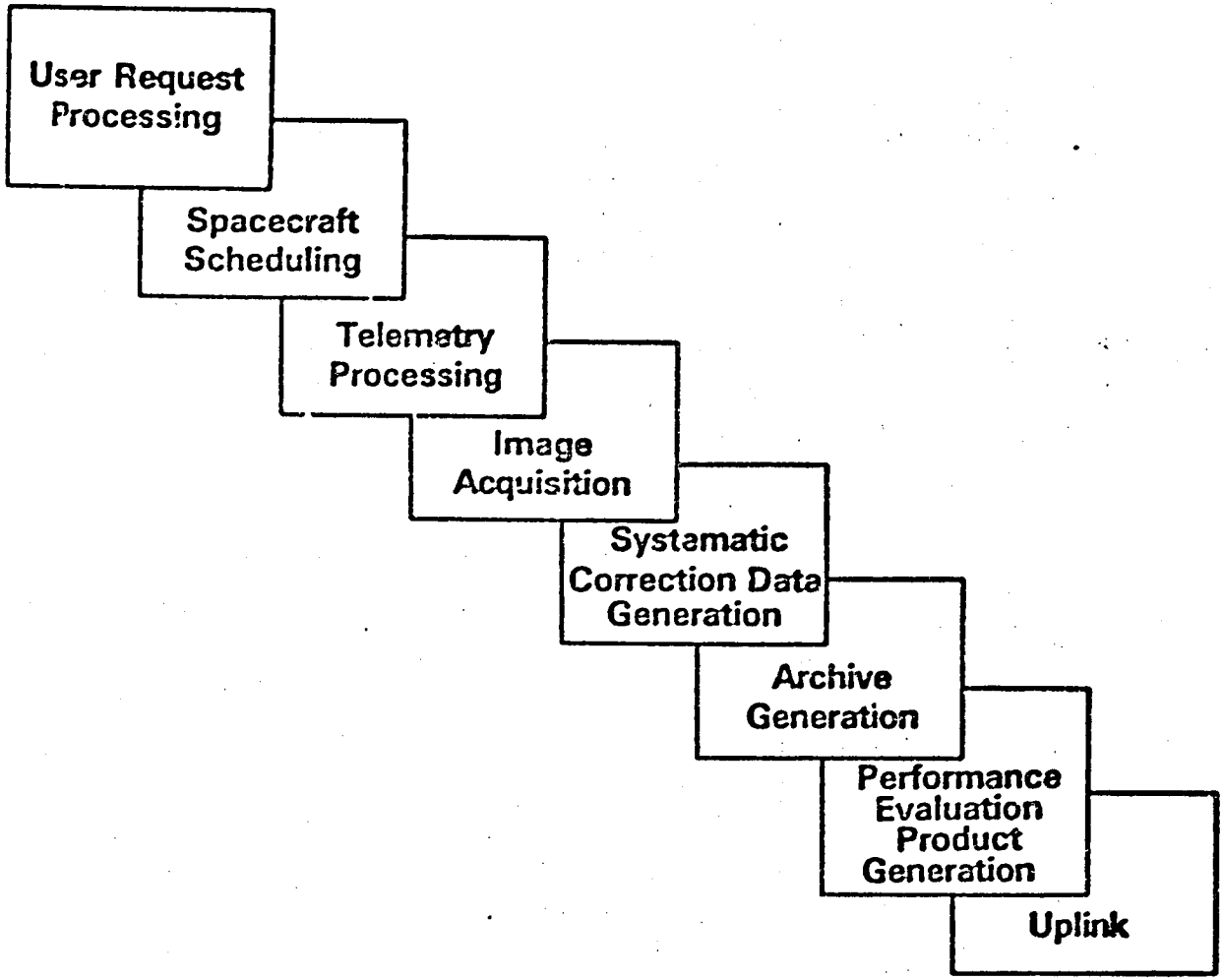
Control of Standard MSS Processing



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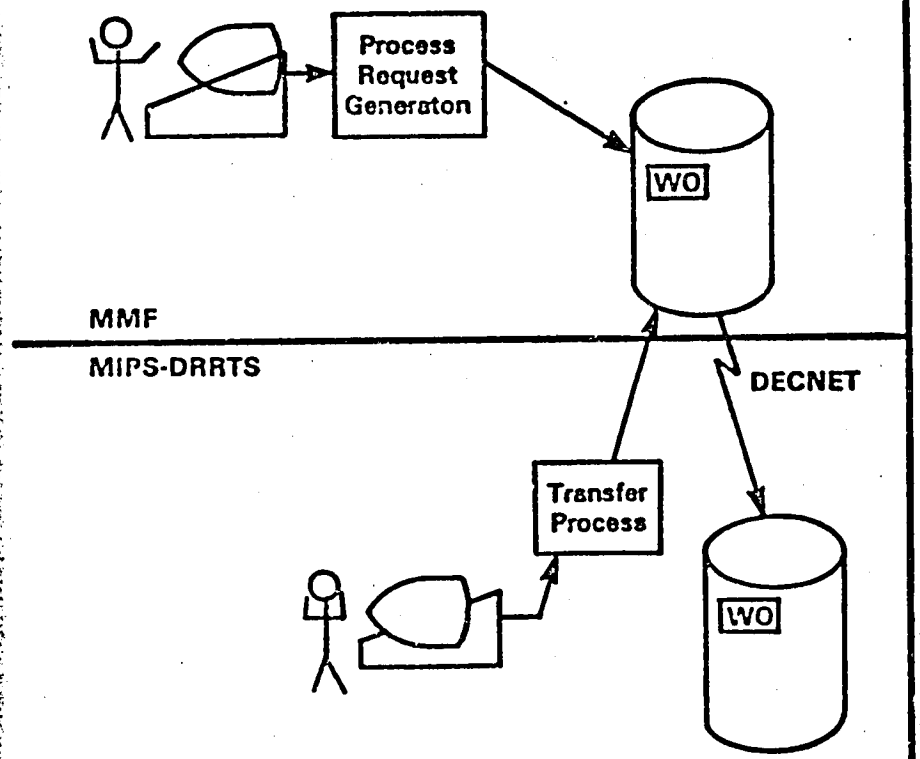
Process Request



- Input Source/MMF
- Defines Work for/— Systematic Correction Data Generation (MMF)
  - — Archive Generation (MIPS)
  - — Performance Evaluation Product Generation (MIPS)
  - — Uplink/Copy Processing (DRRTS)
  - — Photo/Shipping (Bldg. 23)
- How/Manual Initiation and Control, Receiver Initiates DECNET Transfer
- Who/MMF Production Specialist/ DRRTS/MIPS Computer Operator
- When/Periodically During a 2 Shift Day

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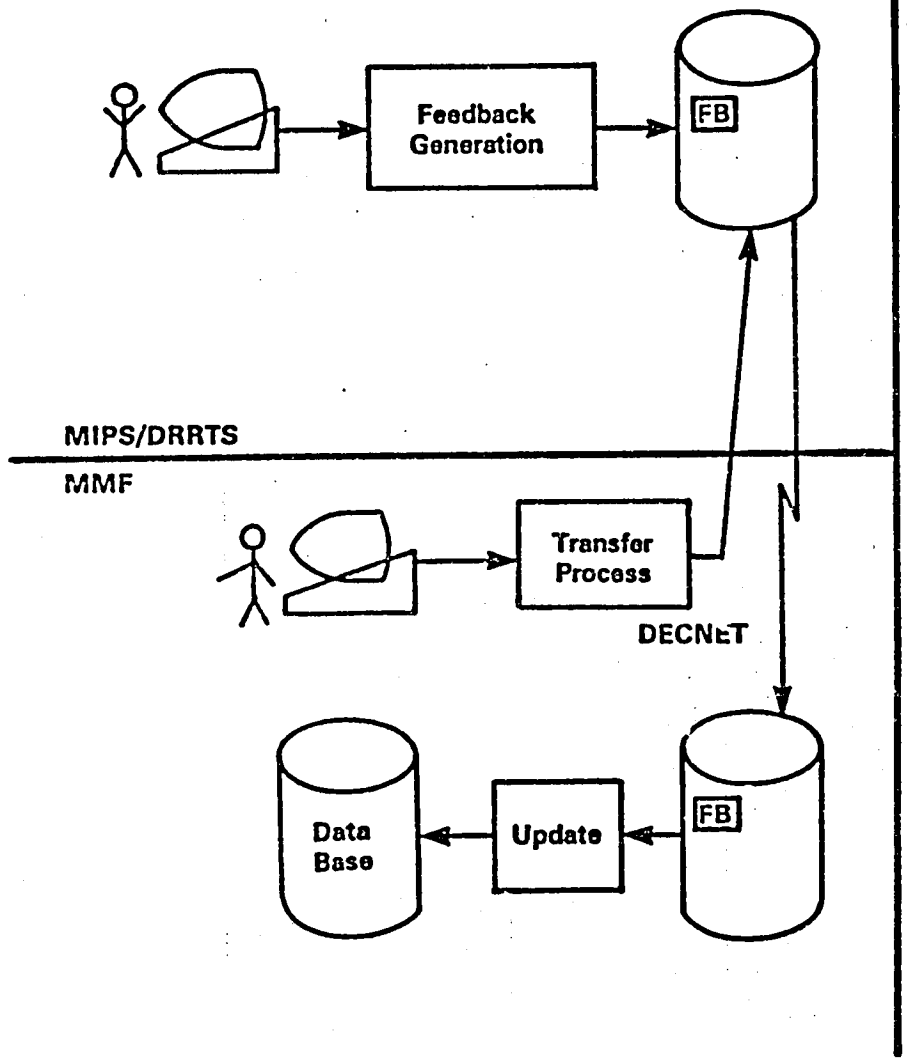
Process Request Feedback



- Input Source/MMF, MIPS, Bldg 23 or DRRTS
- Reports On/— Systematic Correction Data Generation Processing (MMF)
  - — Archive Generation (MIPS)
  - — Performance Evaluation Product Generation (MIPS)
  - — Uplink/Copy Processing (DRRTS)
  - — Photo/Shipping (Bldg 23)
- How/Manual Control, Receiver Initiates DECNET Transfer
- Who/MIPS/DRRTS Computer Operator/ MMF Production Specialist
- When/Peridocally During a 2 Shift Day

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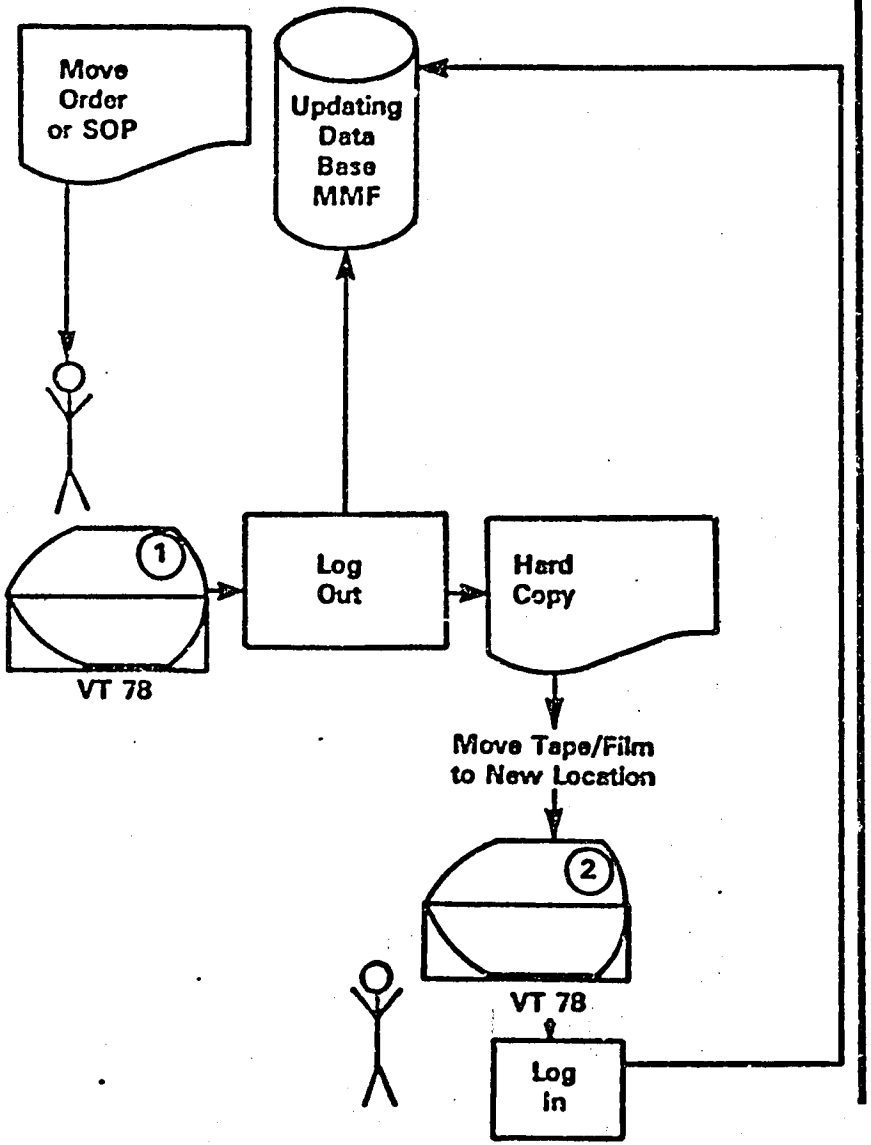
Product Tracking



- From/DRRTS to MIPS
  or MIPS to TAS
  or MIPS to Bldg. 28/23 Staging
  or TAS to DRRTS
  or DRRTS to TAS
- How Often/as Required
- How/Manual
- Who/Staging Clerk
  TAS Clerk
- Where/5 Remote Terminals Located in Major Processing Areas
  1. MMF-M
  2. DRRTS
  3. MIPS
  4. Tape Archival Storage
  5. Building 23

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Data Archive

HDT-RM	Permanent Archive
HDT-RT	Permanent Archive
HDT-AM	Temporary Pending EDC Release/ Control Point Library Use
Telemetry	Permanent Archive

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Reports

Acquisition Candidate Report

List of User Requests Organized on Path Row Basis

Candidate Request Resolution Report

Status of User Requests Organized by Processing Step

Map Report

World Reference View of Landsat Acquisitions

Cycle Report

Acquisitions on a Per Day Base for an Entire Cycle

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Reports

Cloud Cover Report

Compares Predicted Cloud Cover Versus Assessed Cloud Cover

Work Order Status Report

Detailed Tracking From Date Ordered to Date Completed

HDT-R Status Log

Tracks Processing of HDT-R Tapes

Image Generation Statistics Report

Provides Statistics for Archive Generation Processing

Rework Tracking Report

Scene Tracking Based Upon Rework Status Code

Priority Item Status Report

List of the Status of all Priority Items

Tape/Film Inventory Report

Identifies Information About High Density Tapes, CCTs, Film Rolls

Image Catalog

- List of Scenes Which Have Been Processed Through Archive Generation

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Reports

	Acquisition Candidate Report	Candidate Request Resolution Report	Map Report	Cycle Report	Cloud Cover Report	Work Order Status Report	HDT-R Status Log	Image Generation Statistics Report	Rework Tracking Report	Priority Item Status Report	Tape/Film Inventory Report	Image Catalog
User Request Processing		X										
Spacecraft Scheduling	X	X	X	X	X					X		
Telemetry Processing						X	X	X	X	X	X	
Image Acquisition						X	X	X	X	X		
Systematic Correction Data Generation						X	X	X	X	X	X	
Archive Generation						X		X	X	X	X	
Performance Evaluation Product Generation						X		X	X	X	X	
Uplink						X		X	X	X	X	
Inquiry Response						X		X	X	X	X	X

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Acquisition Candidate Report

STING : NF0998 — NATIONAL AERONAUTICS AND SPACE ADMINISTRATION — PAGE : 2
STATION : MSS — GODDARD SPACE FLIGHT CENTER — DATE : 02-DEC-82
LANDSAT MISSION MANAGEMENT FACILITY — TIME : 19:07

CANDIDATES FOR ACQUISITION REPORT (NFCAAV) FOR LOADRAT = 4
DOMESTIC RECEIVING STATION
TIME FRAME : FROM 29-SEP-82 02100106 TO 30-SEP-82 02100106

RECEIVING STATION	ORBIT	PATH	ROW	ACQ. PRIORITY	USER ID.	USER TYPE	ORDER ID.	SENSOR	MAX ZEN % CLD COVER	SUN ANGLE	MODE	GAIN
	40860	034	024	10	000198	F	82030103	MSS	04	10	C	L
			025	10	000198	F	82031010	MSS	04	10	C	L
			025	10	000198	F	82030010	MSS	04	10	C	L
			026	10	000198	F	82031010	MSS	04	10	C	L
			026	10	000198	F	82030010	MSS	04	10	C	L
			027	40	000040	D	82030106	MSS	09	10	C	L
			028	40	000040	D	82030106	MSS	09	10	C	L
			029	40	000040	D	82030106	MSS	09	10	C	L
			030	40	000040	D	82030106	MSS	09	10	C	L
			031	40	000040	D	82030106	MSS	09	10	C	L
			032	40	000040	D	82030106	MSS	09	10	C	L
			033	40	000040	D	82030106	MSS	09	10	C	L
			034	40	000040	D	82030106	MSS	09	10	C	L
			035	40	000040	D	82030106	MSS	09	10	C	L
			036	40	000040	D	82030106	MSS	09	10	C	L
			037	40	000040	D	82030106	MSS	09	10	C	L
			038	40	000040	D	82030106	MSS	09	10	C	L
			039	40	000040	D	82030106	MSS	09	10	C	L
			040	40	000040	D	82030106	MSS	09	10	C	L
			041	40	000040	D	82030106	MSS	09	10	C	L
			042	40	000040	D	82030106	MSS	09	10	C	L
			043	40	000040	D	82030106	MSS	09	10	C	L
			044	40	000040	D	82030106	MSS	09	10	C	L
			045	40	000040	D	82030106	MSS	09	10	C	L
			046	40	000040	D	82030106	MSS	09	10	C	L
			047	40	000040	D	82030106	MSS	09	10	C	L
			048	40	000040	D	82030106	MSS	09	10	C	L
			049	40	000040	D	82030106	MSS	09	10	C	L
			050	40	000040	D	82030106	MSS	09	10	C	L
			051	40	000040	D	82030106	MSS	09	10	C	L
			052	40	000040	D	82030106	MSS	09	10	C	L
			053	40	000040	D	82030106	MSS	09	10	C	L
			054	40	000040	D	82030106	MSS	09	10	C	L
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Ground Segment Tasks

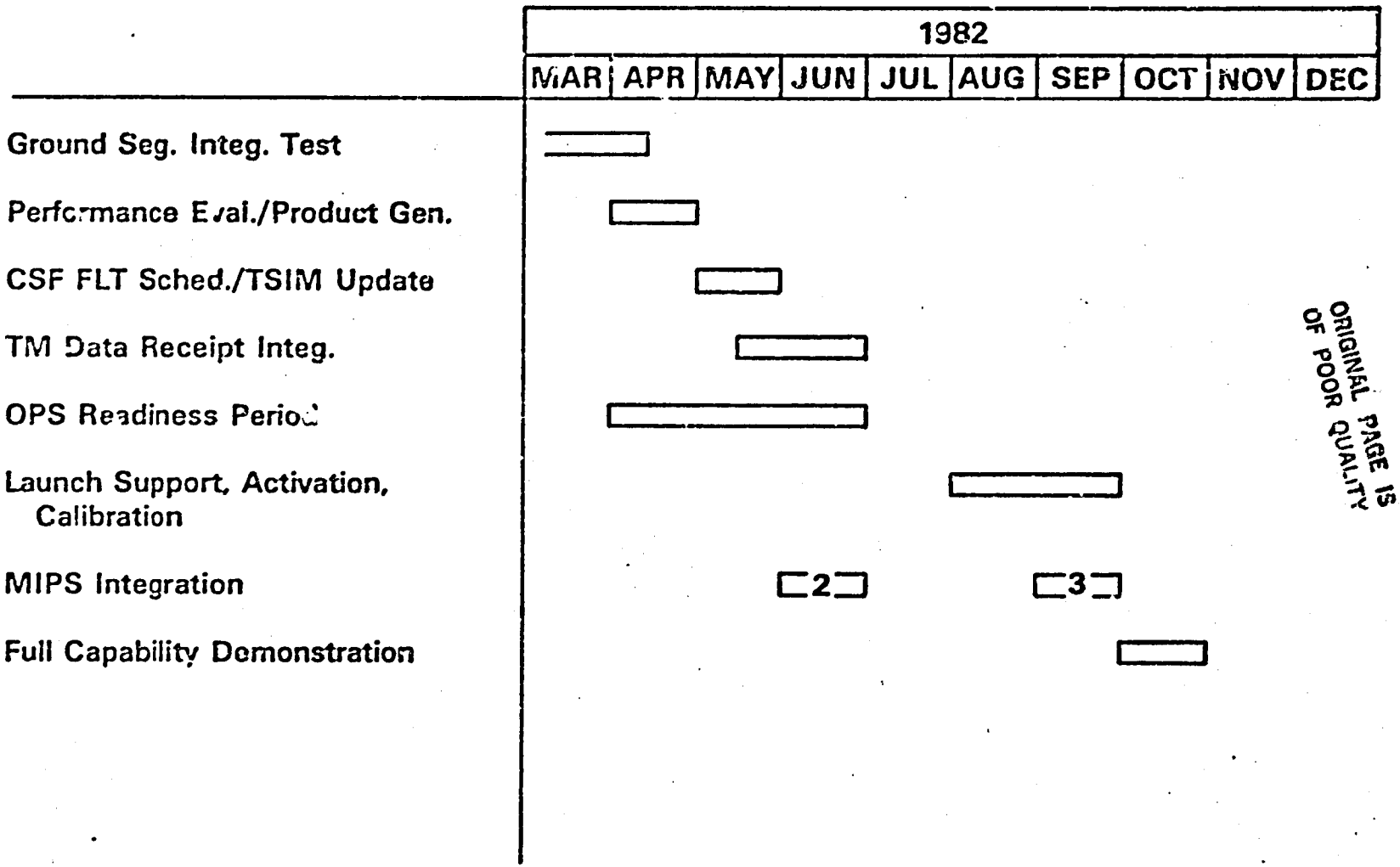

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Image Catalog

REPORT : MM0530
SUBSYSTEM : RSS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
LANDSAT MISSION MANAGEMENT FACILITY

PAGE :
DATE : 03-MA
TIME : 1

RSS CATALOG MASTER FOR LANDSAT- 4 & 5
SORTED BY NASA SCENE ID

ACQUISITION PERIOD: 01-JAN-81 THRU 31-JAN-81

SCENE NASA	WRS PATH	WRS ROW	ACQ. YR	ACQ. DAY	SUN ELEV	SUN AZIM	TENS% CC B1	TENS% CC B2	TENS% CC B3	TENS% CC B4	BND1 MSS	BND2 MSS	BND3 MSS	BND4 MSS	CTR-LAT DEG.MIN	CTR-LNG DEG.MIN
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5[illegible]2311[illegible]74	193	211	81	024	82	34	03	03	03	03	CH8	CH8	CH8	CH8	38.54	-69.39
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5[illegible]01031	013	027	81	031	88	20	07	06	05	04	CH8	CH8	CH8	CH8	47.27	-72.43

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Production Control Contingencies

FAILURE	ACTION	WHO
DECNET	• Assess Failure, Use CCT Back-Up as Required • Repair	• Data Processing Planner
2050	• Maintain MIPS Queues at 4 Hours • Schedule CSF for 48 Hour Period	• Data Processing Planner • Data Processing Planner

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MSS Flow

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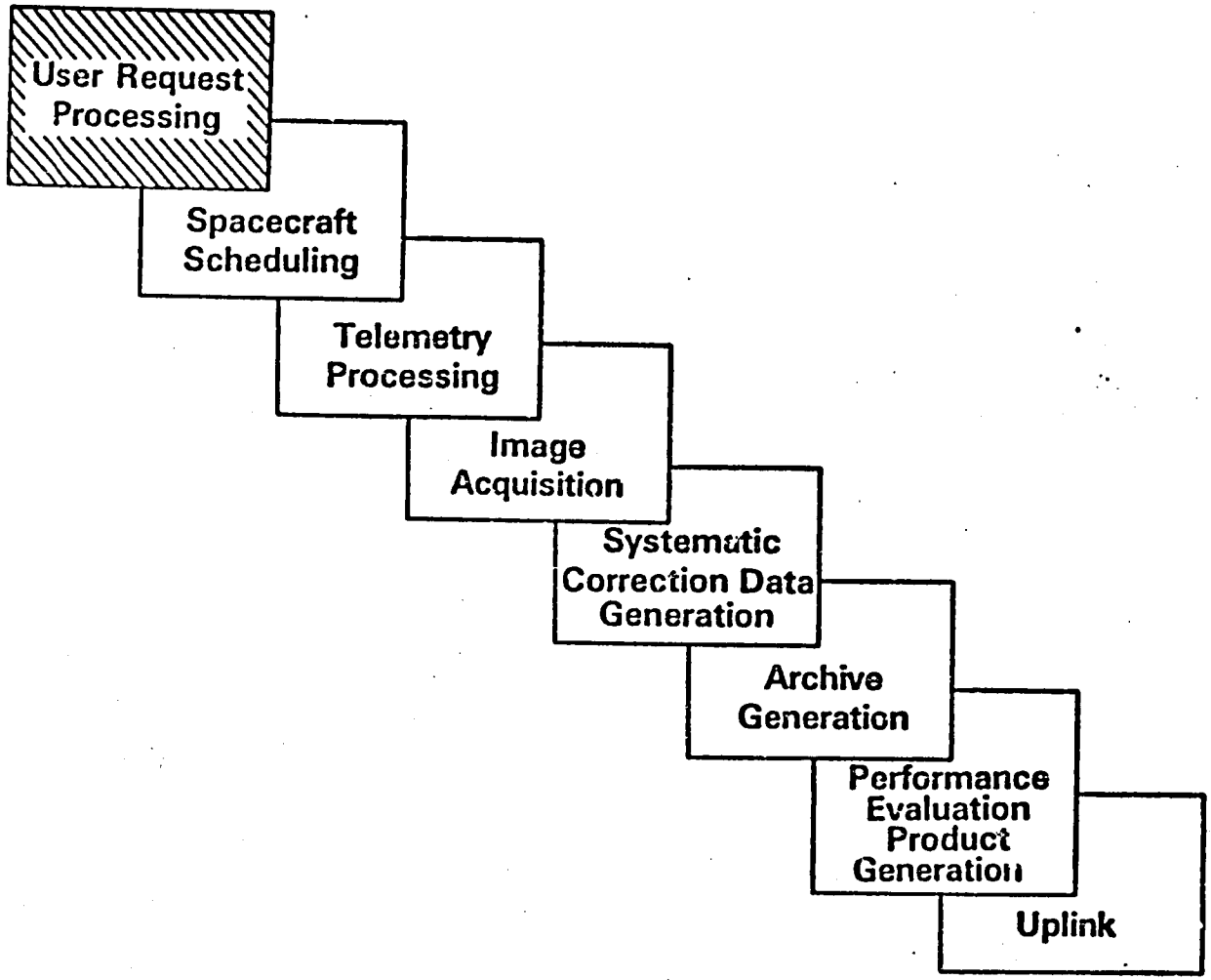
Standard MSS Processing



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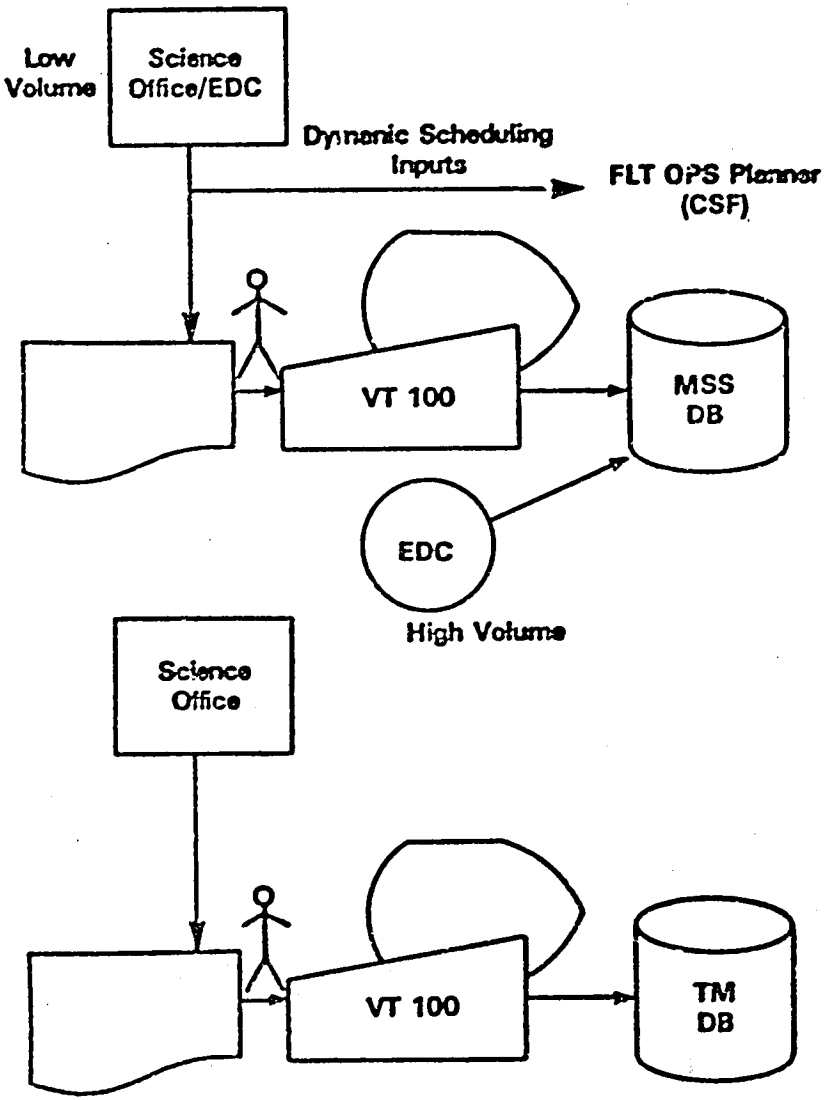
User Request Processing



- Input Source/Science Office & EDC
- How Often/Tape Once Per Week or Hard Copy as Required
- What Time/PM for Tape—Any Time for Paper
- How/Manual Start Using Standard Procedures
- Who/Data Technician
- Where/MMF-M and MMF-T
- When Effective/
  - Tape
    - Acquisition Requirements—2 Days Later
    - Processing Requirements—Next Day
  - Hard Copy
    - Acquisition Requirements—2 Days Later
    - Processing Requirements—Immediately

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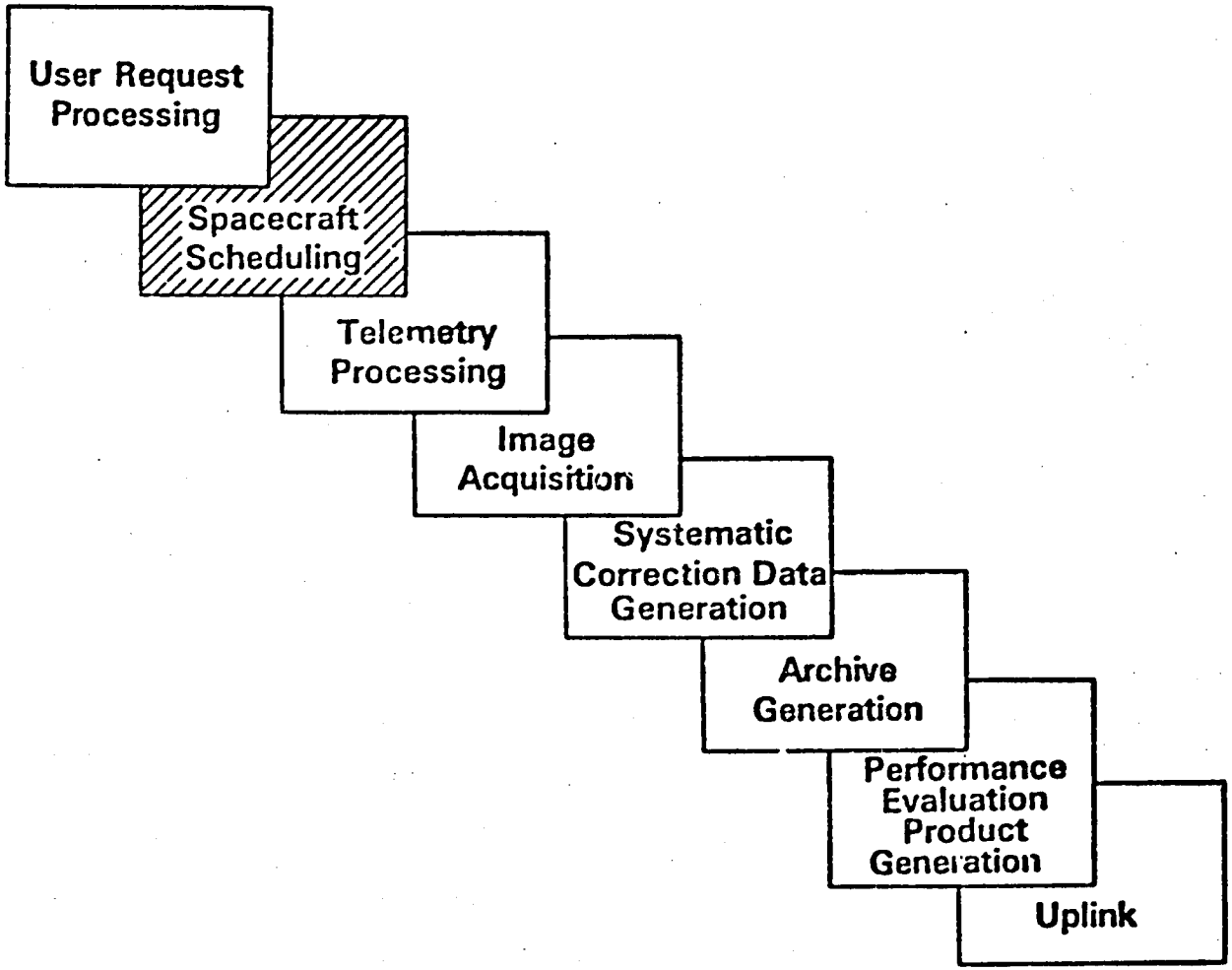
Standard MSS Processing



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Weekly Candidate Request Selection

Plan

- How Often/Once Per Week (Friday)
- What Time/9:00 AM
- How/Manual Initiation
- Who/Data Processing/Flight Operations Planners
- Where/MMF-M, MMF-T, and CSF
- Time Span/7 Days

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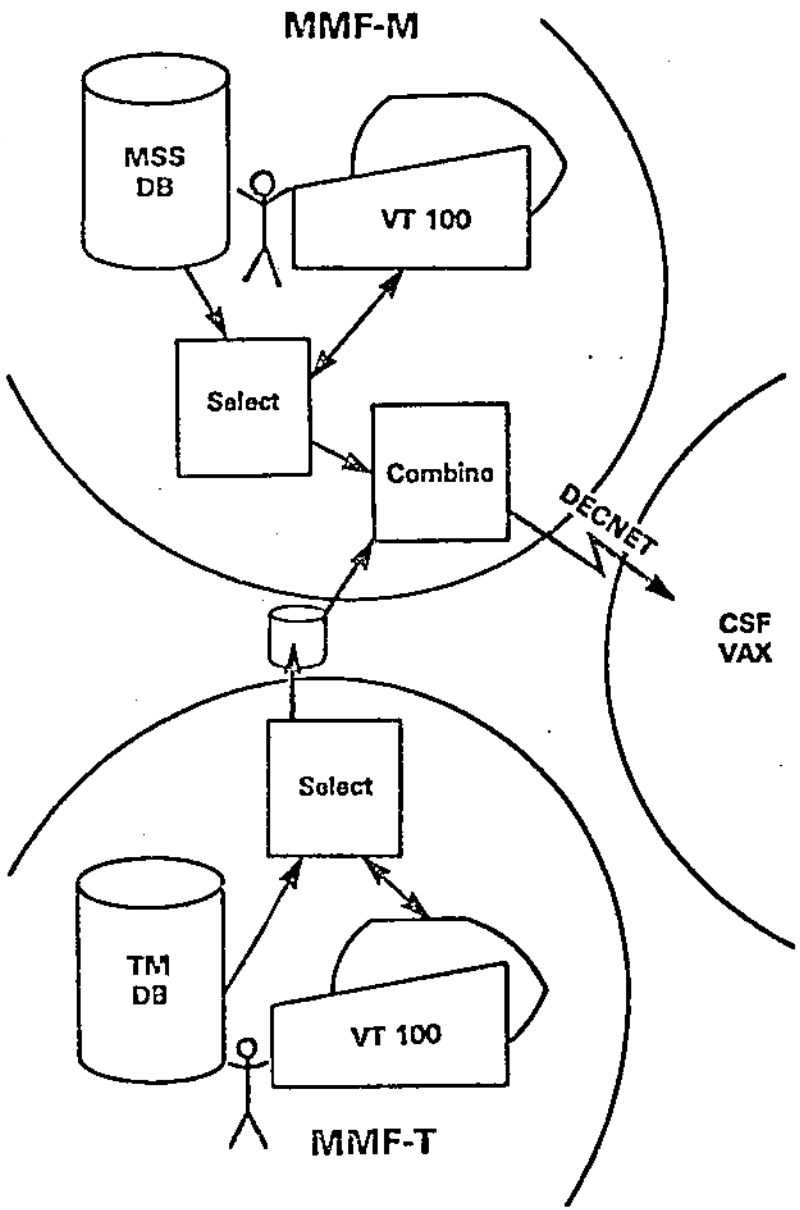
Daily Candidate Request Selection



Schedule

- How Often/Once Per Day
- What Time/10:00 AM
- How/Manual Initiation
- Who/Data Processing/Flight Operations Planners
- Where/MMF-M, MMF-T, and CSF
- Time Span/48 Hours

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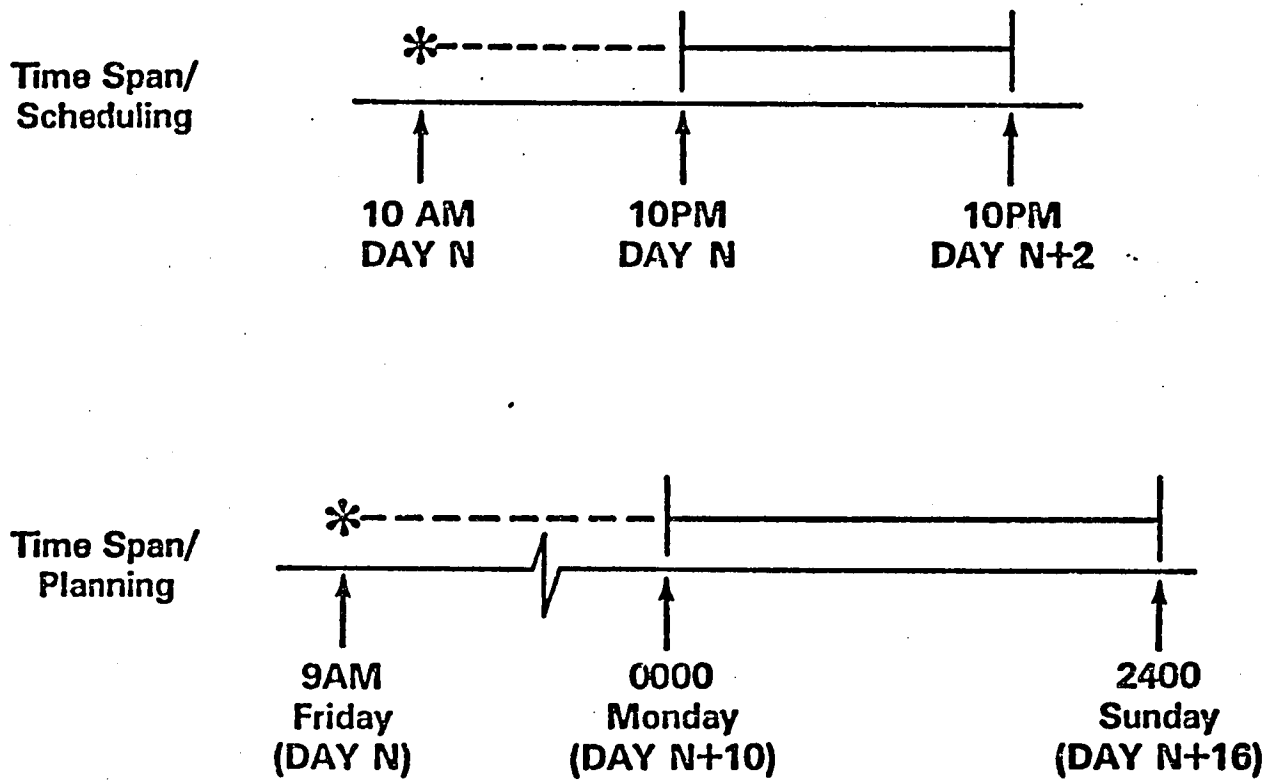
Time Span for Spacecraft Scheduling/Planning



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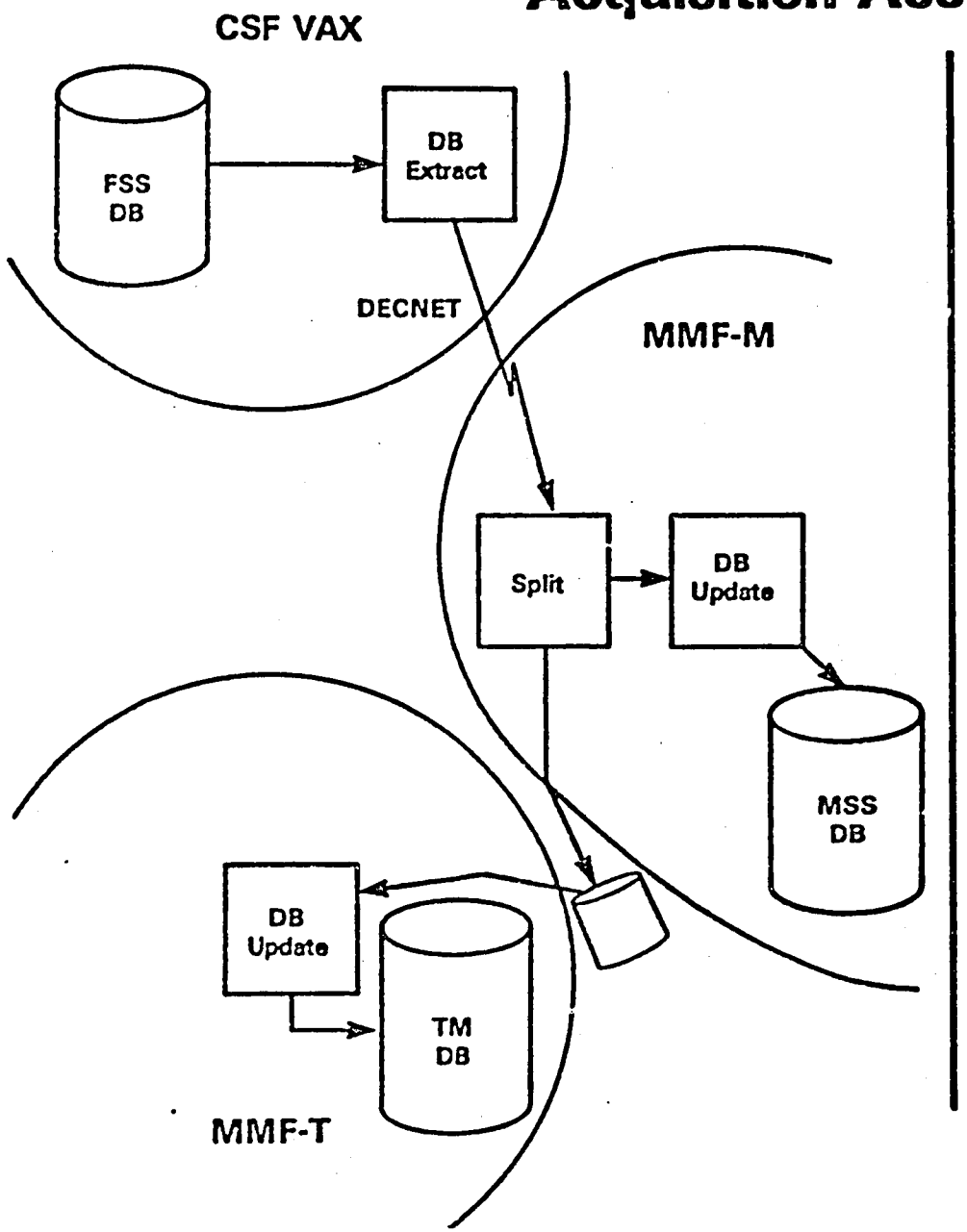
Acquisition Accounting



- How Often/Once Per Pass
- What Time/Post Pass
- How/Manual Initiation
- Who/Ground Controllers
  Data Processing Planner
- Where/CSF, MMF-M, MMF-T

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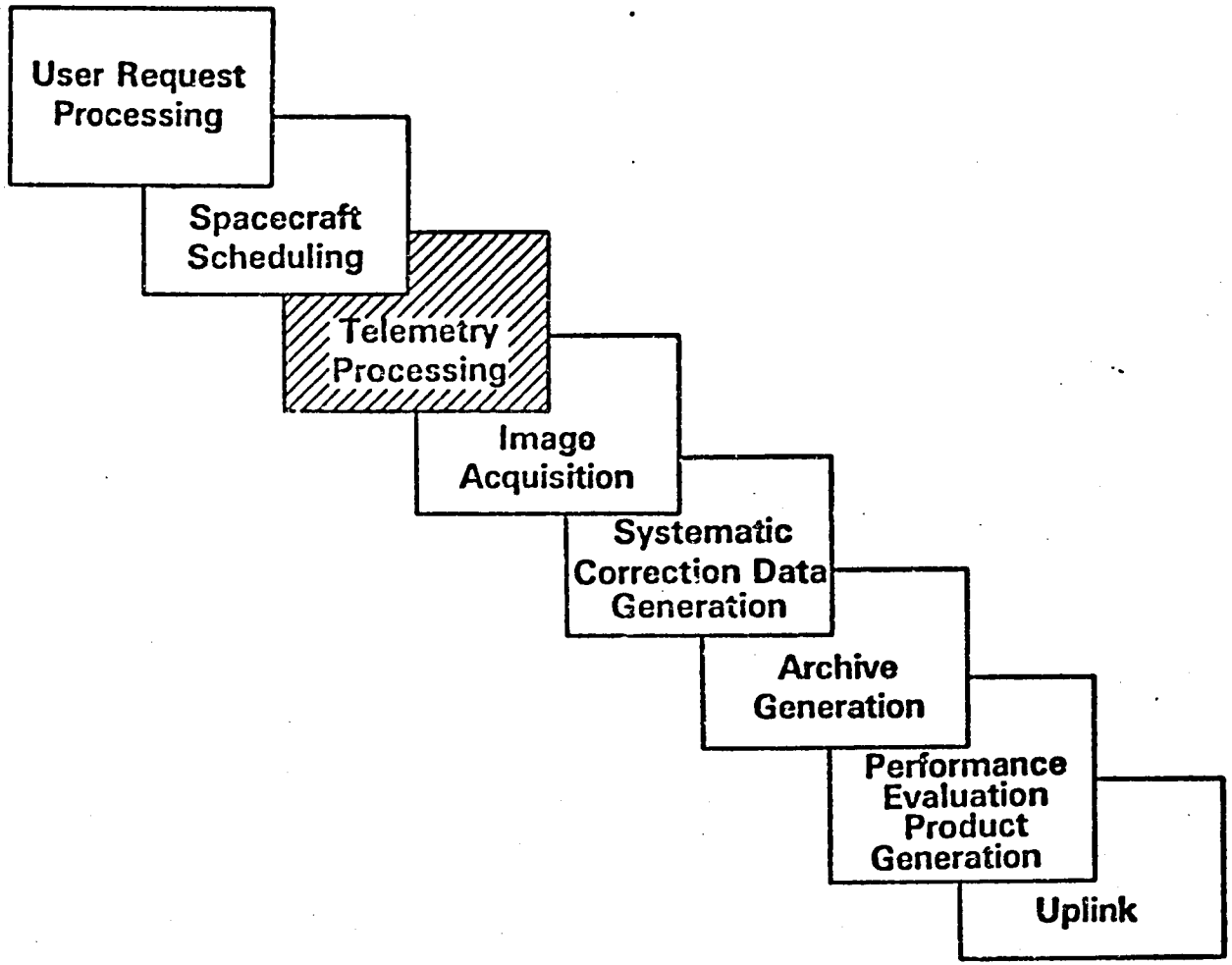
Standard MSS Processing



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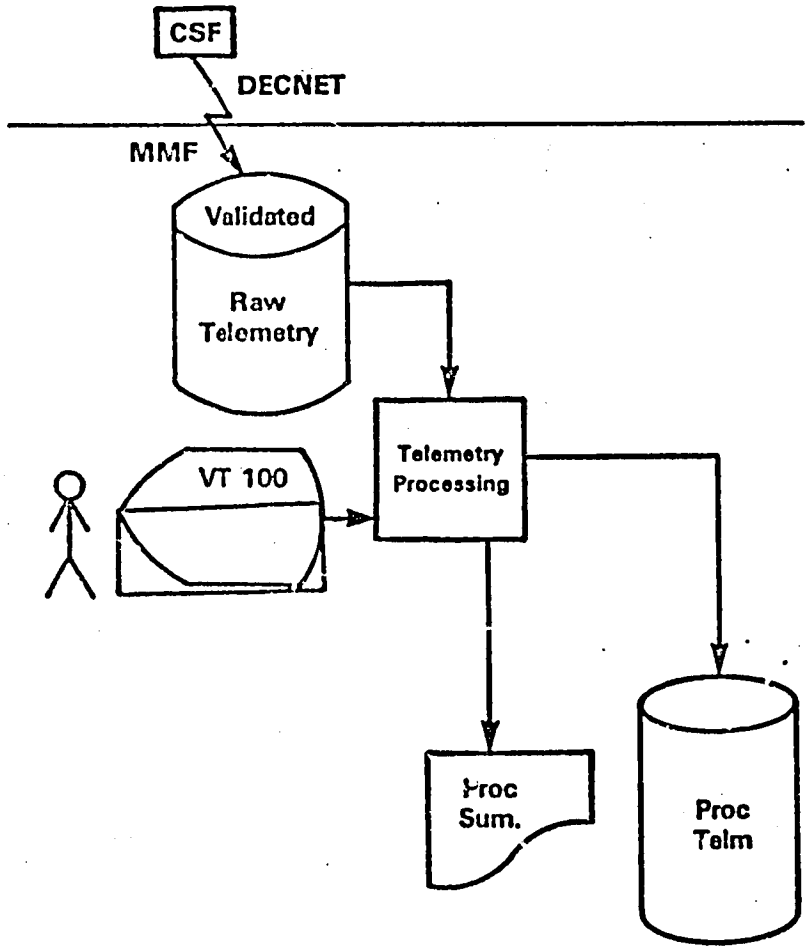
Telemetry Processing



- Input Source/CSF
- How Often/Every 90 Min. During MMF Operations
- How/Manual Initiation
- Who/Production Specialist
- Where/MMF-M DEC 2050

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```
PCS1SU                          PCS PHASE ONE PROCESSING SUMMARY REPORT                                  PAGE 1
DATE: 25-MAR-82                                                                                          RMF-R
TIME: 21:49:12                  PROCESS REQUEST ID: BATCH                                  PCS BASELINE: 18-AUG-81
SEQ. NO.: 316                   LF PARM FILE: PL4001.CTB                                ST PARM FILE: PS4001.CTB

INTERVAL START TIME: 82:253:14:17:59                    INTERVAL FINISH TIME: 82:253:14:27:31
PROCESSING START TIME: 25-MAR-82 21:47:34               PROCESSING STOP TIME: 25-MAR-82 21:48:06
INPUT PCO FILE:        T4M31C.DAT                       EPHEMERIS SOURCE:     P

DATA QUALITY SUMMARY:
TOTAL INPUT QUALITY ERRORS:  0
MAPS:   0   LINES:   0   EULER PARMS:   0   OTHER ACS:   0   ECI POSITIONS:   0   ECI RATE:   0
OUTPUT QUALITY INDICATORS:
EPHEMERIS DATA ERRORS:    0                             ATTITUDE DATA ERRORS:    0
TOTAL POINTS:           287                             TOTAL POINTS:          1152
REJECTED POINTS:          0                             REJECTED POINTS:          0
MISSING POINTS:           0                             MISSING POINTS:           0
DEV. X,Y:  .2452E-03  Y:  .1615E-03  Z:  .2123E-03      DEV, PITCH:  .1039E-01  ROLL:  .2016E-05  YAW:  .2429E-05
RADIUS:   MAX:  .7070752E+07   MIN:  .7067644E+07      MAX EXCURSION PITCH:  .6 .6E+00  ROLL:  .1375E-03  YAW:  .9113E-04
VELOCITY: MAX:  .7003151E+01   MIN:  .7590633E+01      MAX RATE      PITCH:  .1038E-02  ROLL:  .3280E-06  YAW:  .3652E-05
PROCESSING ERRORS:        0                             PROCESSING ERRORS:        0
FATAL ERROR:
```

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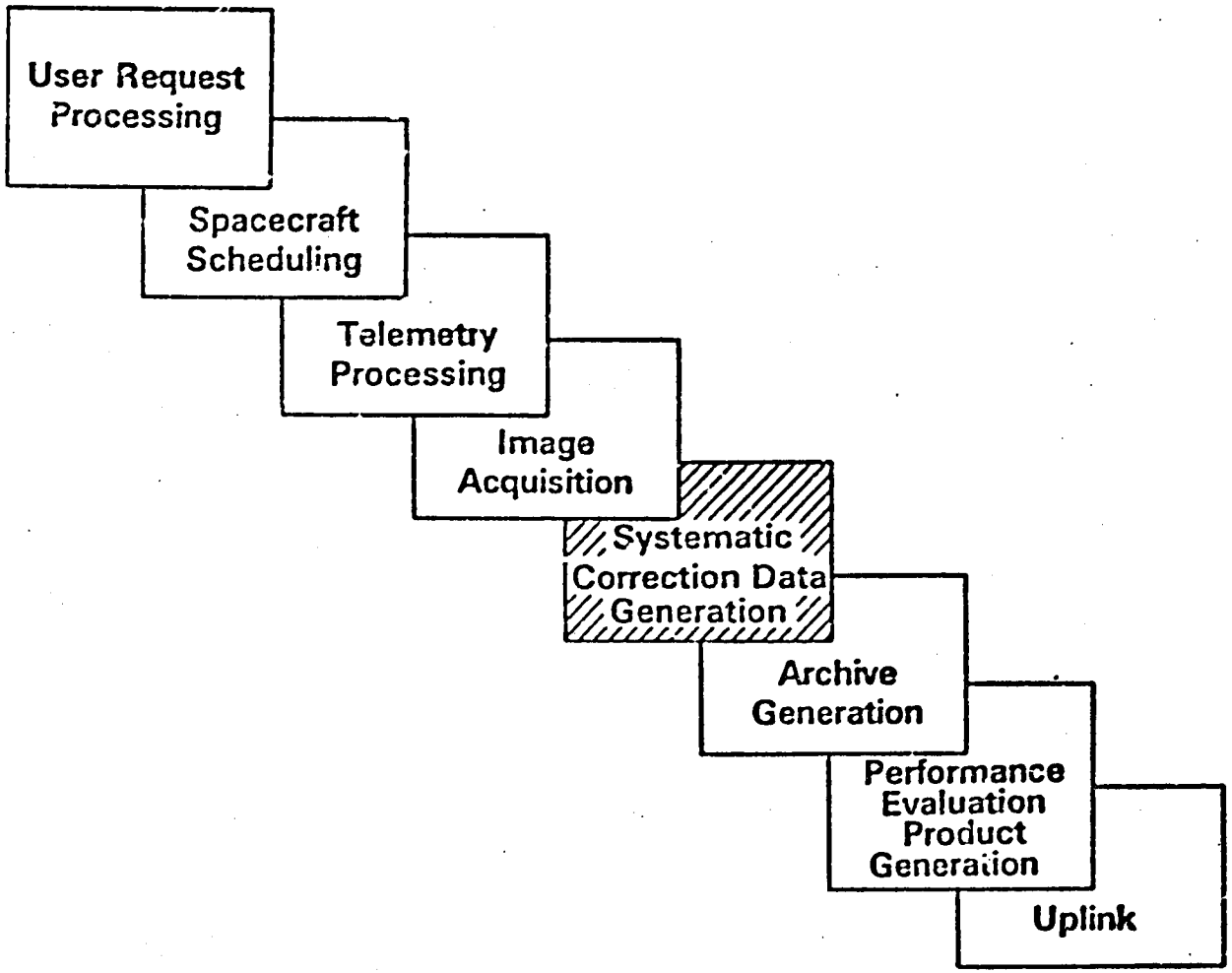
Standard MSS Processing



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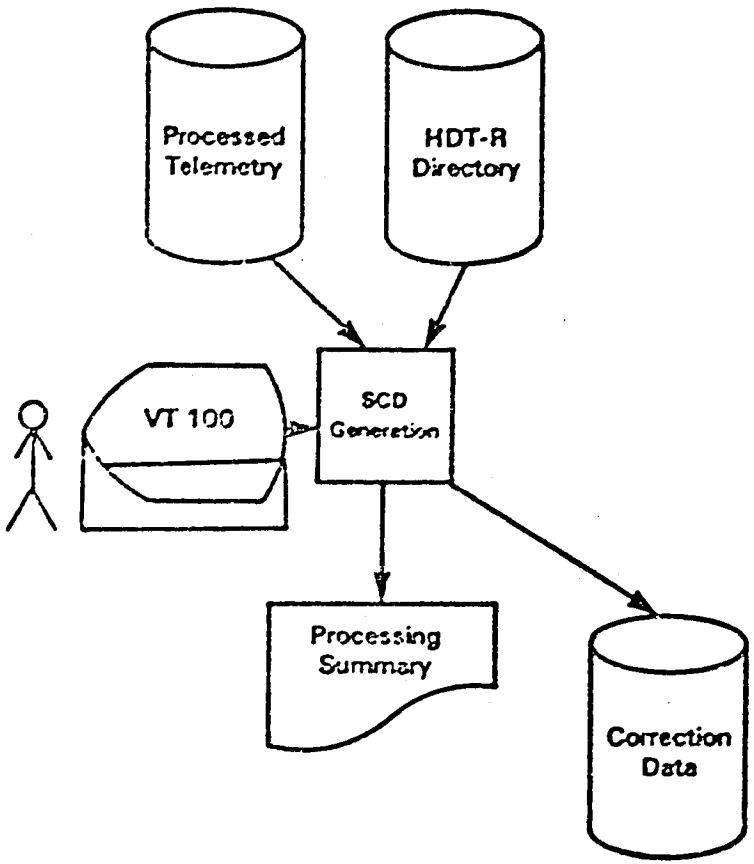
Systematic Correction Data Generation



- Input Source/Telemetry Processing and DRRTS Image Acquisition
- What Time/Distributed Over 2 Shifts
- How/Manual Initiation
- Who/Production Specialist
- Where/MMF-M DEC 2050

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PCS25V PCS PHASE TWO PROCESSING SUMMARY REPORT PAGE 1
DATE: 26-MAR-82 REF-M
TIME: 13:06:53 PROCESS REQUEST ID: SPR011.CTS PCS BASELINE: 13PAR82
SEQ. NO.: 301 LT PARM FILE: PL4001.CTS MDT TAPE ID: L4SNR8225311

SCENE STATUS - PROCESSED CENTERS

FASA SCENE ID	ROW	PATH	EPHEMERIS DEVIATION X	Y	Z	ATTITUDE DEVIATION PITCH	ROLL	YAW	EPH PTS MISS	EPH PTS REJ	ATT PTS MISS	ATT PTS REJ	PROC ERROR	SCENE STATUS
4241101275	71	112	.9156E+02	.1556E+02	.6491E+01	.7621E-01	.6492E-06	.3401E-05	0	0	0	0	0	1
4241101281	72	112	.1288E+03	.1709E+02	.8961E+01	.1275E+00	.1350E-05	.7010E-05	0	0	0	0	0	1
4241101286	73	112	.1584E+03	.1838E+02	.1073E+02	.1811E+00	.2359E-05	.1151E-04	0	0	0	0	0	1

INTERVAL START TIME: 82:253:01:25:41 INTERVAL FINISH TIME: 82:253:01:29:09
PROCESSING START TIME: 26-MAR-82 13:06:50 PROCESSING STOP TIME: 26-MAR-82 13:06:53
PROCESS REQ TYPE: P PROCESS REQ STATUS: 1
INPUT PCD FILE: PPC301.DAT

DATA QUALITY SUMMARY:

NO. OF SCENES: 3

EPHEMERIS DATA ERRORS: 0
TOTAL POINTS: 79
REJECTED POINTS: 0
DEV. X: .9351E-04 Y: .8104E-04 Z: .2632E-03
CORRECTION STATISTICS
MAX,RSS DEVIATION X: -.9241915E+02 .1291907E+03
Y: -.1832615E+02 .1706980E+02
Z: .6852582E+01 .8899243E+01
PROCESSING ERRORS: 0
FATAL ERROR: 0
TOTAL PROCESSING ERRORS: 0
OUTPUT CORRECTION FILE: SCD011.DAT

ATTITUDE DATA ERRORS: 0
TOTAL POINTS: 320
REJECTED POINTS: 0
DEV. PITCH: .5460E-02 ROLL: .8641E-07 YAW: .3862E-06
MAX,RSS DEVIA PITCH: .1449687E+00 .1352043E+00
ROLL: -.2510936E-05 .1615932E-05
YAW: -.1169428E-04 .8032177E-05
PROCESSING ERRORS: 0
FATAL ERROR: 0

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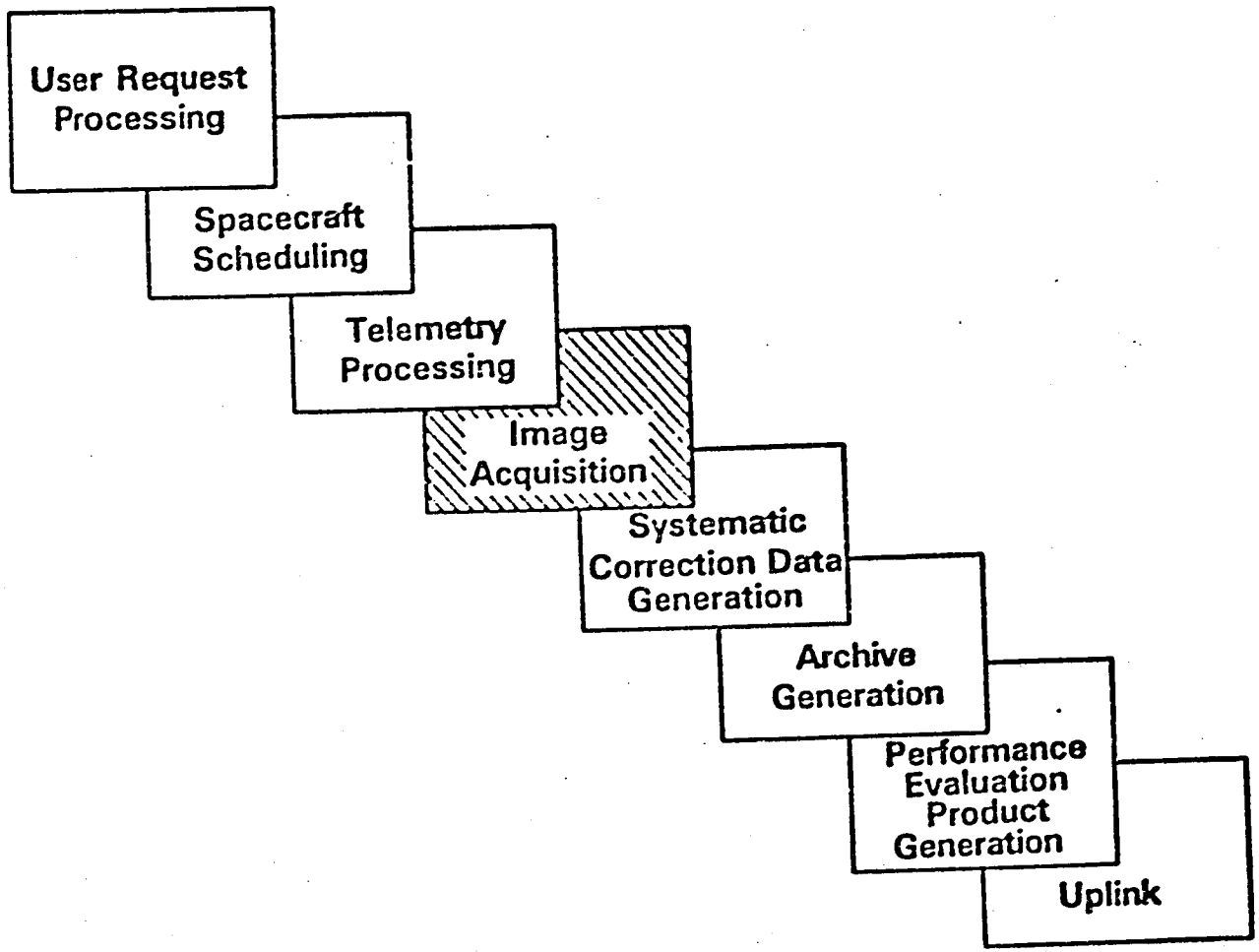
Standard MSS Processing



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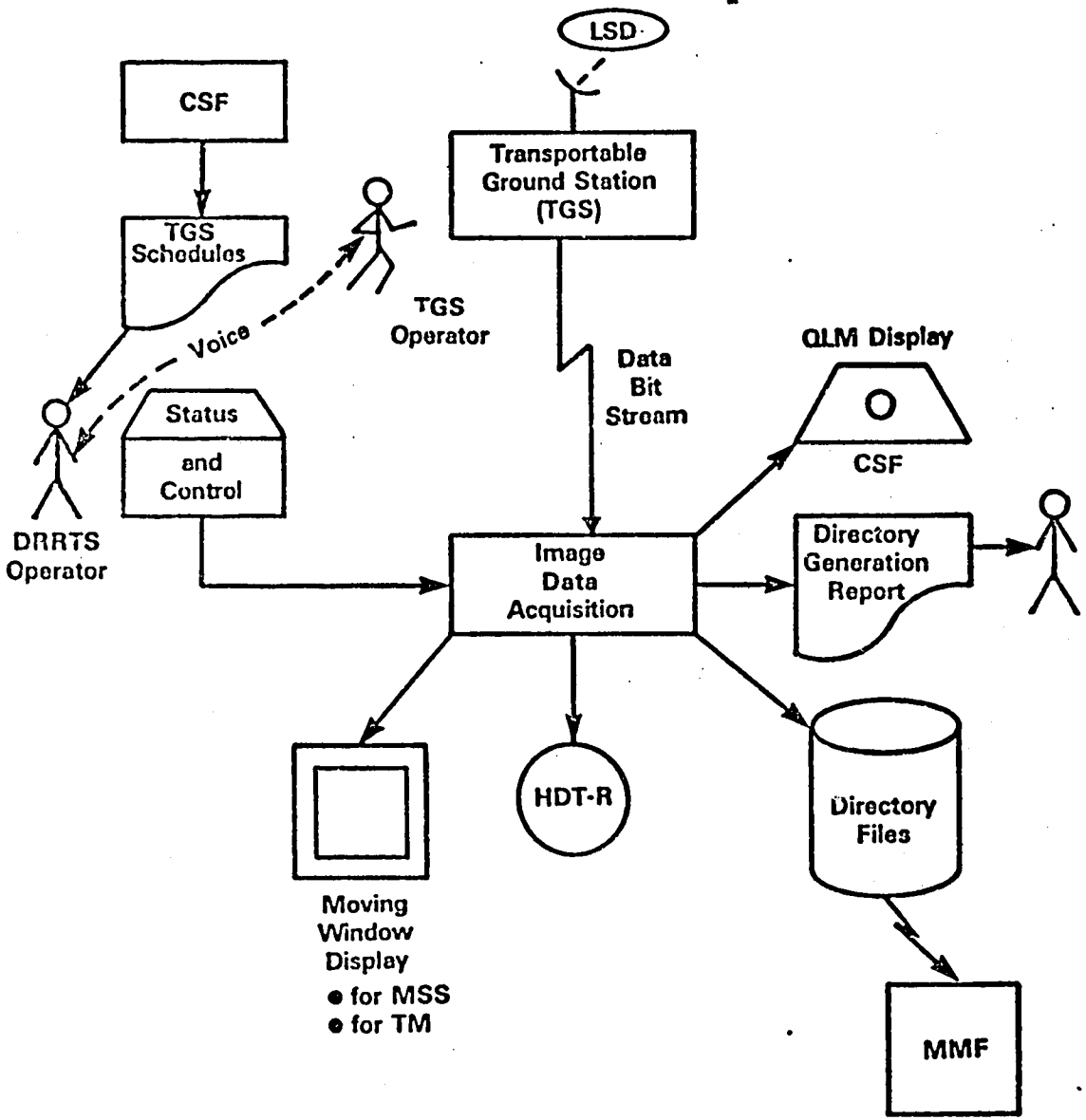
DRRTS Operation—TGS (MSS & TM) Data Acquisition



- Input Source/CSF Schedule for TGS
- How Often/Two or Three Acquisitions Per Day at 9 to 11 A.M. (Occasional Night Passes for TM)
- How/Manual Entry From Menu for Automatic Processing
- Who/DRRTS Operators Using Standard Procedures
- Where/DRRTS

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TGS Data Acquisition—Sequence of Events

Record HDT—RM/RT (28 Track Tape)

- Pre-Load System Configuration
  - — Operator Steps Through Function, Process and Operation Menus
  - — Prompted for Specific System Configuration
- Establish TGS/DRRTS Link Before Pass
  - — Test With Simulator Data
- Start Operation
  - — Operator Steps Through Function and Operations Menus
  - — Prompted to Mount and Verify HDT's
- Operation Control
  - — Automatic or (for contingency) —Manual
- Release Resources
  - — Operator Resource Release Upon Successful Conclusion of Operations

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Example—Pre-Load System Configuration

SYSTEM PROMPT	OPERATOR RESPONSE
PLEASE SELECT FUNCTION 1. DEFINE PROCESS 2. DELETE PROCESS 3. DEFINE OPERATION 4. LOAD OPERATION 5. CONTROL OPERATION 6. CANCEL OPERATION 7. DELETE OPERATION 8. RELEASED PROCESS TO MMF 9. MANUAL OPERATION 10. STATUS 11. ABORT DRRTS 12. END OPERATION	TYPE "1" C/R
PLEASE SELECT PROCESS TYPE 1. IMAGE DATA ACQUISITION 2. HDT COPY 3. HDT-AM UPLINK	TYPE "1" C/R
PLEASE ENTER PROCESS NAME (1 TO 6 ALPHABETIC CHARS)	TYPE "TGSACQ"

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Pre-Load Example (Continued)

SYSTEM PROMPT	OPERATOR RESPONSE
PLEASE ENTER HDT TAPE LABEL ID (MNSTTYYJJJXX)	TYPE "L4MHR8223502" C/R
IDA PROCESS TGSACQ DEFINITION COMPLETE	
PLEASE SELECT FUNCTION 1. DEFINE PROCESS 2. DELETE PROCESS 3. DEFINE OPERATION 4. LOAD OPERATION 5. CONTROL OPERATION 6. CANCEL OPERATION 7. DELETE OPERATION 8. RELEASED PROCESS TO MMF 9. MANUAL OPERATION 10. STATUS 11. ABORT DRRTS 12. END OPERATION	TYPE "3" C/R

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Pre-Load Example (Continued)

SYSTEM PROMPT	OPERATOR RESPONSE
PLEASE SELECT OPERATION TYPE 1. HDT-R GENERATION 2. HDT COPY 3. HDT-AM UPLINK 4. HDT-R PLAYBACK 5. RETROSPECTIVE DIRECTORY GENERATION 6. SCENE PACKING 7. MSS LINE TEST 8. TM LINE TEST 9. HDT COPY LINE TEST	TYPE "1" C/R
PLEASE ENTER OPERATION NAME (1 TO 6 ALPHABETIC CHARS)	TYPE "TGSACQ" C/R
PLEASE SELECT PROCESS 1. TGSACQ L4MHR8223502	TYPE "1" C/R
HDT LABEL ID IMPLIES MSS INSTRUMENT TYPE PLEASE SELECT DATA SOURCE 1. TGS 2. DOMSAT 3. HDT-GM	TYPE "1" C/R

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Pre-Load Example (Continued)

SYSTEM PROMPT	OPERATOR RESPONSE
RECORDING DATA RATE IS TRUE MSS REAL-TIME RATE DO YOU WANT A DIRECTORY ? (Y OR N)	TYPE "Y" C/R
PLEASE SELECT MSS DEMUX (1 OR 2)	TYPE "1" C/R
PLEASE SELECT DATA CAPTURE HDDR 1. 28-T #1 2. 23-T #2 3. 28-T #3 4. 28-T #4	TYPE "1" C/R
CURRENT CORRECTED ERRORS THRESHOLD FOR 28-T #1 IS 1000 ENTER NEW THRESHOLD, OR HIT RETURN TO USE CURRENT VALUE	TYPE C/R
CURRENT UNCORRECTED ERRORS THRESHOLD FOR 28-T #1 IS 0010 ENTER NEW THRESHOLD, OR HIT RETURN TO USE CURRENT VALUE	TYPE C/R
·· n GENERATION OPERATION TGSACQ DEFINITION COMPLETE	

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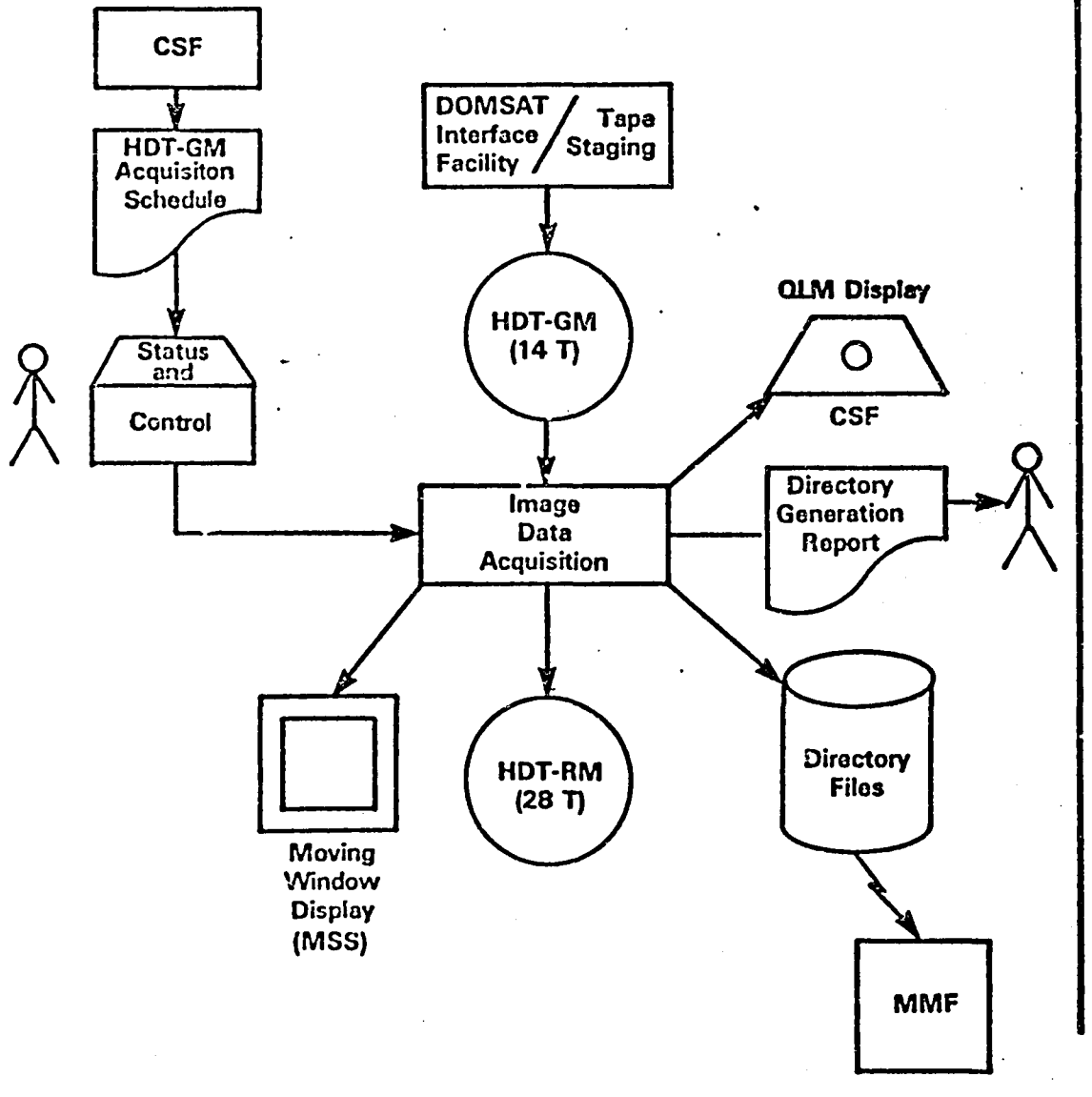
DRRTS Operation—GSTDN/Foreign Stations
MSS Data Acquisition



- Input Source/DIF
- How Often/Tapes Arrive
  Once Per Day and Periodically (Foreign Stations)
- How /Manual Entry
  From Menu for Automatic Processing
- Who/DRRTS Operators
  Using Standard Procedures
- Where/DRRTS

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GSTDN Data Acquisition—Sequence of Events

HDT-GM (14-Track From DIF) to HDT-RM (28-Track Tape)

- Pre-Load System Configuration
  - — Operator Steps Through Function, Process and Operations Menus
  - — Prompted for Specific System Configuration
- Start Operation
  - — Operator Steps Through Function and Operation Menus
  - — Prompted to Mount and Verify HDT's
- Operation Control
  - — Automatic or (for Contingency)—Manual
- Release Resources
  - — Operator Resource Release Upon Successful Conclusion of Operations

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DRRTS Contingency Operations

Failure	Method to Continue Operations	Responsible
High Density Recorder	• Switch to Another Recorder	DRRTS Operator
MSS Demultiplexer	• Switch to Redundant Demultiplexer	DRRTS Operator
TM Demultiplexer	• Cable in CSF Demultiplexer	Maintenance Personnel
Matrix Switch	• Cable Around Port and Redesignate • Cable Around Matrix Switch	Maintenance Personnel
PDP 11/34	• Record Data Manually and Generate Directories After Repair	DRRTS Operator

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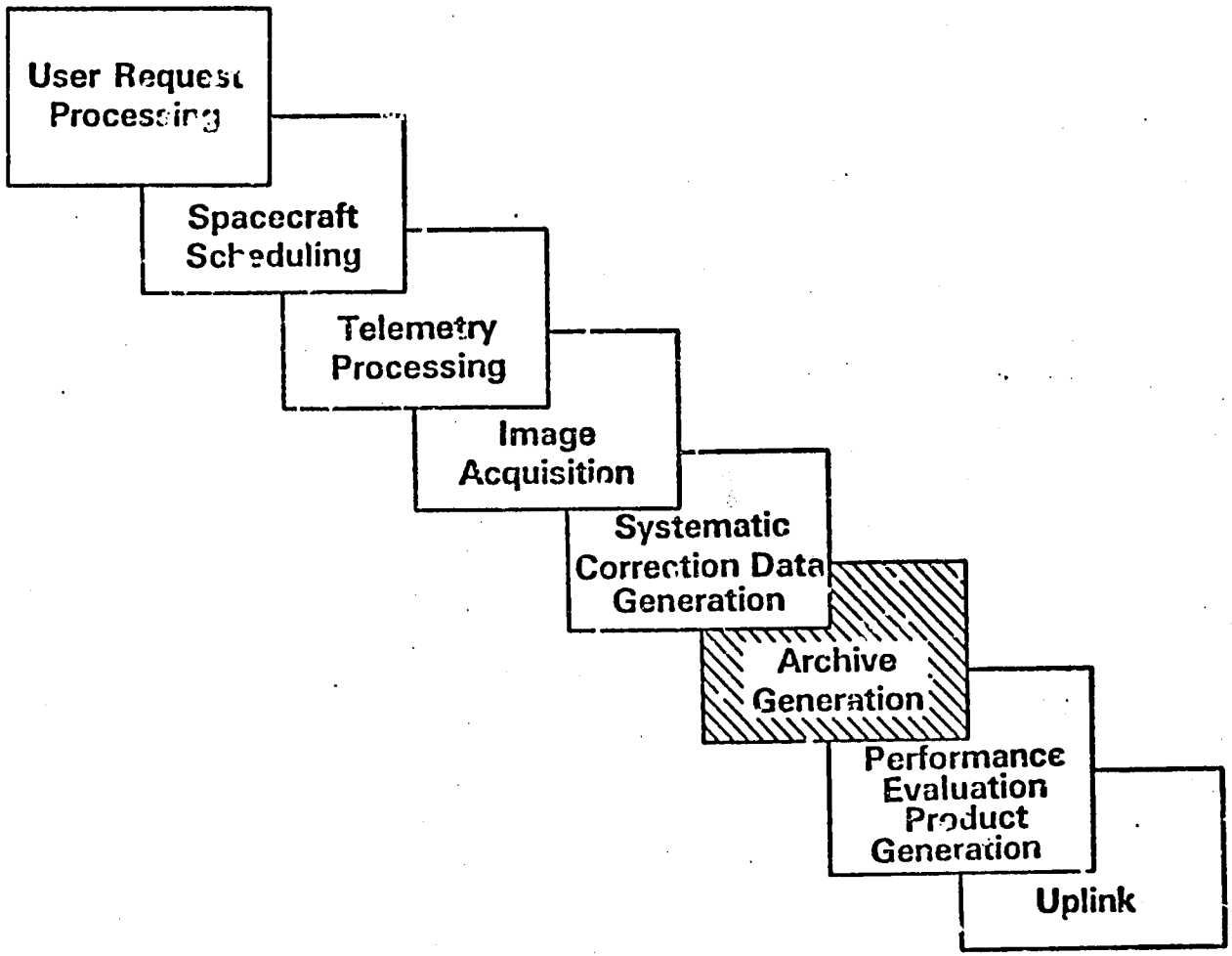
Standard MSS Processing



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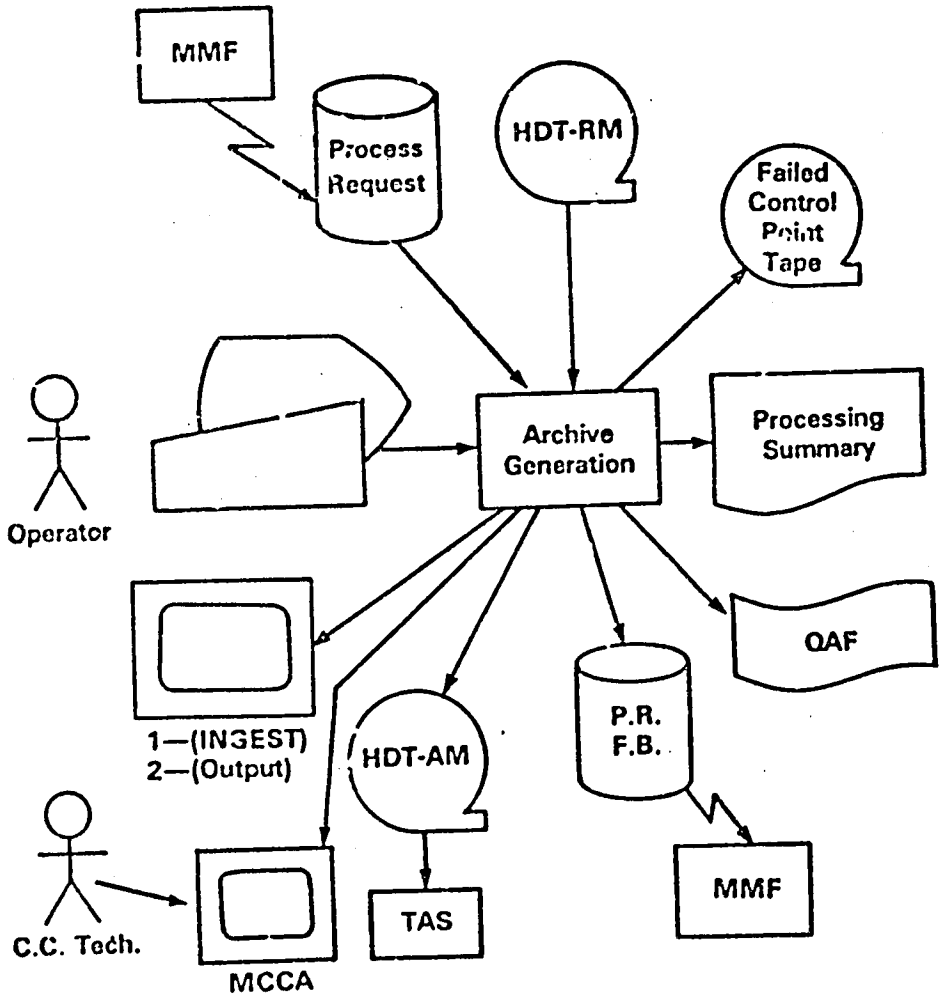
MIPS Archive Generation



- Input Source/Process Request
- How Often/Two Shifts Per Day
  7 Days/Week
- How/Manual Selection Via Menu
  for Automatic Processing
- Who/Computer Operator
  Cloud Cover Tech. Using
  Standard Procedures
- Where/Any MIPS String

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Archive Generation—Sequence of Events

- Display Available Work
- Start Archive Generation
- Operator Prompted for:
  - HDT-RM Mount
  - HDT-RM Dismount
  - MCCA Data Ready
  - QAF Data Ready
  - HDT-AM Mount
  - HDT-AM Dismount
- Data Processing is Automatic

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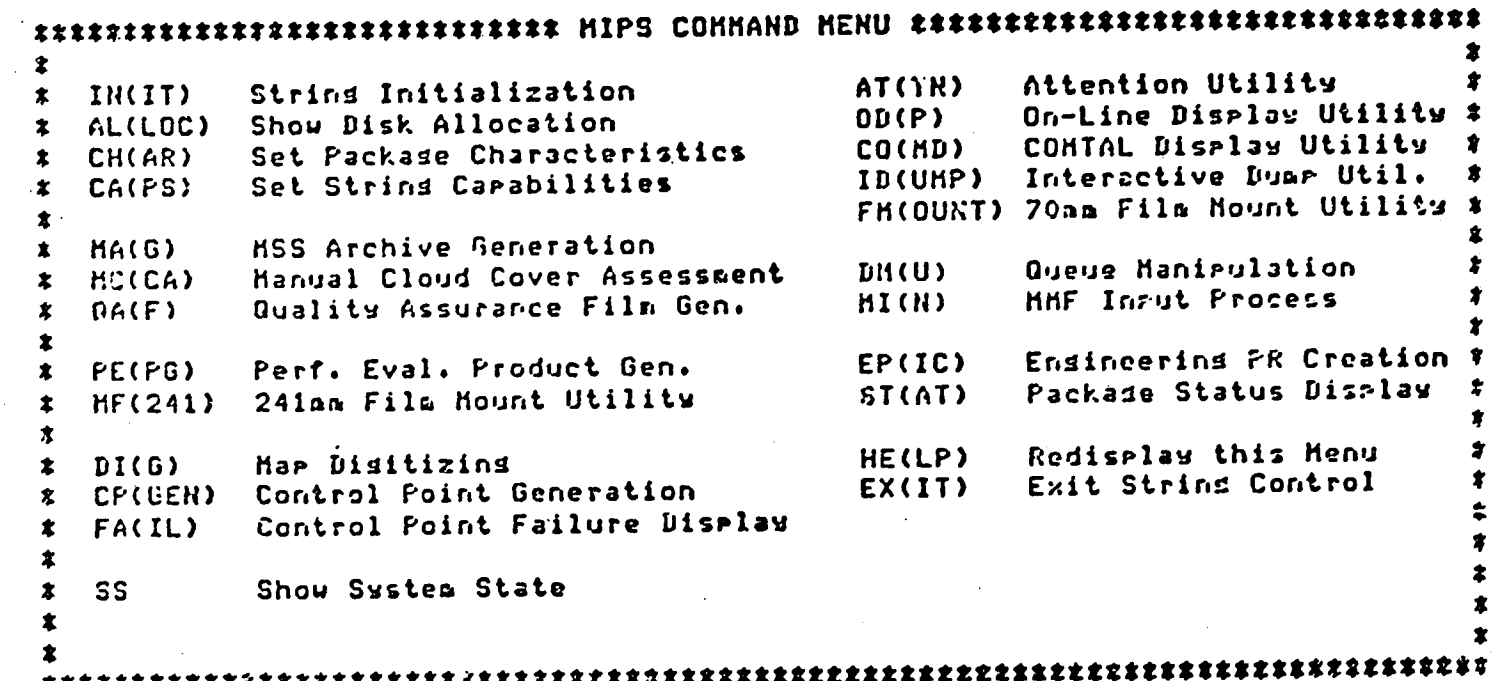

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STRING: MIPS2 DMU COMMAND SUMMARY DATE:25-JAN-1982
TIME:19:06:13.12

ENTER THIS..	TO DO THIS...
DISP	SELECT A DMU DISPLAY
EXIT	EXIT THE DMU SESSION
HELP	DISPLAY THIS MENU
PWOR	CHANGE THE (P)RIORITY OF A GIVEN (W)ORK (OR)DER
WCOM	ATTACH A (COM)MENT TO A WORK ORDER
POSI	CHANGE THE SCHEDULING (POSI)TION FOR ONE WORK ORDER
RWOR	(R)EWORK A (W)ORK (OR)DER
RQUE	(R)ESEQUENCE THE ENTIRE SCHEDULING (QUE)UE
FLPR	(FL)USH A (P)ROCESS (R)EQUEST
FWOR	(F)LUSH A (W)ORK (OR)DER
RSET	(SET) WORK ORDER TO (R)EADY STATE
CSET	(SET) WORK ORDER TO (C)OMPLETE STATE
HSET	(SET) WORK ORDER TO (H)OLD STATE
SBOU	(S)ET A-TAPE (BOU)NDARY
CBOU	(C)LEAR A-TAPE (BOU)NDARY

DMU> DISP

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STRING: MIPS2 DMU COMMAND SUMMARY DATE:24-JAN-1982
TIME:11:22:17.07

ENTER THIS..	TO DO THIS...
ACPR	DISPLAY A SUMMARY OF (AC)TIVE (P)ROCESS (R)EQUESTS
PRWO	DISPLAY THE (P)ROCESS (R)EQUEST (W)ORK (O)RDERS
WOTO	DISPLAY (W)ORK (O)RDER STATE (TO)TALS FOR EACH PACKAGE
HOLD	DISPLAY WORK ORDERS IN (HOLD) STATE FOR A PACKAGE
READ	DISPLAY WORK ORDERS IN (READ)Y STATE FOR A PACKAGE
PART	DISPLAY WORK ORDERS IN (PART)IAL STATE FOR A PACKAGE
COMP	DISPLAY WORK ORDERS IN (COMP)LETE STATE FOR A PACKAGE
FINI	DISPLAY WORK ORDERS IN (FINI)SHED STATE FOR A PACKAGE
HELP	DISPLAY THE COMMAND SUMMARY MENU
EXIT	EXIT DMU

DMU> READ MAG

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STRING: MIPS2 WORK ORDERS IN READY STATE FOR MAG PACKAGE

DATE:26-JAN-1982
TIME:21:03:48.26

LINE	PRI	SEQ.	WORK ORDER ID	SOURCE HDT	SCENES	STATUS	ATTEMPTS
1	30	0010	MIP812410001MAG01	L4MHRB126401	004		00
2	30	0020	MIP812420001MAG01	L4MHRB126401	013		00
3	30	0030	MIP812430001MAG01	L4MHRB126401	013		00
4	30	0040	MIP812440001MAG01	L4MHRB126401	005		00

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```
****************************** MIPS COMMAND MENU ******************************
*                                                                             *
*  IN(IT)    String Initialization          AT(TN)    Attention Utility      *
*  AL(LOC)   Show Disk Allocation           OD(P)     On-Line Display Utility *
*  CH(AR)    Set Package Characteristics    CO(MD)    COMTAL Display Utility  *
*  CA(PS)    Set String Capabilities        ID(UMP)   Interactive Dump Util.  *
*                                           FM(OUNT)  70mm Film Mount Utility *
*  MA(G)     MSS Archive Generation                                           *
*  MC(CA)    Manual Cloud Cover Assessment  DN(U)     Queue Manipulation      *
*  QA(F)     Quality Assurance Film Gen.    MI(N)     MMF Input Process       *
*                                                                             *
*  PE(PG)    Perf. Eval. Product Gen.       EP(IC)    Engineering PR Creation *
*  MF(241)   241mm Film Mount Utility       ST(AT)    Package Status Display  *
*                                                                             *
*  DI(G)     Map Digitizing                 HE(LP)    Redisplay this Menu     *
*  CP(GEN)   Control Point Generation       EX(IT)    Exit Strings Control    *
*  FA(IL)    Control Point Failure Displa.                                    *
*                                                                             *
*  SS        Show System State                                                *
*                                                                             *
*                                                                             *
*******************************************************************************
FUNCTION: MA
```

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Example — Archive Generation Processing

System Prompt/Message	Operator Response
MAGCON I400 PACKAGE INITIALIZATION COMMENCED	
HCS ENTER "ATTN HCS XXX" (XXX = PHYSICAL DEVICE ID)	
	TYPE "ATTN HCS HO1"
HCS PHYSICAL ID IS HO1	
MAGCON I401 PACKAGE INITIALIZATION COMPLETE	
MAGCON I404 WORK ORDER INITIATED	
HCS MOUNT HDT L4MHR8126401 AND ENTER "ATTN HCS ID OR NO"	
	MOUNT TAPE
	TYPE "ATTN HCS L4MHR8126401"
HCS MOUNT ACCEPTED L4MHR8126401	
MAGING I500 MING ACTIVATED	
MAGING I501 MING PROCESSING COMPLETE	

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Example—Archive Generation Processing (Cont.)

System Prompt/Message	Operator Response
MAGCON I416 CALCULATION PHASE INITIATED HCS DISMOUNT HDT L4MHR8225212 MAGDEX I600 MDEX ACTIVATED	● DISMOUNT TAPE TYPE "ATTN HCS YES"
HCS MOUNT BLANK HDT AND ENTER "ATTN HCS LNSTTYYJJJXX"	● MOUNT LABEL ON BLANK TAPE ● MOUNT BLANK TAPE TYPE "ATTN HCS L4MHA8126501"
HCS MOUNT ACCEPTED L4MHA8126501 MAGDEX I601 MDEX PROCESSING COMPLETE CCPPCE MAG HAS FINISHED DATA FOR MCA, WO IS READY MAGGCD I700 MGCD ACTIVATED CCPPCE MAG HAS FINISHED DATA FOR OAF, WO IS READY	

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Example—Archive Generation Processing (Cont.)

System Prompt/Message	Operator Response
MAGGCD I701 MGCD PROCESSING COMPLETE	
MAGHDG I802 MHDG ACTIVATED	
MAGHDG I800 MHDG PROCESSING COMPLETED	
MAGCON I417 OUTPUT PHASE INITIATED	
MAGOUT I956 PROCESSING BEGUN ON WORK ORDER	
MAGOUT I901 MOUT PROCESSING COMPLETE	
MAGCON I406 HDT-AM VOLUME COMPLETED	
HCS DISMOUNT HDT L4MHA8126501	
	● DISMOUNT HDT-AM TYPE "ATTN HCS YES"
HCS DEVICE 01 AVAILABLE	

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```
********************************* MIPS COMMAND MENU ***********************************
*                                                                                      *
*  IN(IT)    String Initialization              AT(TN)    Attention Utility           *
*  AL(LOC)   Show Disk Allocation               OD(P)     On-Line Display Utility     *
*  CH(AR)    Set Package Characteristics        CO(MD)    COMTAL Display Utility      *
*  CA(PS)    Set String Capabilities            ID(UMP)   Interactive Dump Util.      *
*                                               FM(OUNT)  70mm Film Mount Utility     *
*  MA(G)     MSS Archive Generation                                                    *
*  MC(CA)    Manual Cloud Cover Assessment      DM(U)     Queue Manipulation          *
*  QA(F)     Quality Assurance Film Gen.        MI(N)     MMF Input Process           *
*                                                                                      *
*  PE(FG)    Perf. Eval. Product Gen.           EP(IC)    Engineering PR Creation     *
*  MF(241)   241mm Film Mount Utility           ST(AT)    Package Status Display      *
*                                                                                      *
*  DI(G)     Map Digitizing                     HE(LP)    Redisplay this Menu         *
*  CP(GEN)   Control Point Generation           EX(IT)    Exit String Control         *
*  FA(IL)    Control Point Failure Display                                             *
*                                                                                      *
*  SS        Show System State                                                         *
*                                                                                      *
*                                                                                      *
****************************************************************************************
FUNCTION: ST
```

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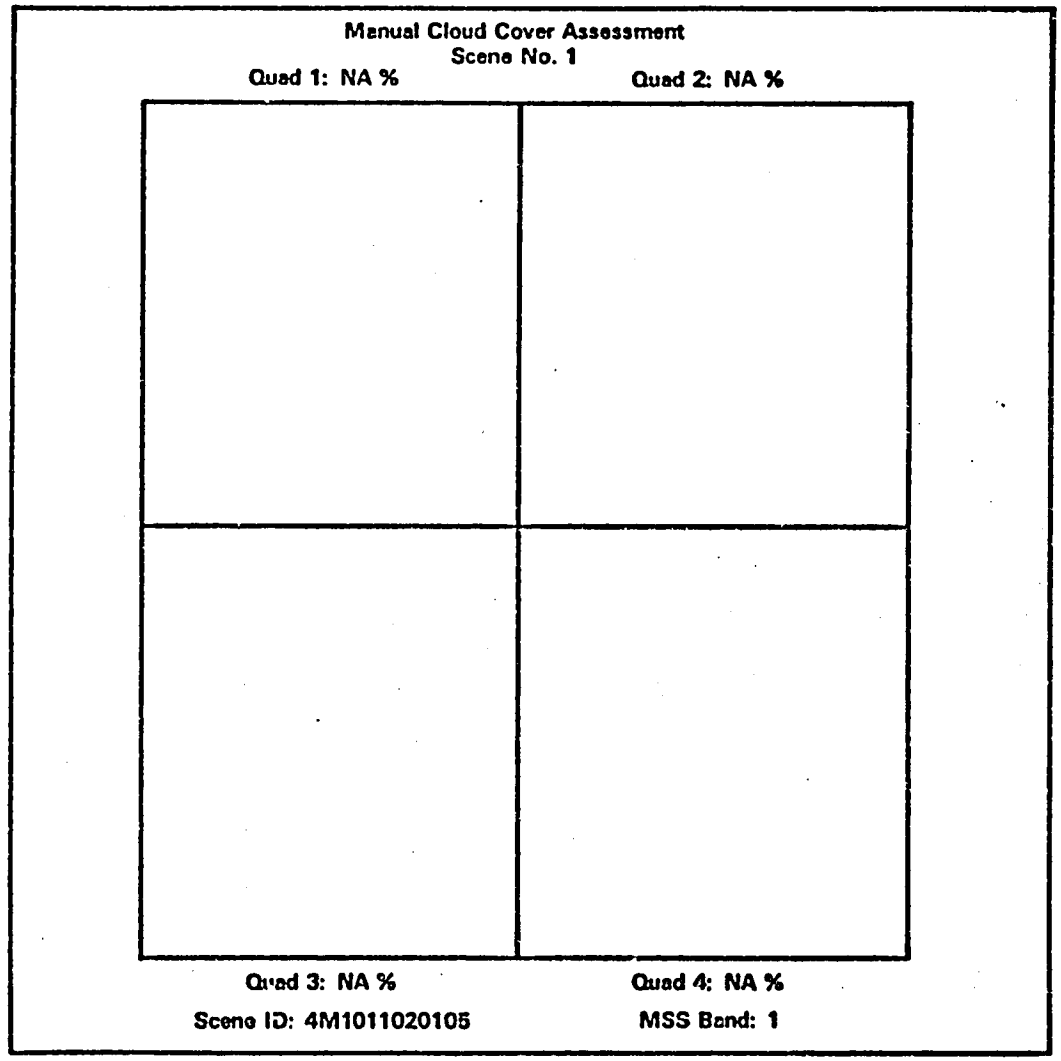
Comtal Display Screen Format



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MIPS Contingency Operations

Failure	Method to Continue Operations	Responsible
• High Density Recorder	• Switch to Spare using Patch Panel	MIPS Operation
• Image Display	• Delete On-Line Image Analysis Function or • Reallocate String Functions	Production Control (MMF)
• PSDO, SPDI, MSS DECOM	• Reallocate String Functions or • Use Overtime to Maintain Throughput	Production Control (MMF)
• Image Disk	• Reduce Number of Input Scenes Stored or • Reallocate String Functions	Production Control (MMF)
• System Disk	• Reduce Maximum Number of MCCA & QAF Scenes Stored	MIPS Operator
• VAX	• Reallocate String Functions or • Use Overtime to Maintain Throughput	Production Control (MMF)
• Matrix Switch	• Reallocate String Functions or • Use Manual Switching	Production Control (MMF)
• 70mm Film Recorder	• Reallocate String Functions, Spool off Unprocessed Data	Production Control (MMF)
• AP180 Array Processor	• Reallocate String Functions	Production Control (MMF)

Legend:
PSDO—Parallel to Serial Data Output
SPDI—Serial to Parallel Data Input
MCCA—Manual Cloud Cover Assessment
QAF—Quality Assurance Film Generation

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Recovery Steps for Loss of a MIPS VAX

Actions	Who
1. Determine How Long to Repair	Data Processing Planner
2. Examine Work Already at String	Production Specialist
3. Decide to Reallocate Process Request	D.P. Planner
If Yes:	
4. Activate MMF Software to Reallocate	Production Specialist
5. Modify Common Parameter for That String's Capability for Future Work to be Allocated	D.P. Planner
6. Notify MIPS Operator to Delete the Process Requests Which Were Reallocated	D.P. Planner

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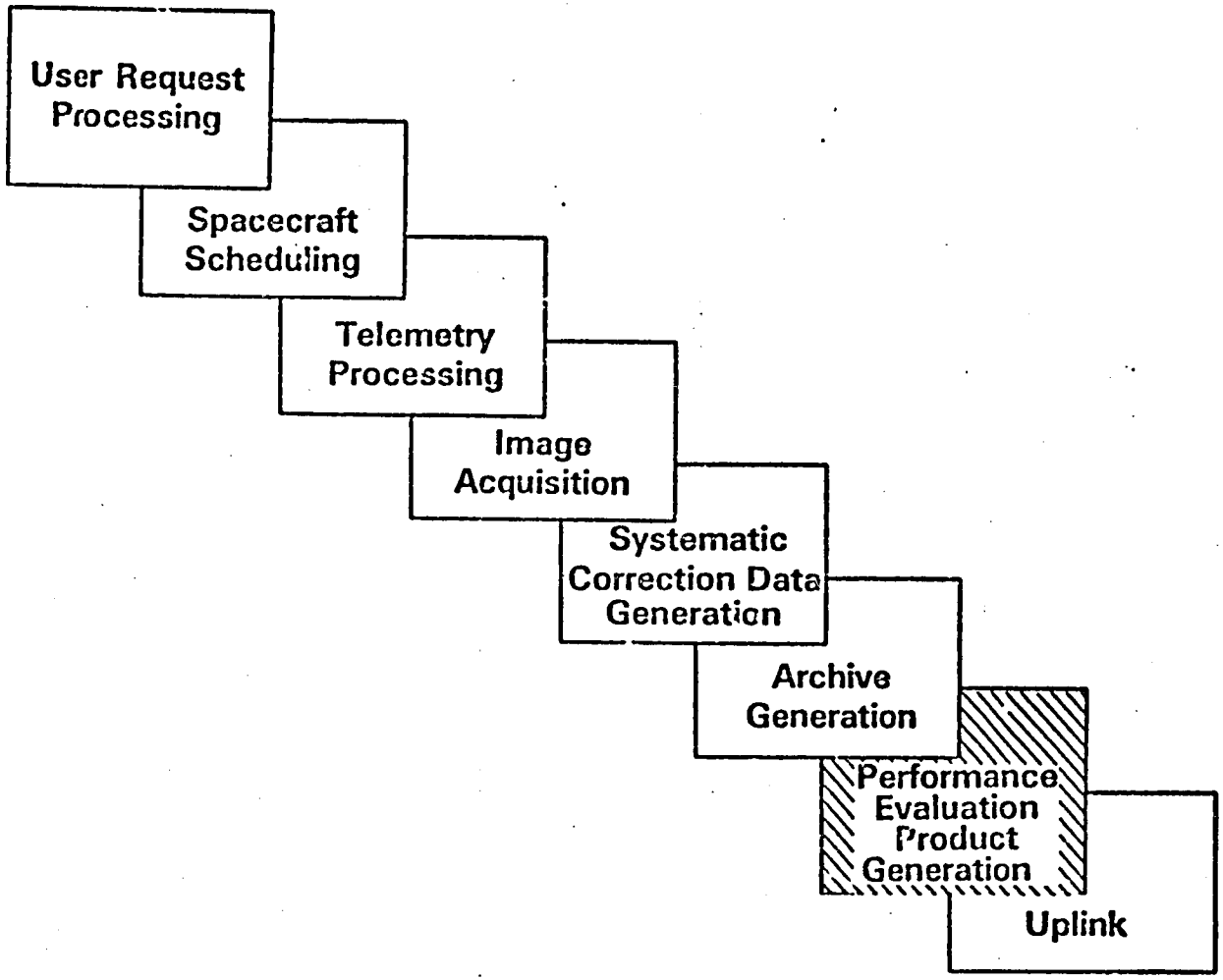
Standard MSS Processing



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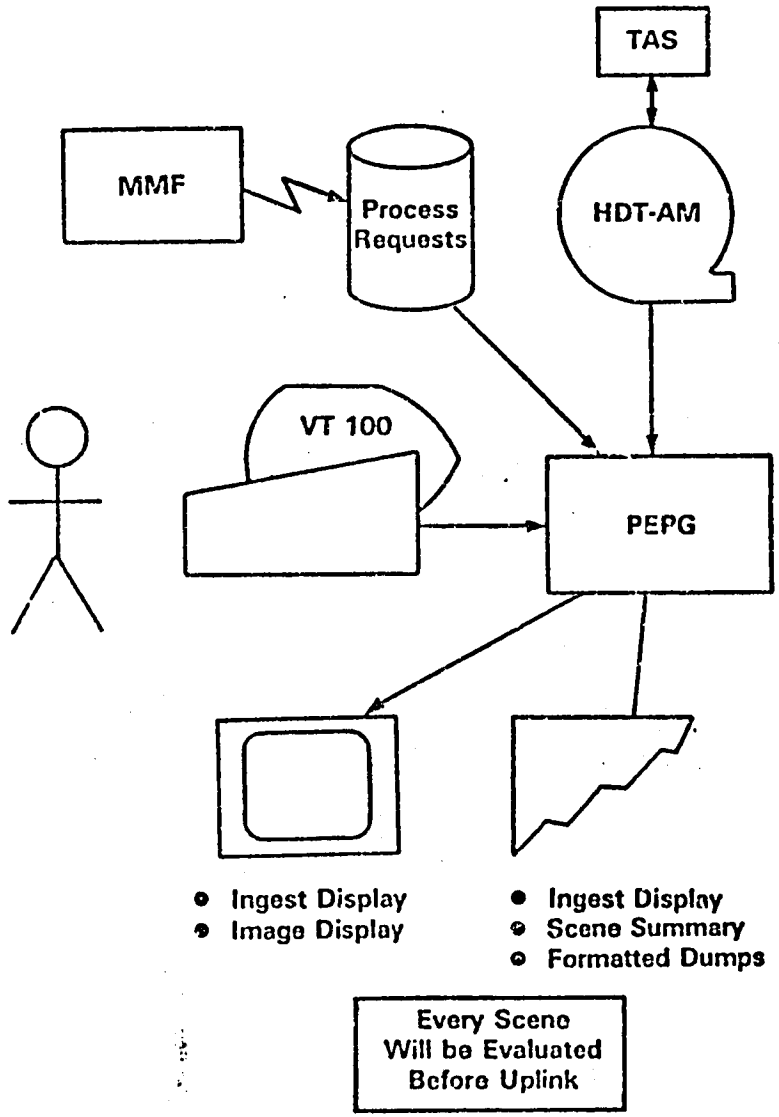
PEPG—HDT-AM Evaluation



- Input Source/Process Request
- How/Manual Selection Via Menu for Automatic Processing
- Who/Computer Operator Using Standard Procedures
- Where/Any MIPS String

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HDT-AM Evaluation—Sequence of Events

- Display Available Work
- Start Product Evaluation
- Operator Prompted for:
  - — HDT-AM Mount
  - — HDT-AM Dismount
- Ingest and Scene Summary Reports Generated Automatically
- Selected Scenes Stored on Disk for Evaluation by Quality Assurance
  - — Formatted Dumps
  - — Image Display

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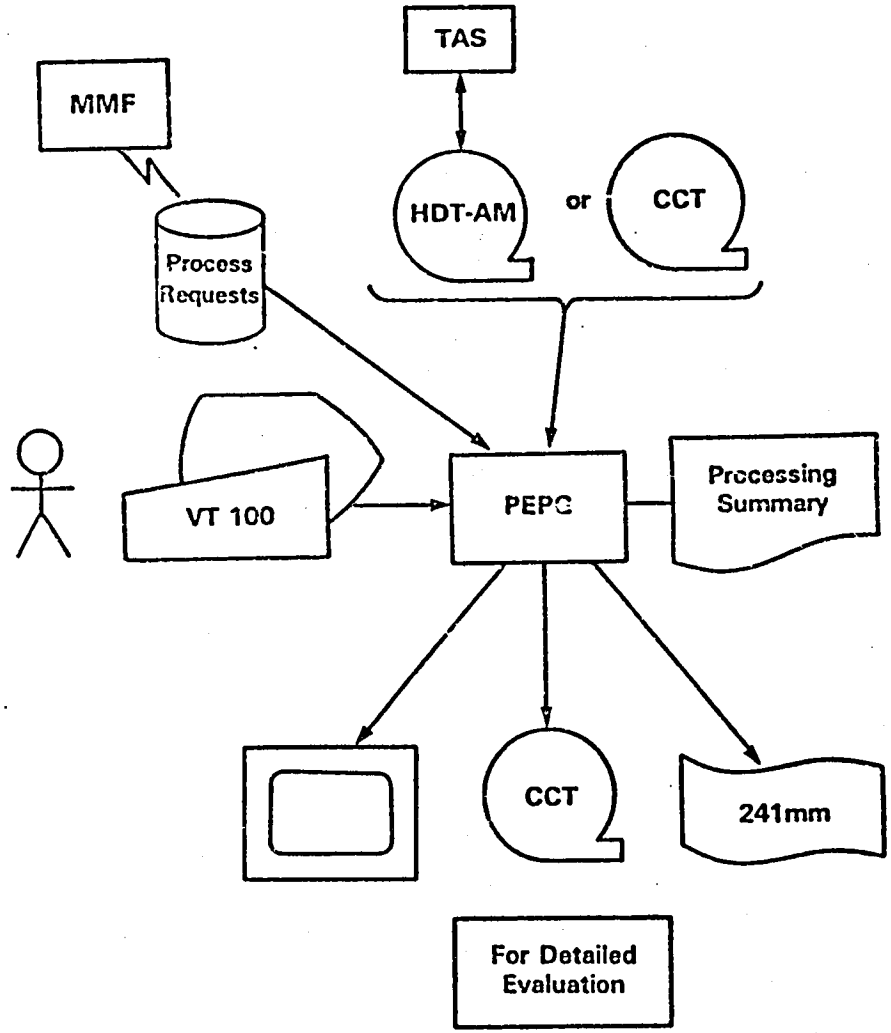
PEPG Product Generation



Input Source/Process Request

- How/Manual Selection Via Menu for Automatic Processing
- Who/Computer Operator Using Standard Procedures
- Where/MIPS for CCT (2 Scenes/Day)
  TIPS for 241 mm (9 Scenes/Day)

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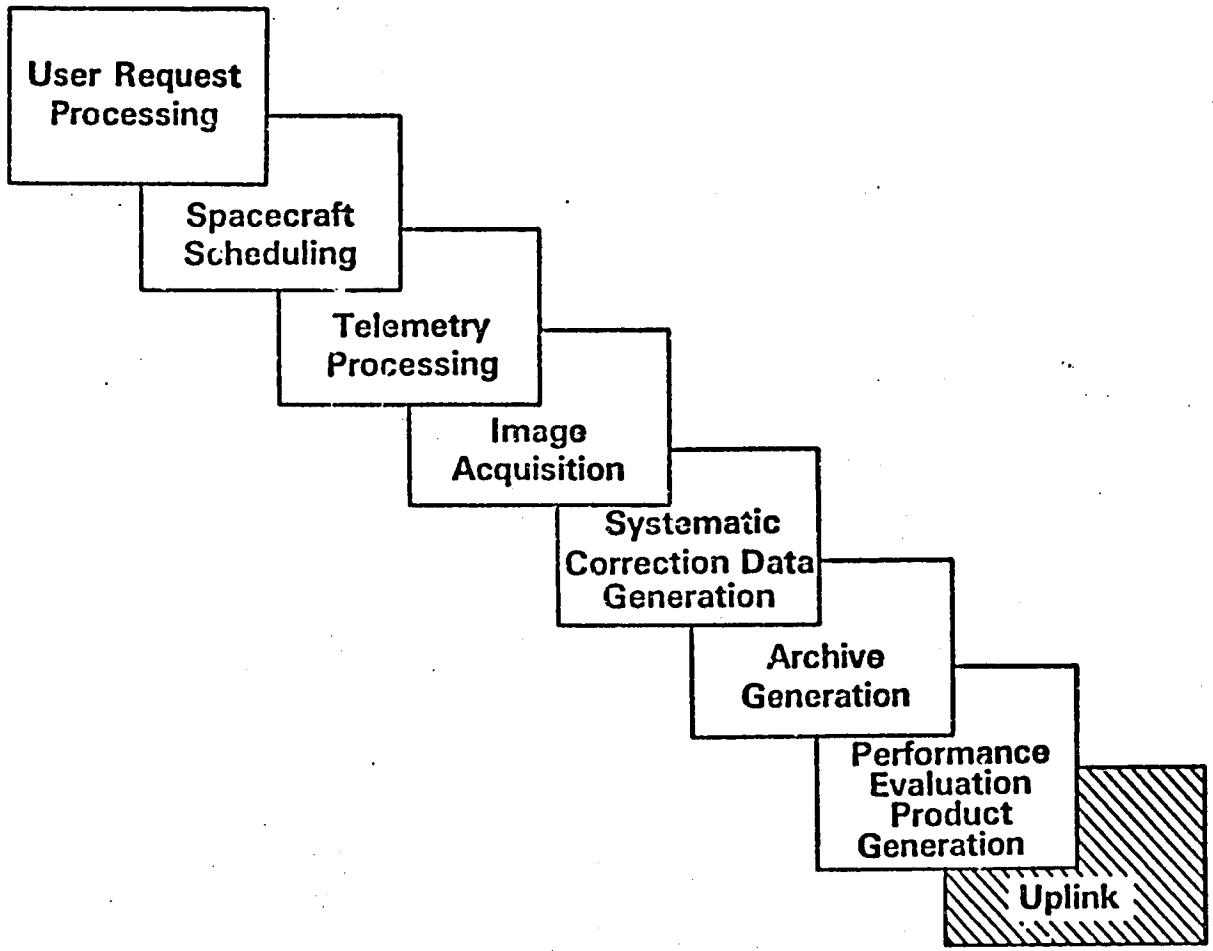
Standard MSS Processing



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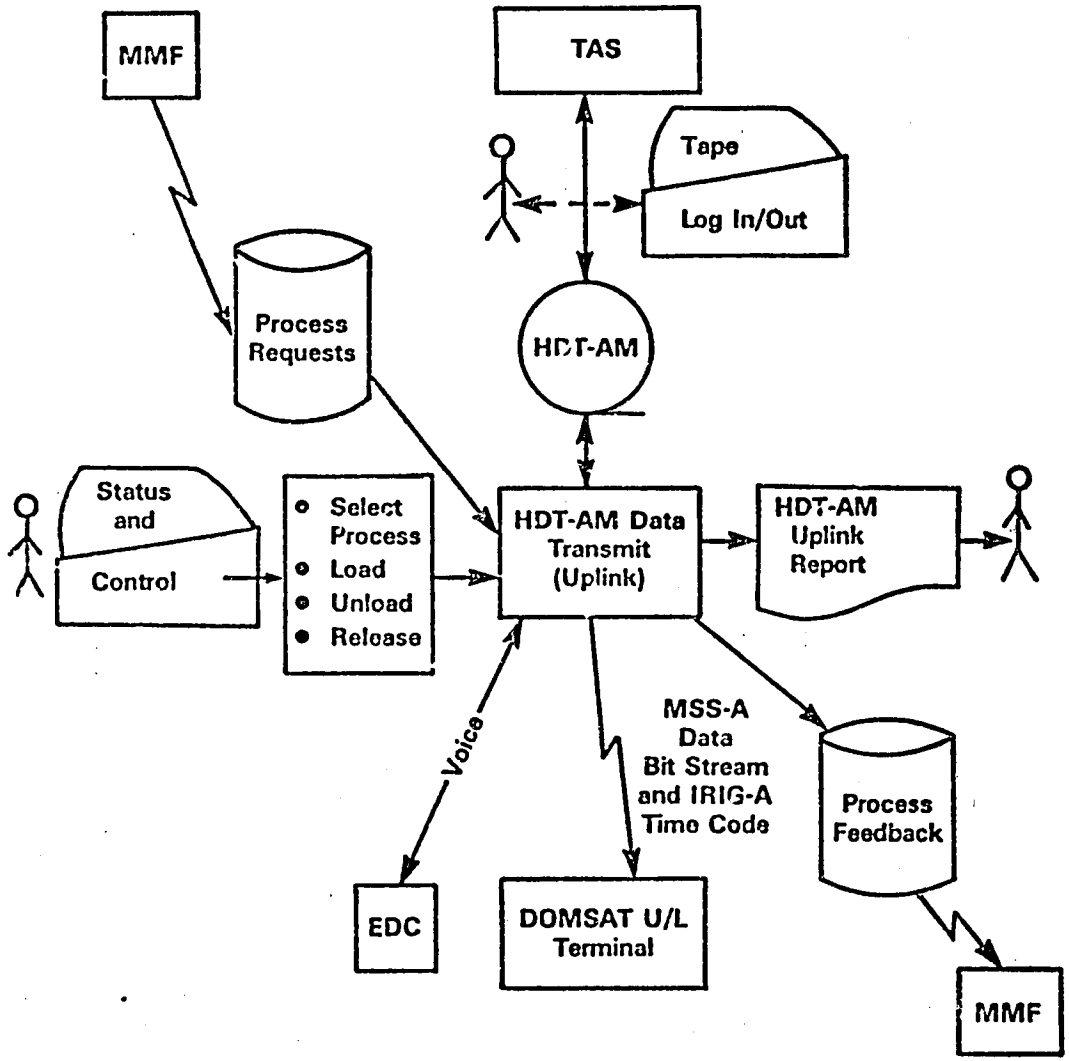
DRRTS Operations—HDT-AM Data Uplink



- Input Source/Process Request
- How Often/Once Per Day (0800-0900)
- How/Manual Selection Semi-Automatic
- Who/DRRTS Operators Using Standard Procedures
- Where/DRRTS VT 100

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Control Point Processing

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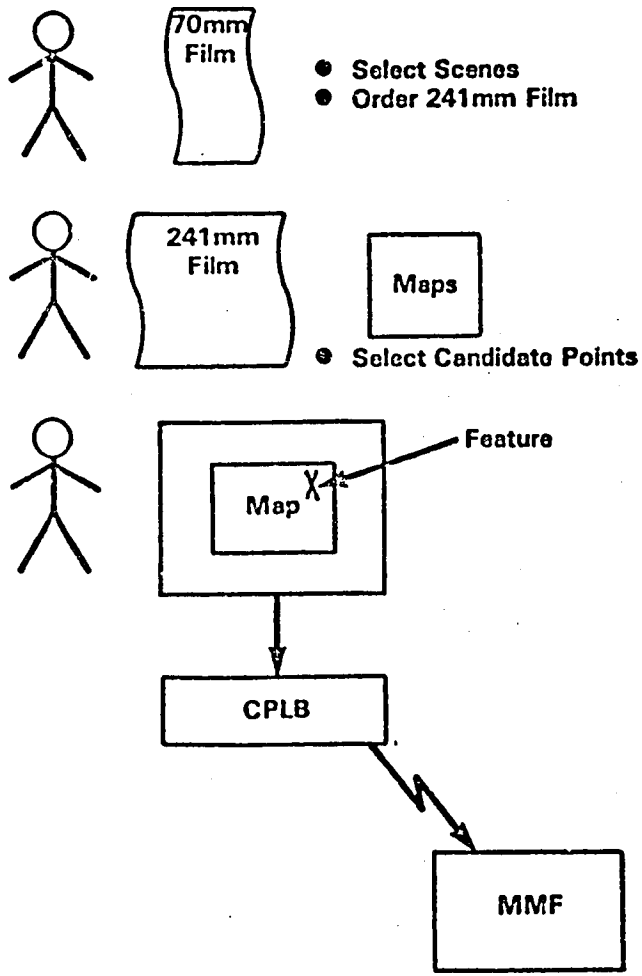
Control Point Candidate Selection



- Input Source/NASA Priorities
- How Often/Two Shifts/Day 5 Days/Week
- Who/Control Point Technician Using Standard Procedures
- Where/Control Point And Digitization Work Areas

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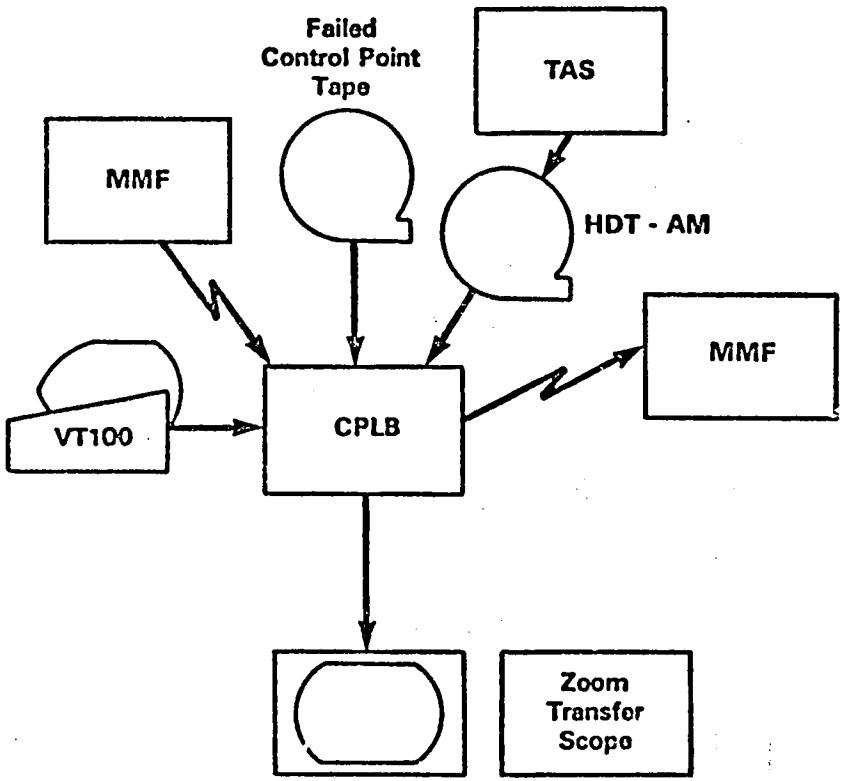
Control Point Generation



- Input Source/Process Request
- How Often/Two Shifts/Day
  5 Days/Week
- How Many/100 Points/Day
- Who/Control Point Technicians
  Using Standard Procedures
- Where/Control Point And
  Digitization Work Areas

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Operational Quality Assurance

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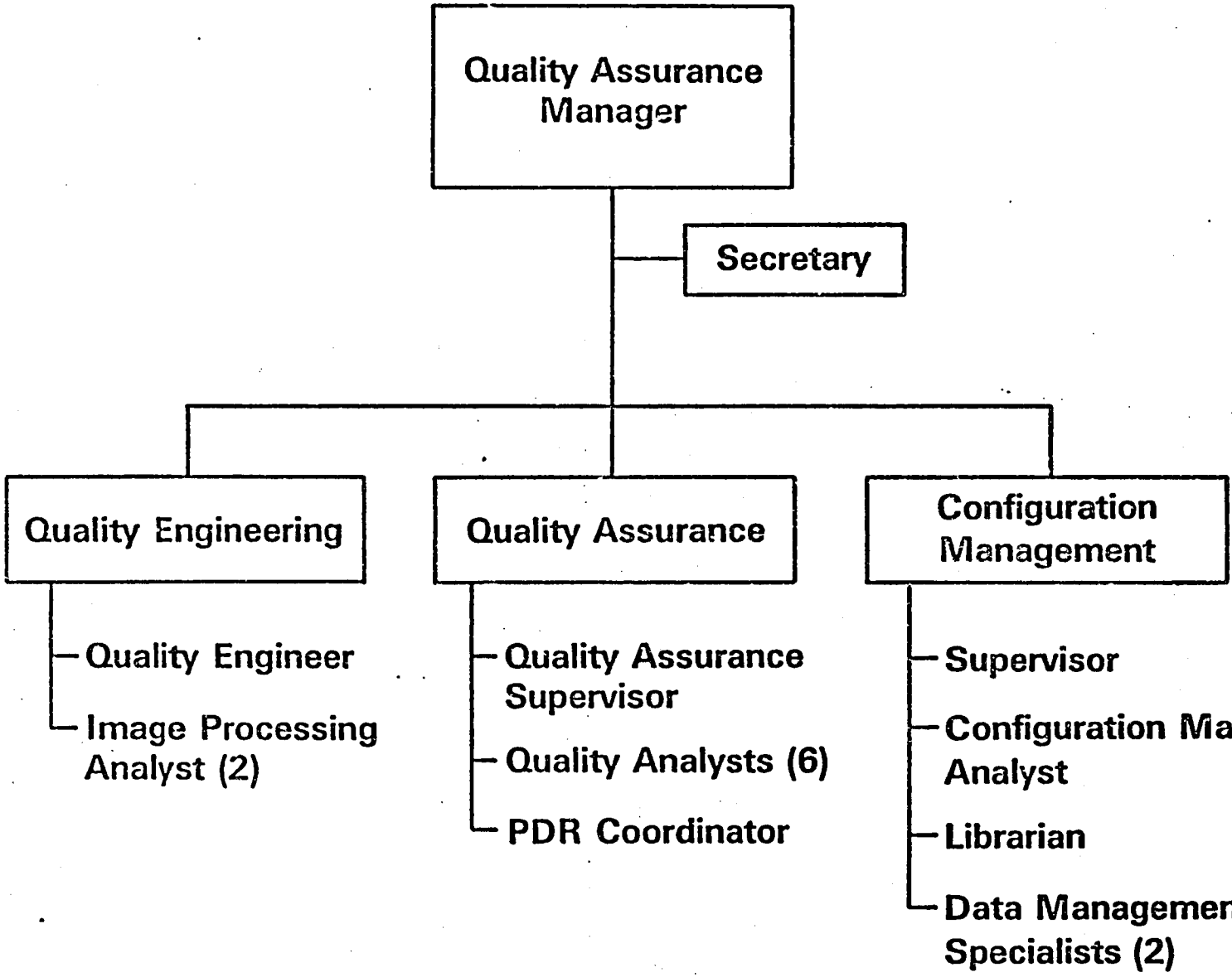
Quality Assurance Organization



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Quality Assurance—Responsibilities

Assure Performance
- Measurement
- Evaluation
- Adjustment
- Enhancement

Problem Management
- Prevention
- Detection
- Investigation
- Solution
- Reporting

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Quality Assurance Implementation

- Quality Assurance Concepts
- Product Evaluation
- Process Evaluation

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Quality Assurance Concepts

- Quality Assurance Features Designed Into System
- System is Fault Tolerant–Thruputs All Processable Data
- Fault Detection Built in, Limits Initially Set High
- System Captures Quality Indicators
  - — Stored in MMF Data Base
  - — Available in Many Computer Reports
- Quality Screening Responsibility Shared With Other Operators
- Quality Personnel Allocated for Problem Identification and Solution
  - — Supported by Automated FDR/ESR System
- High Visibility to Management of Problem and Quality Reports

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System is Fault Tolerant

DRRTS

ECC's—Count Limit Checked ≤10 Uncorrectable (MSS) ≤1000 Correctable (TM)
— If Exceeded, Alarms for Operator; Summary in QA Report

Major Frame Sync Loss—If >10 Consecutive, Automatically Breaks Interval

Bad Time Code—Identified in Directory
—Operator Instructed Via SOP to Re-Dub Good Time Code Data

Recording Quality From TGS—Displayed in Moving Window Display (Read After Write)
—Operator Response
- Notify TGS if Transmission Bad
- Switch Recorders if Recorder Problem

MMF

Quality Checks ECC's and Sync Loss Against Limits—Limits Initially Same as DRRTS/MIPS

MIPS

ECC's—Same Alarms as DRRTS

Time Code—Substitutes if Can't Read

Sweep Substitution—Limit Checks—if Sync Loss for 10 Consective Major Frames, Declares Partial and Continues to Next Scene

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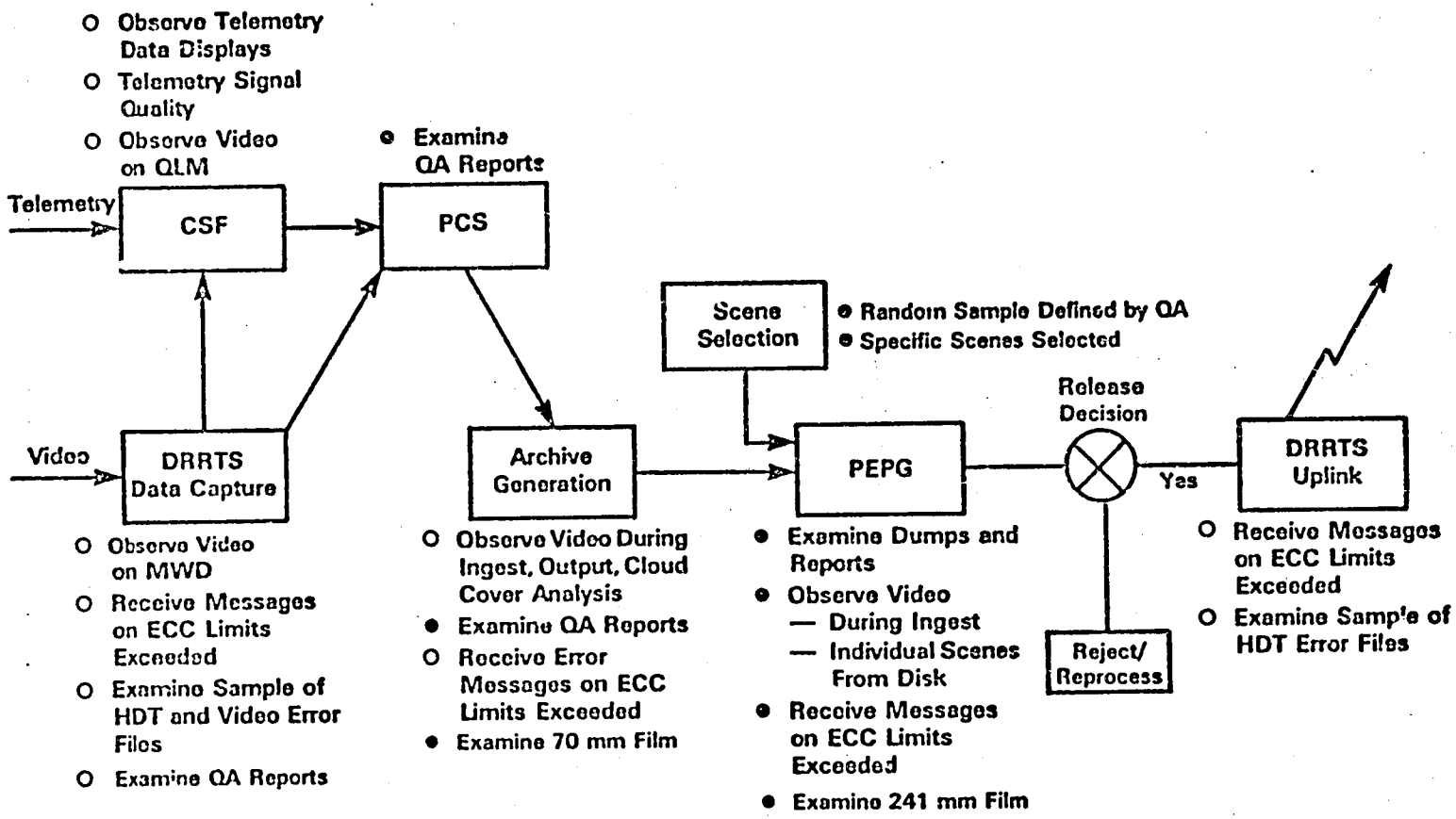
QA Scenerio for Normal Processing (HDT-AM Generation)



QLM: Quick Look Monitor
MWD: Moving Window Display
ECC: Error Correcting Code

O — Performed by Operators
• — Performed by QA

Product Evaluation

Assess Image Quality

- Real Time by Quality Analysts Using Visual and Data Evaluation Techniques
- Real Time by CSF/DRRTS Operators Using Moving Window Display, Quick Look Monitor, and Evaluators Consoles
- Off Line by Image Processing Analysts Using Visual and Data Evaluation Techniques

Authorize Uplinking of Acceptable Products

- By Quality Analysts Following PEPG Process
- By Image Processing Analysts Following Detailed Evaluation of Rejected/ Reprocessed Data

Establish Accept/Reject/Reprocess Criteria

- By Image Processing Analysts With Concurrance of Engineering Review Board
- Update Using Pre and Post Launch Experience

Investigate User Feedback

- By Image Processing Analysts With Response Thru Project Office

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Image Quality Assessment—Visual Techniques

- Each Scene—Scrolling Video Display (PEPG)

  Evaluation Criteria

  - — Video Present
  - — Anomalies in Video Data
  - — Correlate Video Data With Operator Messages

- 1 Band/Scene to 70 mm Film Product

  Evaluation Criteria

  - — Presence of All Characteristics (E. G., Video, Annotation, Tick Marks, Scene ID)
  - — Anomalies in Video Data (Striping, Line Starts, Sync Loss)
  - — Correlation With QA Reports

- PEPG —Upon Request by Image Processing Analyst
  - — Detailed Evaluation Using Comtal Display and 241 mm Film
  - — Typically Used for—
    - More Thorough Evaluation of Apparent Problems Observed During Process
    - Investigation of PDR's
    - Precise Measurements to Support Performance Analysis

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Image Quality Assessment—Data Analysis Techniques

- Uses "Quality Indicators" Designed Into System
- Data Available From—

  Various Processing Reports
  Tape Annotation Records
  QA Reports
  MMF Quality Files

Quality Indicators Used Real Time

  Limit Checks in Software
  Correlate to Video Display During PEPG
  Accept/Reject/Reprocess Criteria Established in SOP's
  Annotate Products for Users

Used Off Line

  To Aid in Problem Investigation
  To Support Performance Trend Analysis
  To Support Adjustments in Criteria—Accept/Reject/Reprocess
  To Support Changes in S/W Limit Checks

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Typical Quality Indicators

DRRTS — Image Quality Data File

Location — DECNET Header Record (DRRTS → MMF)

Data — Major Frames Out of Sync
Minor Frame Sync Loss
Minor Frame Sync Bit Errors
Bit Slips

MAG QA Report — By Scene

Radiometric Quality — Detector Data
Summary by Band

MAG Processing Summary Report — By Scene

Band Quality Indicators — Derived From
Minor Frame Sync Loss
Major Frame Sync Loss
Line Substitutions
Missing Line Starts

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Typical QA Report

Band Quality Indicators
Launch Baseline Criteria - All Quality Levels Acceptable
With Operating Experience - Acceptable Threshold May Be Established

Acceptable Limit For Uncorrected - 10
Criteria given To QA For Uplink Decision

JA_RPG
DATE: 27-FEB-1982
TIME: 17:24:34.72

MAG QUALITY ASSURANCE REPORT PAGE 0 038

MIPS STRING 0 02
S/W VERSION 0 MIPS_STAGE_TST_2

SCENE SUMMARY DATA

SCN AOM	NASA SCENE ID	INTERNAL SCENE ID	SCN STAT	BAD=BUA 0 1 2 3 4	HDT=AM ECC UNCORR	HDT=AM ECC CORR	HDT=PM ECC UNCORR	HDT=PM ECC CORR	CAL. MI	S/C SUB.	RNFR TIM	RNFR SYNC	R.L. SYNC	LINE STAT	P SUB.	CP F	CR	NF INUP	NF ERN
4	402h414595	4h00/0250204	001	0 0 0 0	0	0	0	1096	26921	1	0	0	0	0	0	0	0	0	0

HDT=AM BAND INIG TIMES: 1) 0000000000 : 0000000000 2) 0000000000 : 0000000000 3) 0000000000 : 0000000000 4) 0000000000 : 0000000000

RADIOMETRIC IMAGE QUALITY

NOMINAL CAL MODE SET ID:
GOLF/ADD CONSTANT SET ID:

CALIBRATION METHOD : M
CALIBRATION SEGMENTS : 4
CALIBRATION SUBSEGMENTS: 3

BAND DATA

BAND NO.	GOAL CODE	QUALITY 00	02	03	SENSOR MODE	HISTOGRAMS MEAN	DIFF	STDV	SWEEPS MISS	C.W. WINDOW
1	0	2400	0	0	LC	75.9	4.0	29.27	0	0
2	0	2400	0	0	LC	80.9	3.2	32.19	0	0
3	0	2400	0	0	LC	83.4	0.3	30.84	0	0
4	0	2400	0	0	LC	32.3	0.1	13.02	0	0

Radiometric Indicators
Max Difference Between
Detectors Within Each Band
= 3 Initially

DETECTOR DATA

SCN DET	C.N. SUB.	CALIBRATION GAIN	BIAS	HISTOGRAM GAIN	BIAS	MEAN	STDV
1	1200	0.7	0.6	0.6	0.4	75.7	28.90
2	1200	0.7	1.7	0.7	1.9	75.9	29.16
3	1200	0.8	0.5	0.8	1.5	76.1	29.40
4	1200	0.9	2.3	0.8	1.6	75.6	28.83
5	1200	0.6	2.6	0.7	3.6	76.5	30.01
6	1200	0.8	2.3	0.8	2.3	75.9	29.31
7	1171	0.9	0.9	0.9	1.1	80.8	32.14
8	1006	0.9	0.8	1.0	2.4	81.2	32.56
9	1191	0.8	1.0	0.8	1.3	81.0	32.35
10	982	0.8	0.7	0.8	1.6	81.0	32.26
11	986	0.9	0.5	0.9	1.8	80.9	32.23
12	5	0.8	0.5	0.8	1.8	80.8	31.81
13	1200	0.7	1.9	0.7	1.2	83.2	30.31
14	1200	0.7	0.5	0.7	0.8	83.4	30.87
15	1200	0.9	3.5	0.9	3.0	83.5	30.89
16	1200	0.9	1.8	0.9	2.4	83.5	30.90
17	1200	0.9	1.9	0.9	1.6	83.2	30.56
18	1200	1.0	1.5	1.0	2.9	83.9	31.50
19	1200	0.9	0.8	0.9	0.5	32.3	13.04
20	1200	0.9	0.7	0.9	0.6	32.3	13.03
21	1200	0.9	0.7	0.9	1.3	32.3	13.00
22	1200	0.8	2.2	0.8	1.3	32.3	13.03
23	1200	0.9	1.1	0.9	0.8	32.3	13.00
24	1200	0.9	-0.1	0.9	0.9	32.3	13.04

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Process Evaluation

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Problem Investigation

- PDR Investigations by Quality Analysts and Image Processing Analysts
- PDR Processing and Management Reports by PDR Coordinator
- Problem Trend Analysis By Image Processing Analysts Using PDR's and ESR's and Data Base

Process Quality Assessment

- Processing Success Evaluation by Image Processing Analyst Using Processing and QA Reports
- Operation Audits of All Functions by Quality Analysts
- Refinement of Use of Quality Indicators by Quality Analysts
- Processing Enhancement Recommendations
- Line Tests
  - — Evaluate Results and Authorize Processing—Quality Analysts
  - — Criteria Development and Evaluation—Image Processing Analysts (Approved by ERB)

Management Reporting

- Automated Management Reports for PDR's and ESR's
- Audit Reports
  - — Immediate Reports to Responsible Manager
  - — Corrective Action Reports Required
  - — Management Report
- Special Management Reports
  - — Problem Trend Analysis (Monthly)
  - — Current Quality Problems (Daily)

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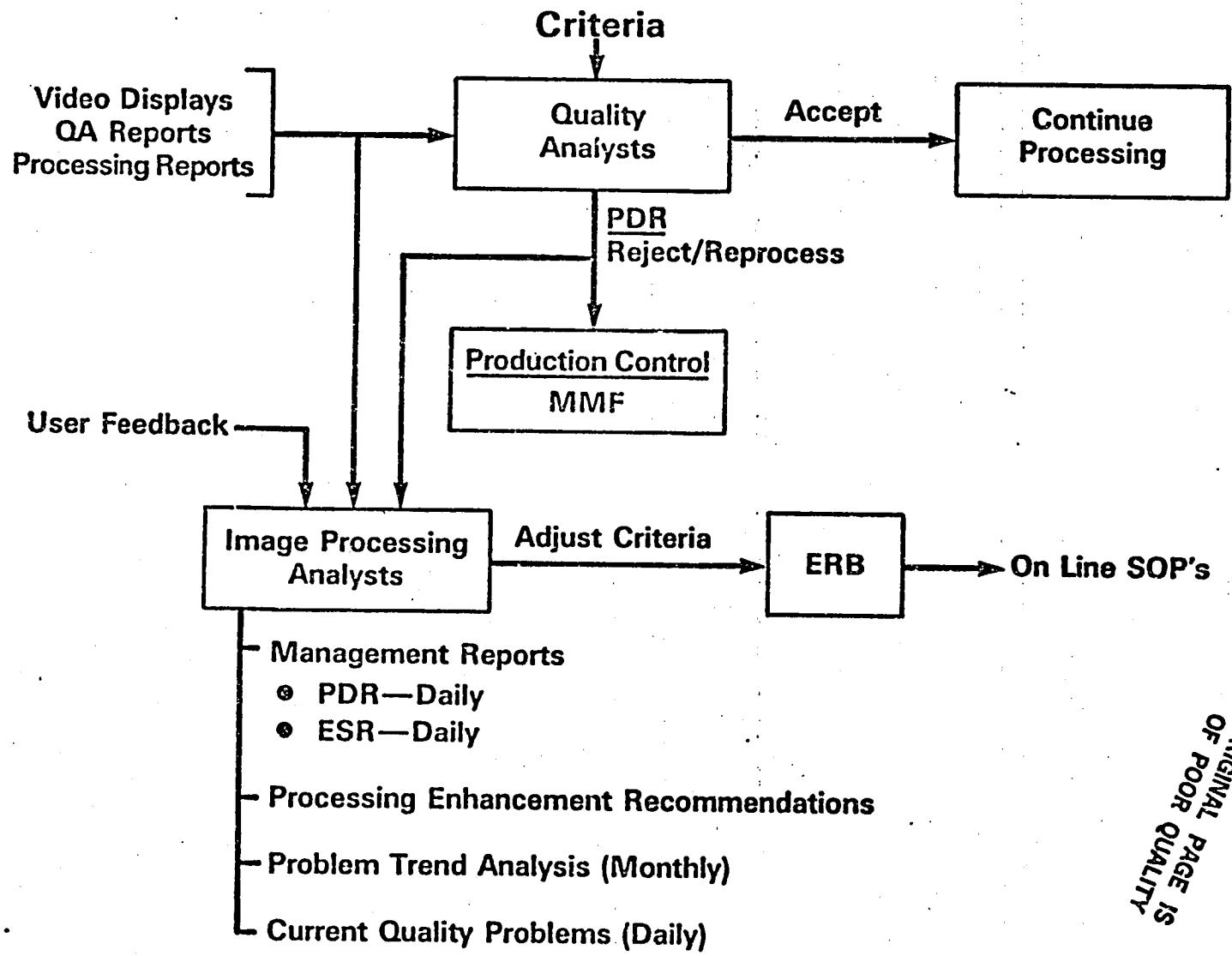
Accept/Reject/Reprocess Flow



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Typical Day Schedules

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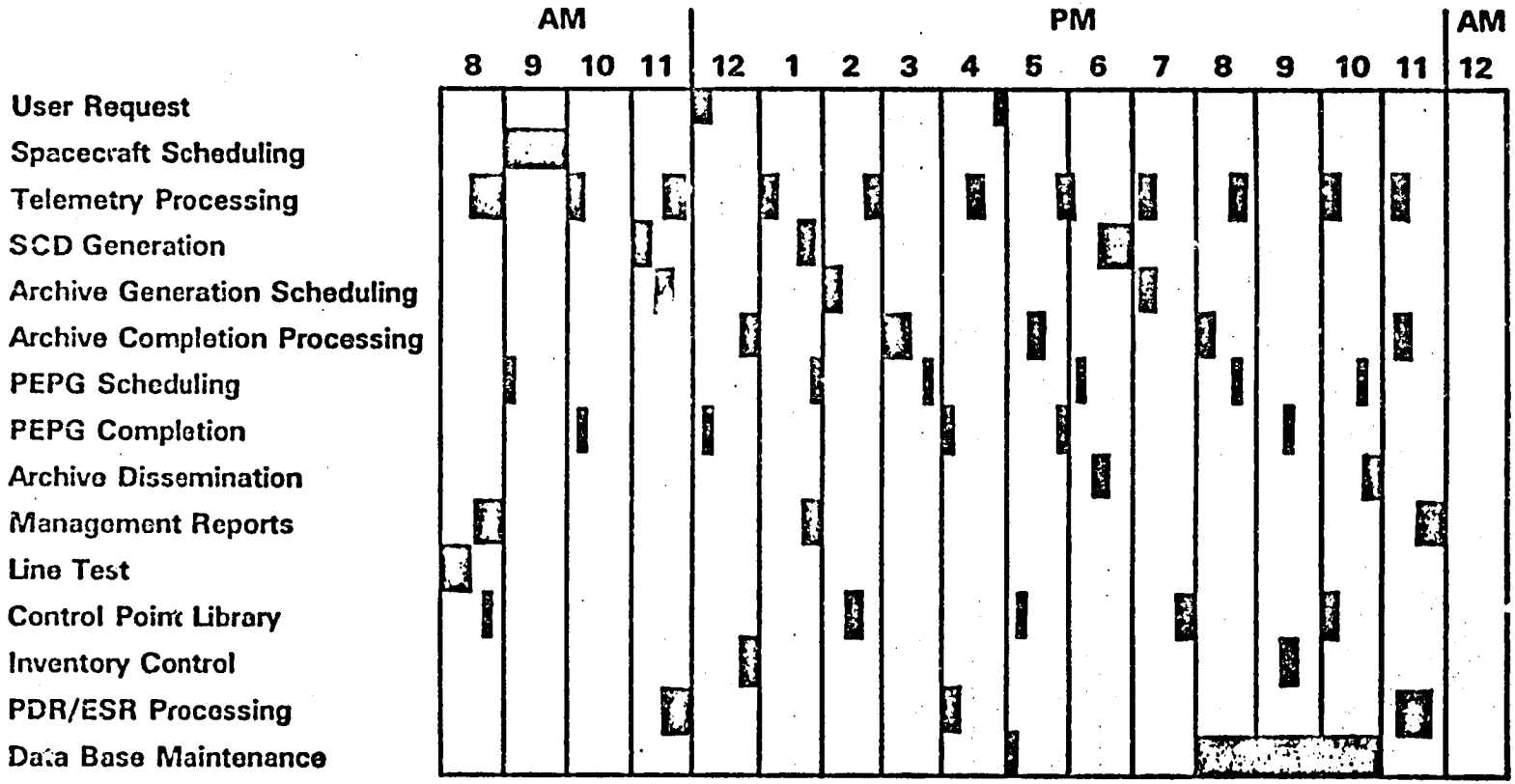
MMF Typical Daily Schedule



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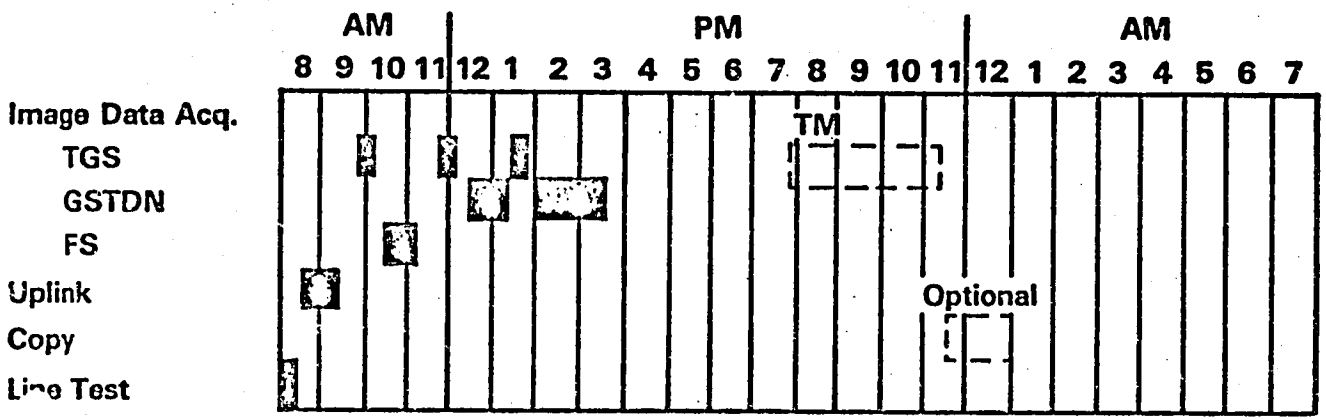
DRRTS



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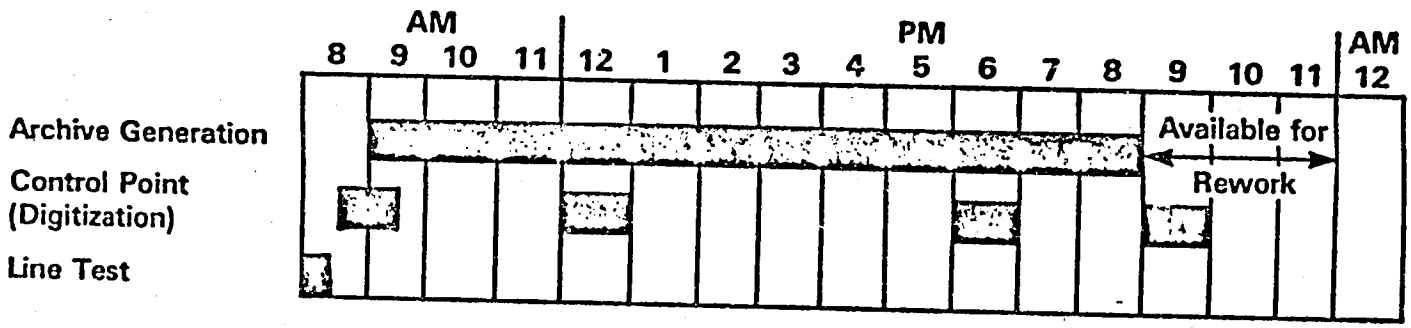
MIPS 1



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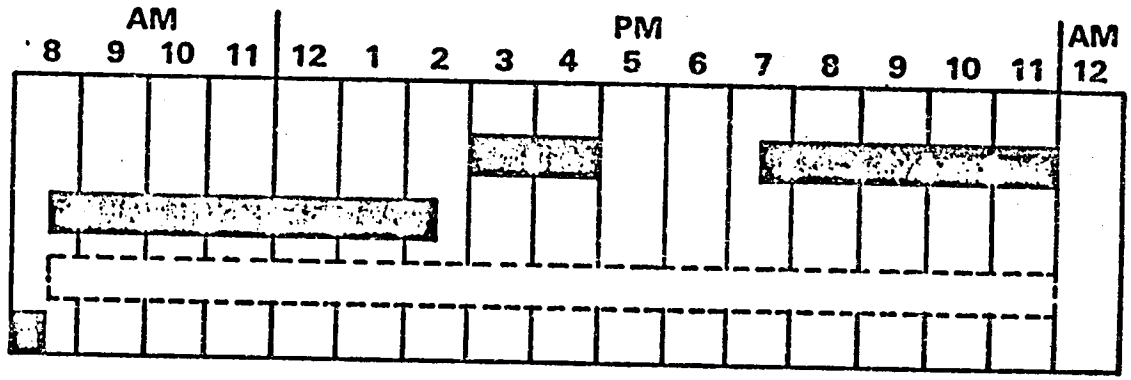
MIPS 2

PEPG

- Dumps
- Geometric Correction CCTs & Analysis Reports

Control Point Generation

Line Test



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Information Processing Division (IPD)

- Requirements
- Functional Interfaces
  - Photo/Shipping Facility/Ground Segment
  - Domsat Interface Facility/Ground Segment
  - Tape Staging and Storage Facility/Ground Segment
- Status

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Requirements

INFORMATION PROCESSING DIVISION

- Photo Processing
  - Process, Inspect and Report on Latent Film Imagery Provided by Ground Segment
  - Sample and Test Received Stock and Inspect Provided Sensitometric Strips for Process Control
- Domsat Interface Facility (DIF)
  - Record Landsat-D MSS Data Received Via Domsat and Forward to Ground Segment
  - Convert Foreign Station Tapes of Landsat-D MSS Data Into a Ground Segment Compatible Format
  - Transmit MSS Inventory Data (GHIT-AM) to EROS Data Center (EDC)
- Tape Staging and Storage Facility (TS&SF)
  - Store and Retrieve Designated Archive Tapes
  - Transport Tapes between Ground Segment and TS&SF
- Transfer Ground Control Point Source Maps and GCP Library Tape
- Ground Segment Magnetic Tape Unit Evaluation

PROJECT

- Provide Latent Film and Move Orders
- Provide Film Processing Instructions
- Provide Data Assessment Film Strips and Instructions
- Provide Sensitometric Strips for LBR Process Control
- Provide Film Stock Withdrawl Requests
- Provide Processed MSS Inventory Data (GHIT-AM)
- Provide Schedules of Planned Activities and Domsat Data Receipt
- Provide CCTs, HDTs, and GHITs/Associated Shipping - Process Requests and Packing Lists (as Required)
- Provide CCT Sampling Requirement for Magnetic Tape Unit Evaluation

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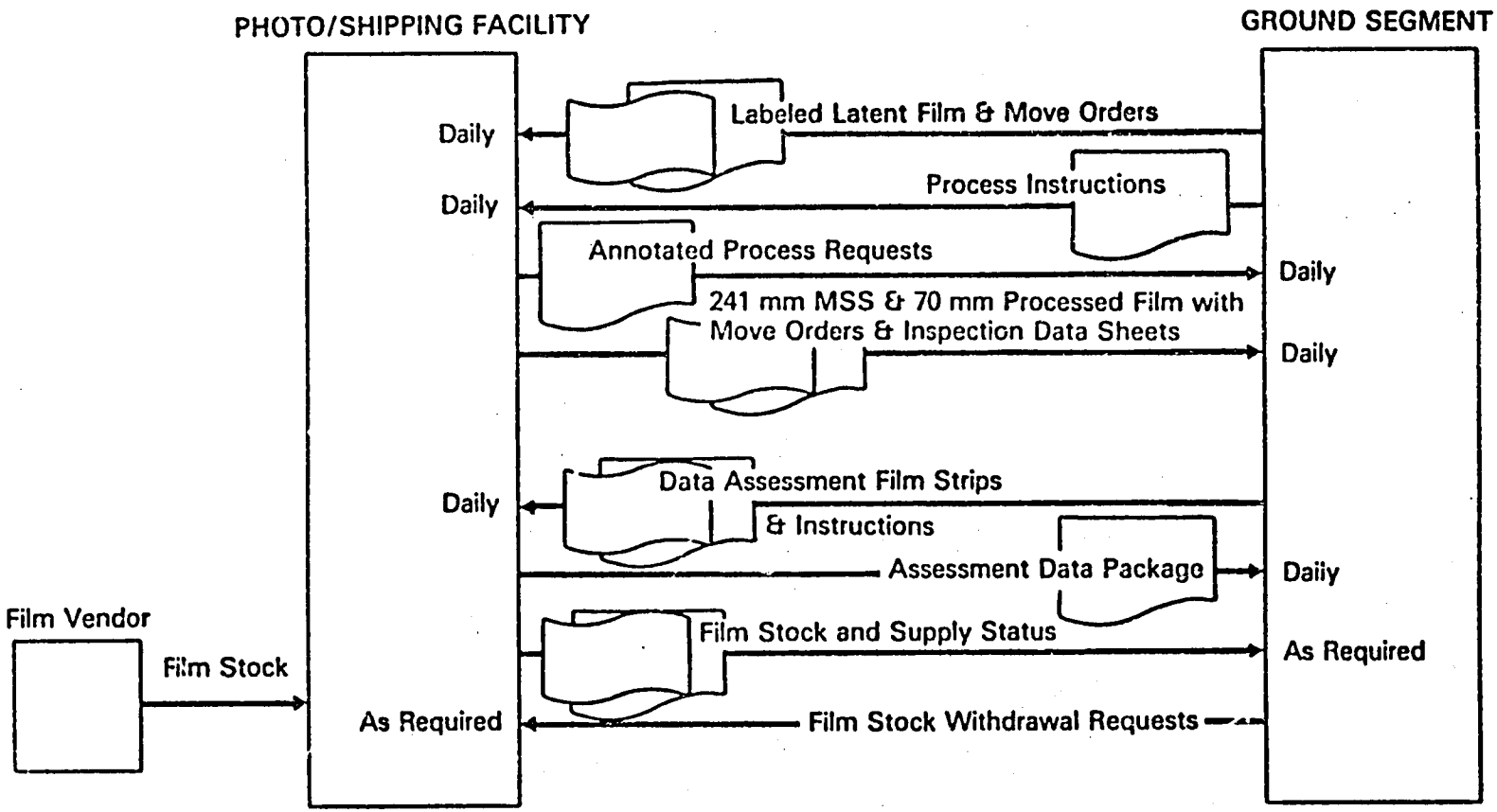
Photo/Shipping Facility/Ground Segment
Functional Interface



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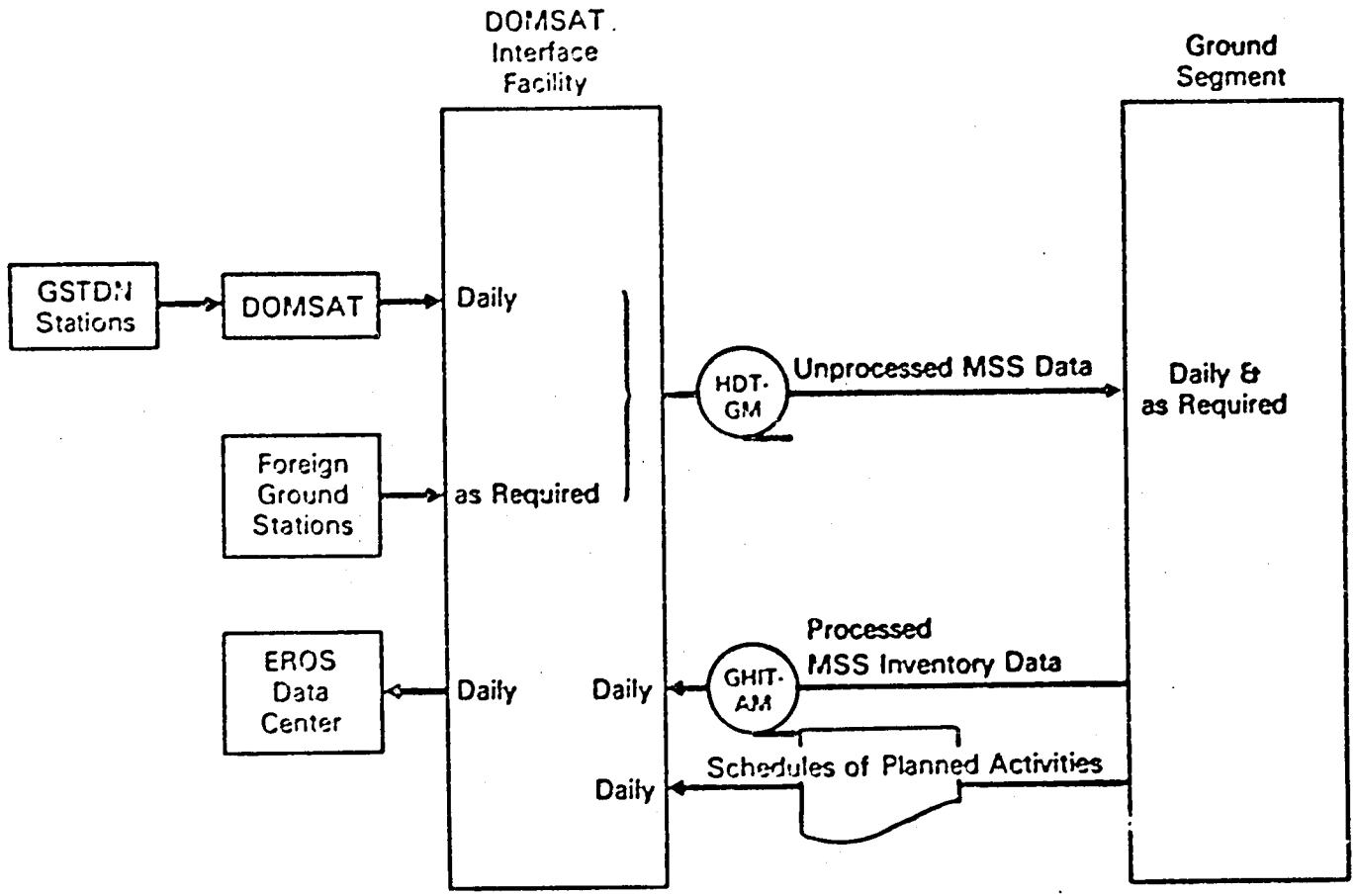
DOMSAT Interface Facility (DIF)/Ground Segment Functional Interface



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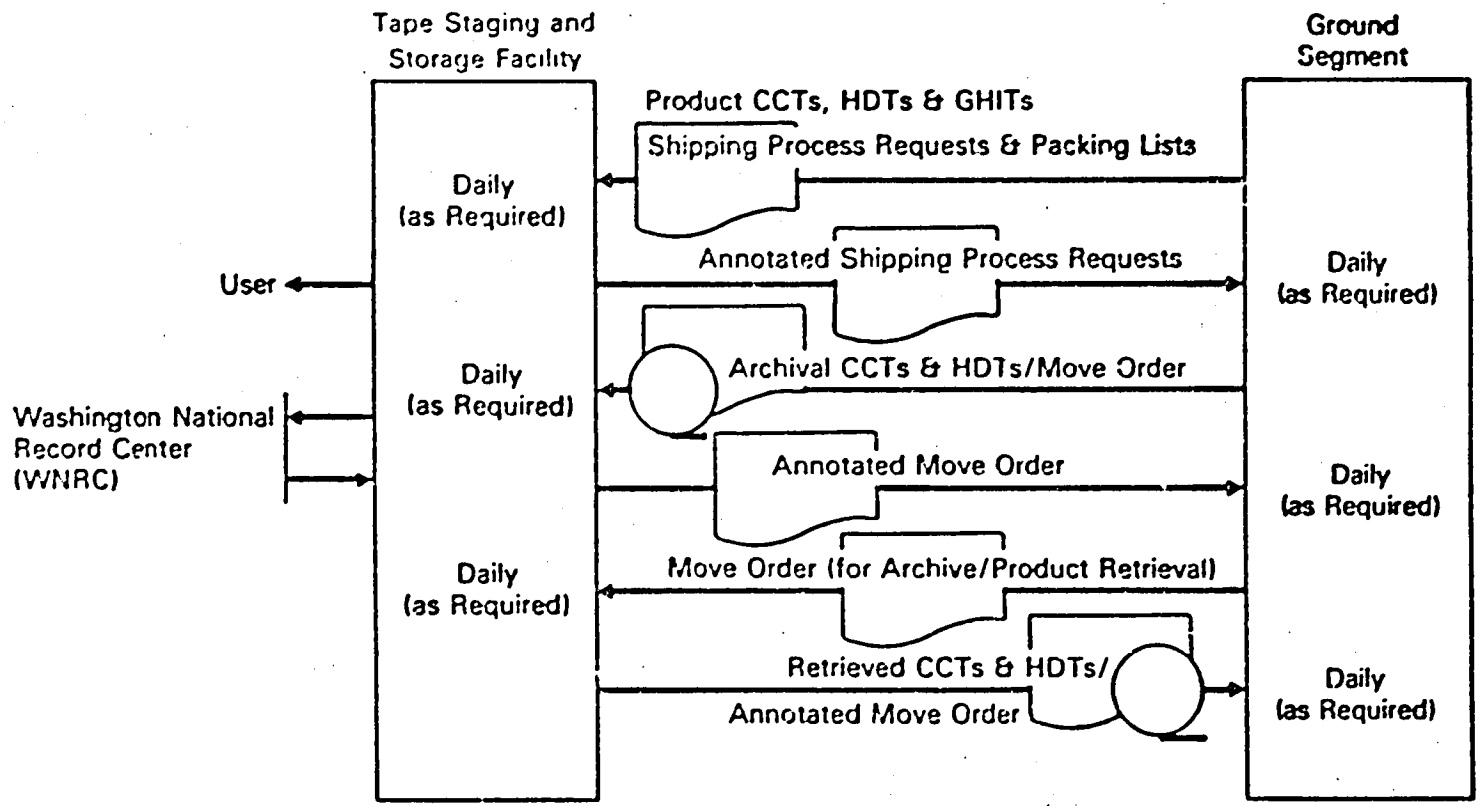
Tape Staging and Storage Facility/Ground Segment Functional Interface



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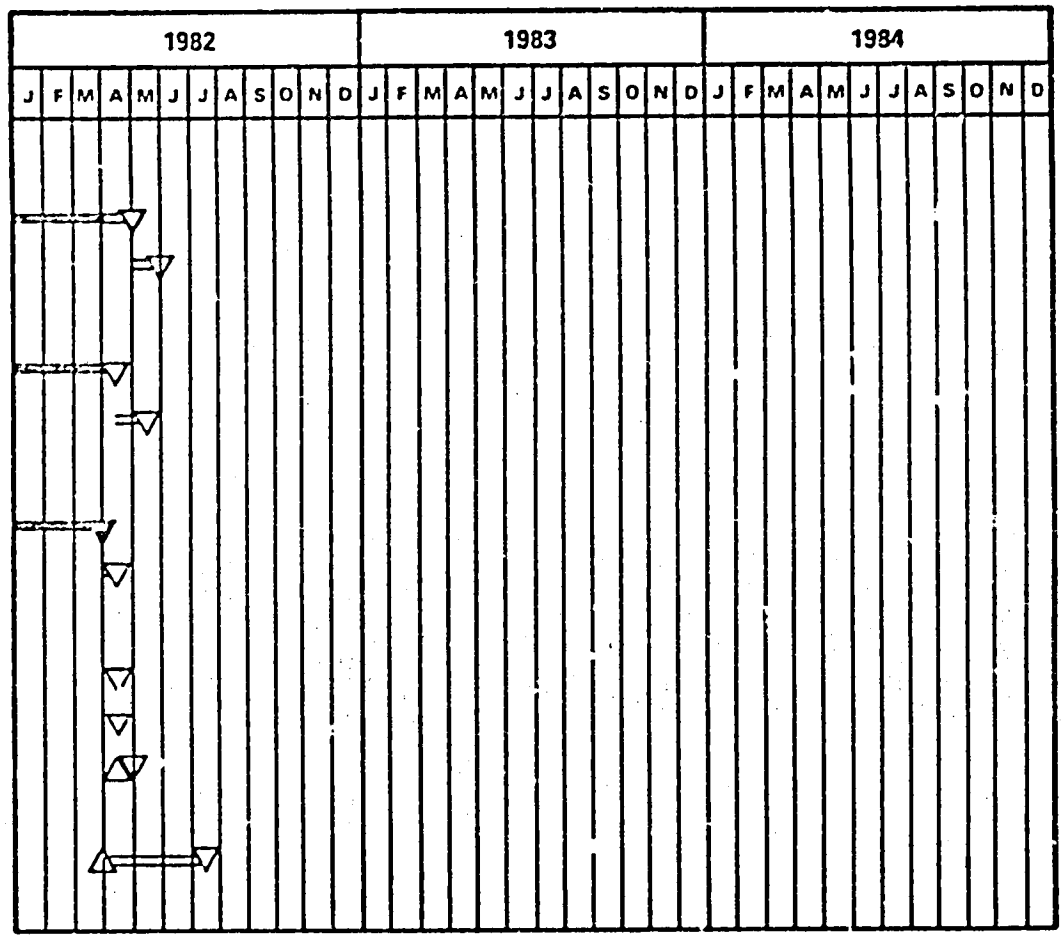
Status

- Photo Processing ICD
  - Written & Published
  - Sign-Off
- DIF ICD
  - Written & Published
  - Sign-Off
- Tape Staging & Storage ICD
  - Written & Published
  - Sign-Off
- Photo Lab Command Terminal
  - Installation
  - Operating Procedures
  - Training
- Operational Readiness Test Support



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EROS Data Center (EDC)

- Requirements
- Major Functions
- Landsat-D Data Flow
- GSFC—EDC Data and Information Interface
- EDC Landsat Data Handling and Processing Systems
- Landsat-D Products
- Schedules

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Requirements

The EROS Data Center (EDC) Is Responsible for Landsat Data Archives, Final Data Processing and Data Product Generation and Distribution

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Major Functions Required to Support Landsat-D

- Accept and Process User Requirements for Data Acquisition
- Apply Geometric Corrections to MSS Data and Create Archival Film
- Maintain Data Archives
  - -- MSS Partially Processed High Density Digital Data (HDT-A)
  - – MSS Film
  - – TM Film
  - – TM CCTs

  } as Consistent with Scrounge Activity
- Maintain Computerized Data Base of Archived Imagery
- Accept and Process User Data Availability Inquiries and Orders for Products
- Produce and Distribute User Products
- Produce User Accession Aids
- Publish and Distribute the Landsat-D Data Users Handbook and Newsletter

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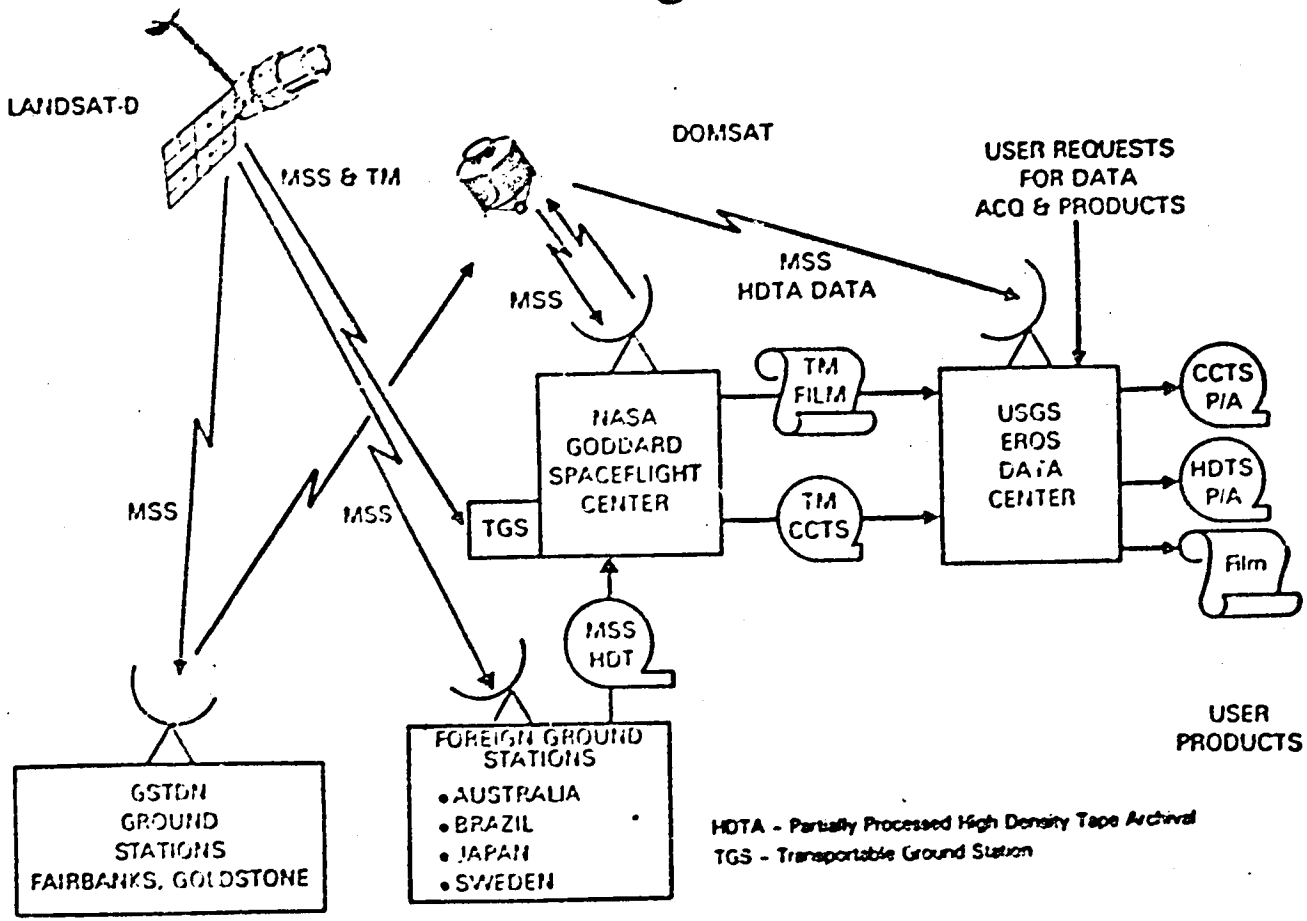
Landsat-D Image Data Flow



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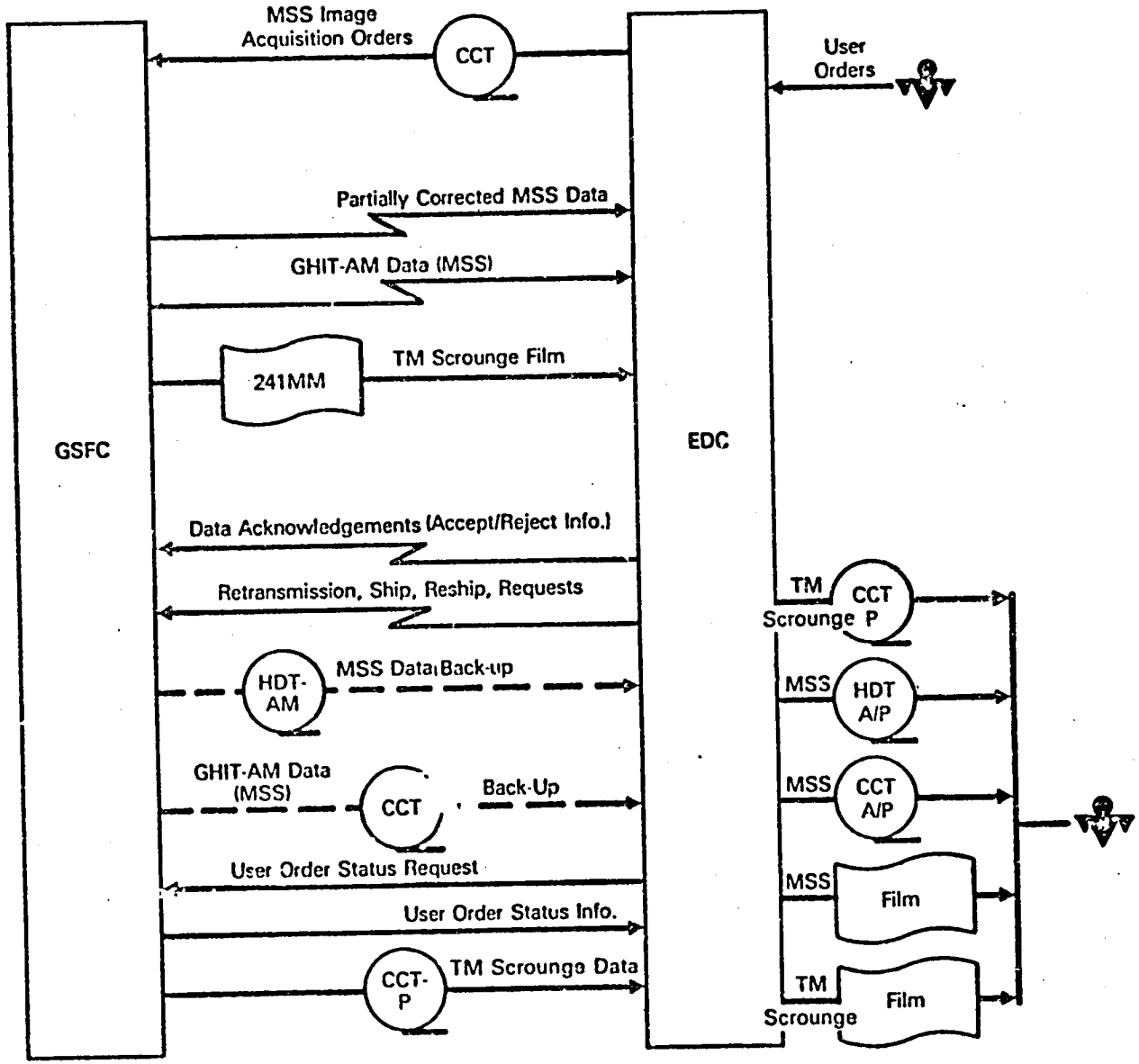
GSFC-EDC Data and Information Interface



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EDC Landsat Data Handling and Processing Systems

- No Major New Systems Required for Landsat-D
- EROS Digital Image Processing System (EDIPS)
  - Software Mods Required to Differentiate Between Landsats 2/3 and D, Band Numbering and Path/Row Differences
  - SEL 32/55 Upgrade to 32/77 for Compatibility and Maintainability
  - Laser Beam Film Recorder Upgrade (Film Drives, Capstans and Field Flattener Lens)
  - High Density Tape Recorder Upgrade (Drives and Heads)
- inquiry, Order and Account (INORAC) Processing System
  - Software Mods Required for
    - Data Acquisition Request
    - Different Landsat-D Orbit Path/Row, MSS and TM Band Numbers
- Physical Archives — No Change
- Production and Custom Photographic Labs — No Change

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Landsat-D Products

PHOTOGRAPHIC

	IMAGE SIZE	FORMAT	BLACK AND WHITE	COLOR
Film	70 mm	Pos & Neg	x	
	9″×9″	Pos & Neg	x	
	9″×9″	Positive		x
Paper	9″×9″	Positive	x	x
	20″×20″	Positive	x	x
	40″×40″	Positive	x	x

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Landsat-D Products (Cont'd)

DIGITAL

Computer Compatible Tapes (CCTs) — 9 Track 800, 1600, & 6250 BPI

High Density Tapes (HDTs) — 14 Track, 20,000 BPI

Partially Corrected & Fully Corrected

ACCESSION AIDS

Micro Catalogs

Micro Image Fiche

Micro Image Film

Worldwide Reference System Maps

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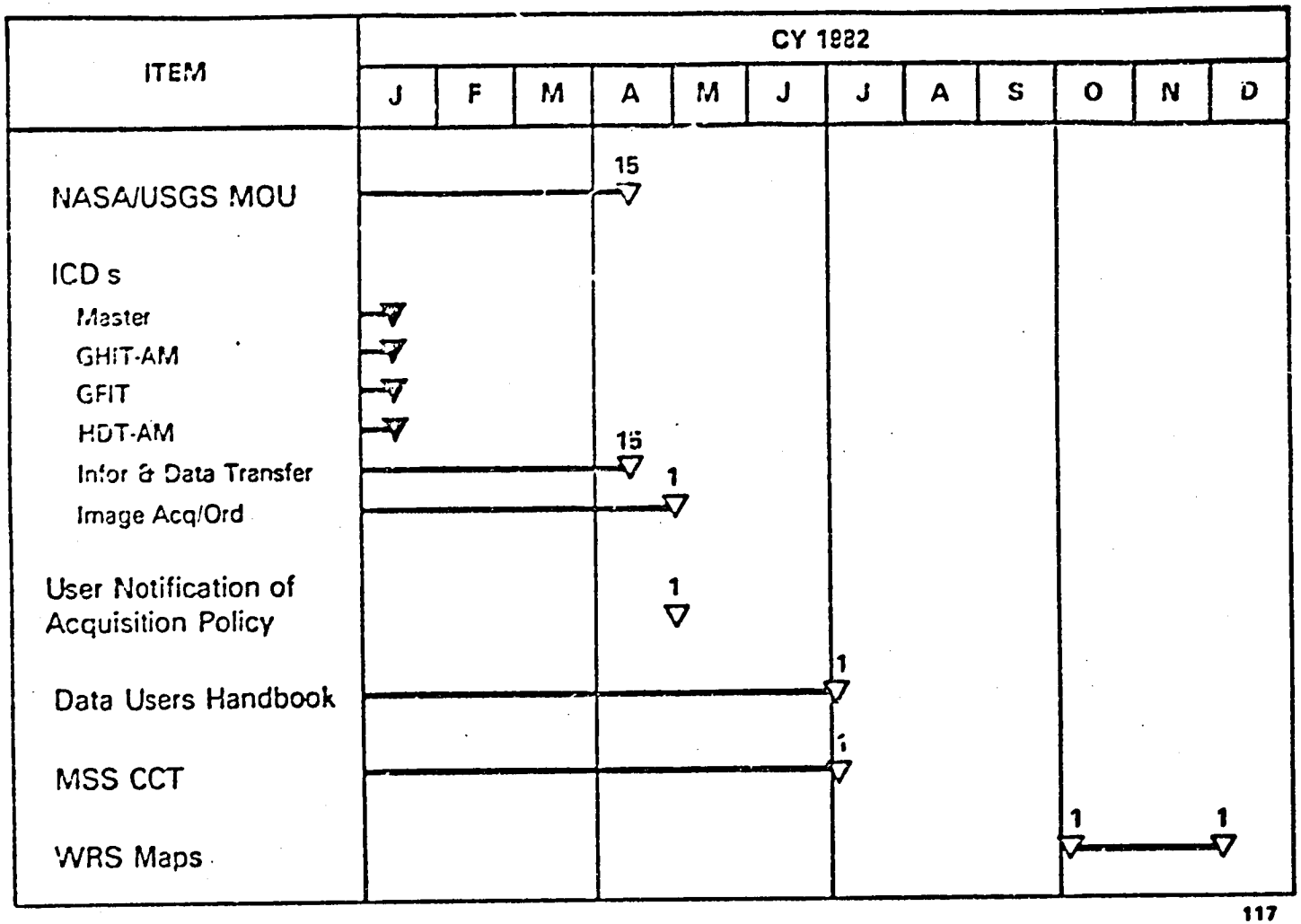
Documentation Schedule



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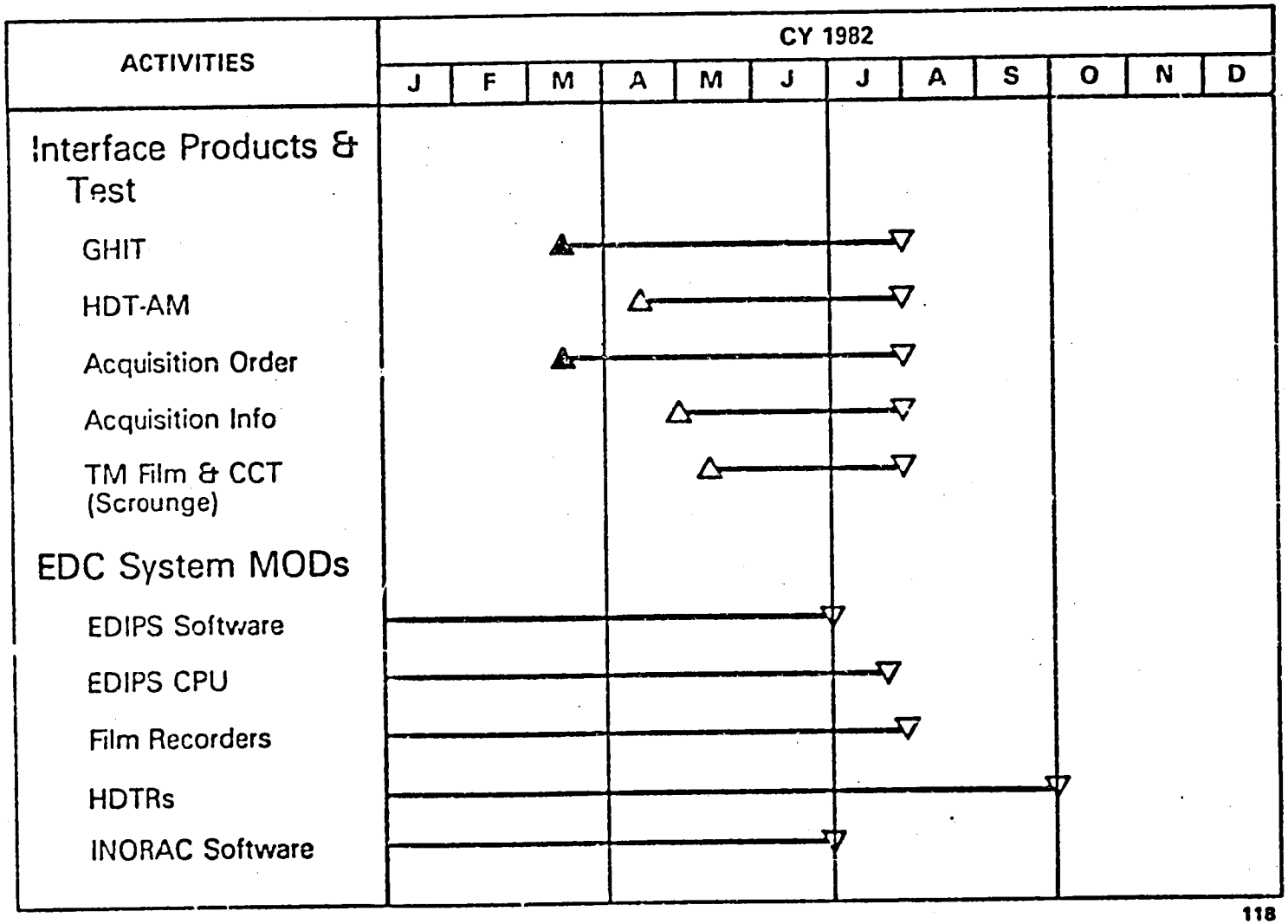
Development Schedule



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VI. Operations Support

A. Operations Support Overview

B. Maintenance

C. Logistics

D. Configuration Management

E. Documentation

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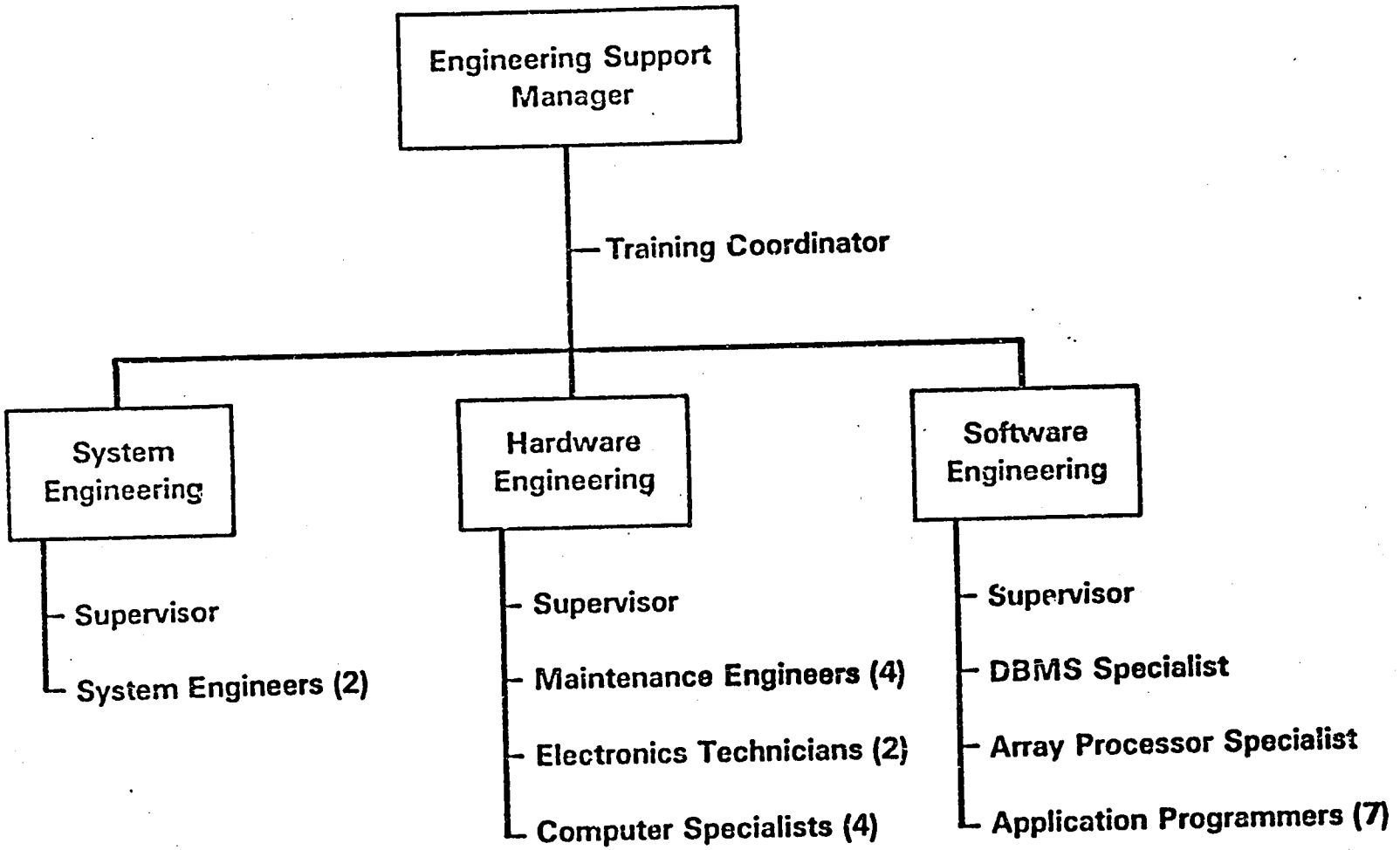
Engineering Support Organization



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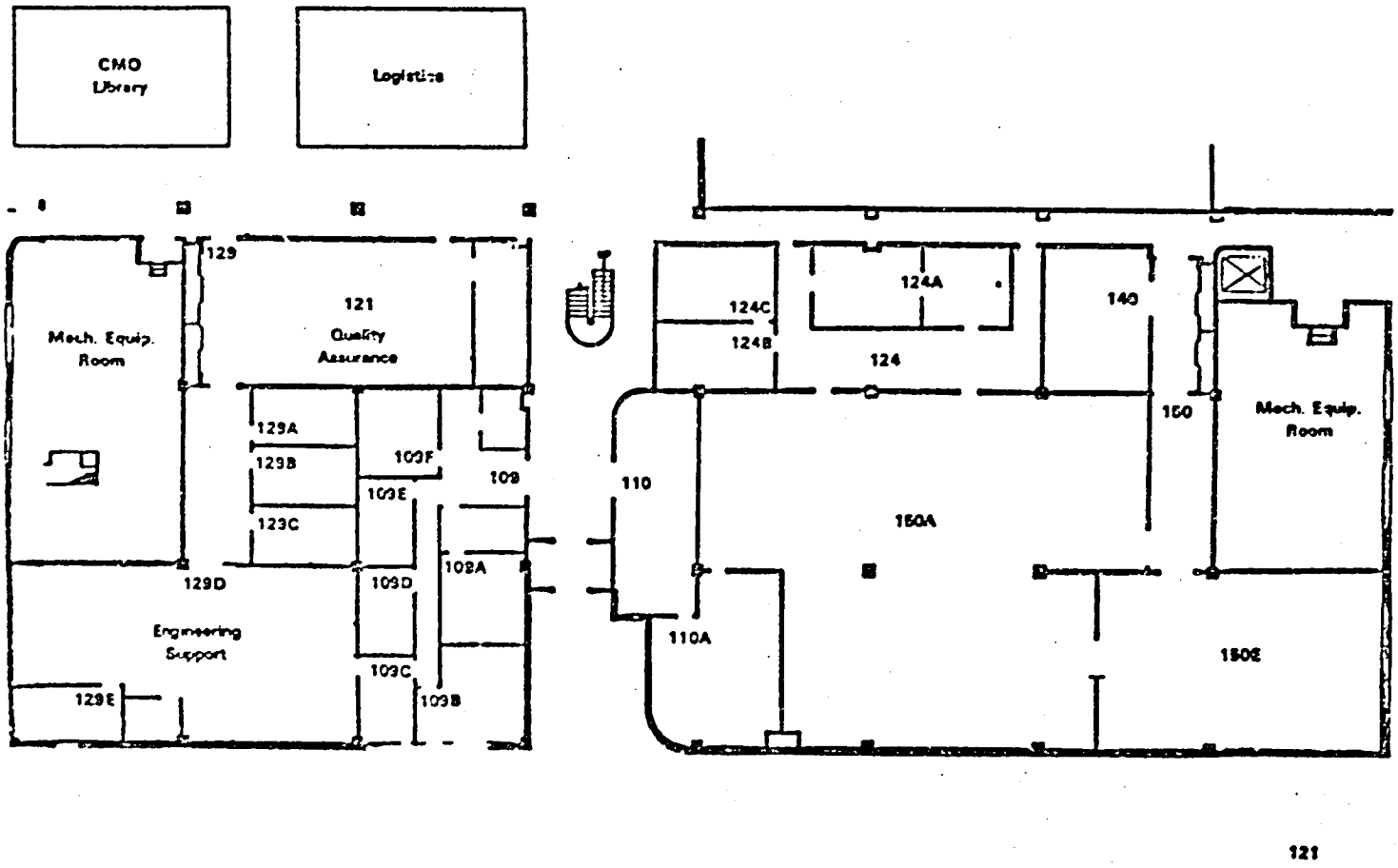
Support Facilities

First Floor Building 28



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LSD Maintenance Plan

- Defined in Maintenance Plan— 81SDS4248
- Preventive Maintenance Performed by Engineering Support
- Corrective Maintenance
  - — Diagnosed by Engineering Support
  - — Repaired by Engineering Support and Contractors
- Maintenance Agreements

DEC	—	On Site	16 Hrs/Day, 5 Days
		On Call	3rd Shift and Weekends
Honeywell	—	On Site	24 Hrs/Day, 5 Days
		On Call	Weekends

  Dicomed, Versatec, Digitizers, Floating Point, GE (Terminets)

- On Call Maintenance

  Gould (Strip Chart Recorders)
  Houston (Plotter)
  Comtal
  Recognition Products
  GE-LCO (Build Hardware)

Status—In Full Operation

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Landsat D Spares

- Spares at Replaceable Part Level (e.g., Boards)
- Spares for Other Major Parts (Long Lead, Essential for Operations)
- Generally at 10% of Use Level; Minimum of 1
- Off-Line Repair of Replaced Parts—at Contractor's Facility
- Spares Currently On-Site and in Inventory Control System

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Equipment Service Report (ESR) System

Components

- ESR Form
- Processing Procedure
- Data Base
- Management Reports

Features

- Reports Equipment Failures
- Records Corrective Maintenance Activity
- Maintains Configuration Status Records
- Collects Data in Operational Data Base
- Automatically Provides Various Management Reports
- Allows Accurate Determination of Equipment Availability
- Provides Data for Computing Equipment Reliability and Maintainability

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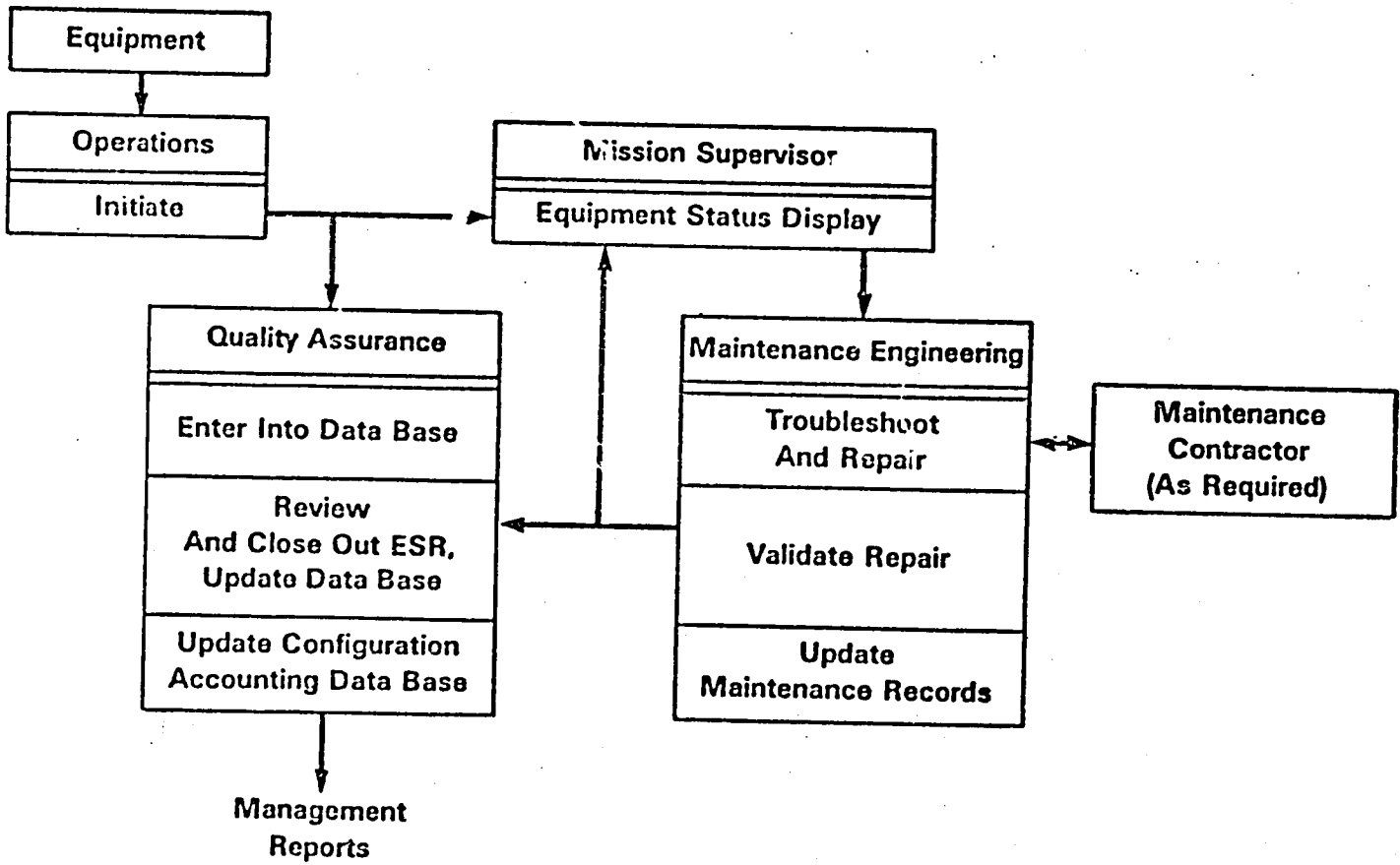
ESR System Flow



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Problem/Defect Report (PDR) System

Components

- PDR Form
- Processing Procedure
- Data Base
- Management Reports

Features

- Documents Processing and Product Problems
- Assigns Responsibility for Problem Investigation
- Records Corrective Action
- Automatically Produces Management Reports for:
  - — Statusing Investigations in Process
  - — Identifying Open Problems by Facility
- Monitors Problem Correction Time
- Identifies Areas for Processing Improvements
- Facilitates Analysis of Problem Trends

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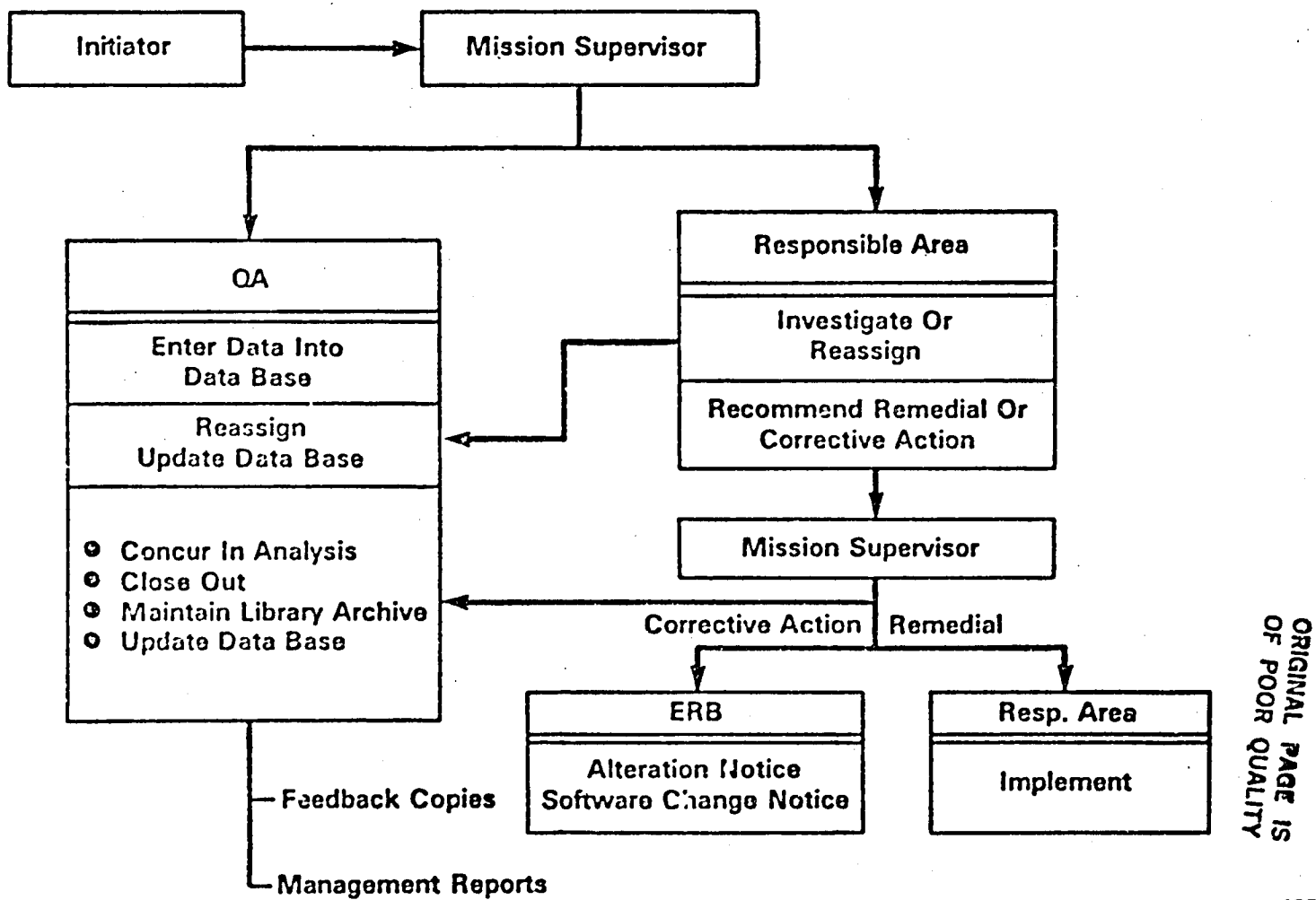
Problem/Defect Report System Flow



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Logistics Plan

Tapes—HDT & CCT

Provided by Code 800

- Fully Integrated Thru GSFC Code 800—Supply, Recycle, Storage

Film—70 mm & 241 mm

- Provided by Project
- Stored and Processed Thru Building 23
- Supplemented by Inventory Control and Reordering

Supplies—Computer Paper, Office Supplies, Other Consumables

- Provided by Project
- Stored in Building 28
- Inventory Maintained by Inventory Control and Reordering

Status—In Full Operation

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Configuration Management

Objectives

- Define the System—Hardware, Software, Documentation
- Control Changes
- Manage Change Implementation
- Record Configuration Status

Implement Thru

- Configuration Management Plan
- Procedures
- Personnel Training
- Management Attention Throughout Operations and Program Team

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Configuration Management Functions

Identification

- All Items Under Configuration Control Identified
- Specific Documentation List Maintained by CMO, Approved by ERB
- Specific Software Directories Identify Operational Software
- Hardware Identified in Configuration Accounting Data Base

Definition

- Baseline Concept
  - — Initial Operational Baseline
  - — Planned/Controlled Rebaselines

Control

- ERB/CCB Authorization of Changes
- Designed Via Alteration Notice/Software Change Notice
- Controlled Change Implementation
  - — Hardware Change Notice (HCN)
  - — Software Data Base/Library
- PDR—Documents Emergency Changes
- ESR—Documents Hardware Maintenance Reconfigurations

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Configuration Management Functions (Continued)

Status Accounting

- Status Accounting Data Base maintained by CMO
- Updated Via
  - — Alteration Notice
  - — Software Change Notice
  - — PDR
  - — HCN
  - — ESR
- Status Reports as Requested

Repository

- Library Maintained by CMO Librarian
- CMO Library Disk/Directories Represent Software
- Status Accounting Reports
- Archiving
- Maintaining
- Purging

Validation/Audits

- Change Verification
- Performance Validation
- Operations Audits

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Engineering Review Board

Functions

- Review All Proposed Changes - Approve/Reject
- Establish Effectivity Of All Changes
- Establish All Baselines
- Review And Approve Test/Operations Readiness

Membership

- G.E. Technical Representatives
- Mission Operations Manager

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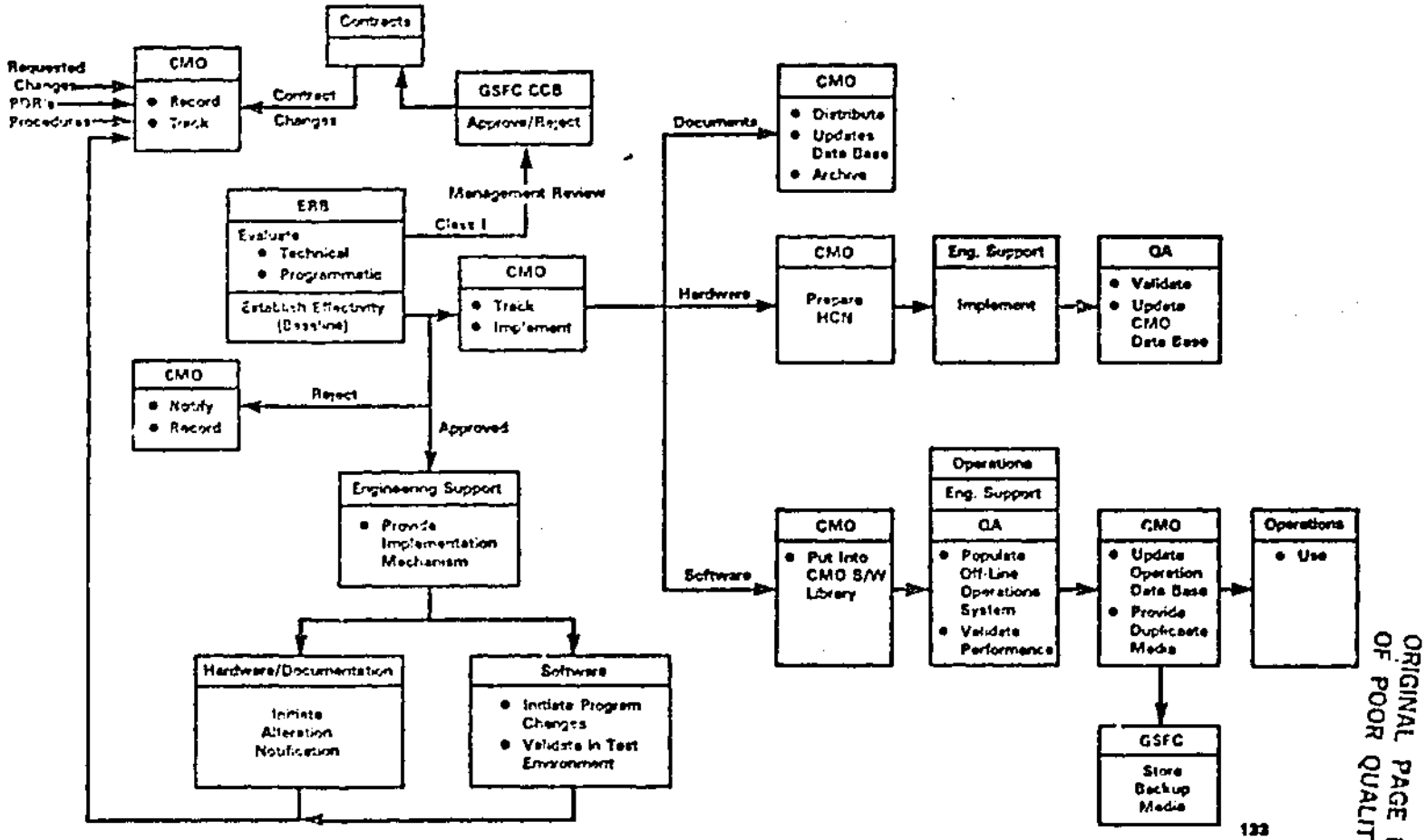
Management Control of Configuration Changes



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Operational Baselines

- Established at Key Milestones and Periodic Calendar Dates
- Release Management for Baselines
  - — Planned, Coordinated and Scheduled
  - — Specifically Identifies a Set of Coordinated Changes, Software—Hardware—Documentation
- Emphasis on Software Change Control
- Emergency Change Management
  - — Control Via PDR's
  - — Track/Plan Permanent Fix
  - — Purge Temporary Changes at Earliest Rebaseline
  - — Report All for Management Visability

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Software Configuration Control

- Software Library And Operational Software Under CMO Control
- Changes Planned For Incorporation At Specific Baselines.
- All Changes Approved Via ERB/CCB Prior To Implementation.
- All Changes Validated Prior To Implementation.
- Baselines Established For Block Change Incorporation.
- Controlled Environment For Development/Repair.
- Backups For Operational System - Building 28 And Glendale.
- Emergency Changes Controlled Via PDR And Put Into Control System.

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Documentation

Emphasis

- Document Operational Information
- Maintain Current
- Purge Outdated Documentation
- Update Controlled Copies
- Make Accessible To Operations

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Documentation Implementation

Identification

- Specifically Establish By ERB At Initial Operational Baseline-May 1
- Maintained Current Through Configuration Management

Change Control

- Via Standard Configuration Management Control Mechanism

Documentation Maintenance

- Maintained Current Via CMO
- Emphasis On Controlled Copies Of M & O Manual/Procedures

Availability

- Reference - Through Library
- Use - Manuals In Specified Areas
  - Update Via CMO

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Operational Documentation

- Ground Segment Specification
- External And Internal Interface Control Documents
- Data Format Control Books
- Software User Guides
- Vendor Documentation
- Software Listings/Link Maps
- Software Data Design Specs (Per Facility)
- Operator Messages (Per Facility)
- Software "As-Builts" (CPS Sections)
- Top Level Drawing Tree And Parts List For Each Facility
- Facility Drawings (Power, Grounding, Layout)
- Cable Label List
- Unit Historical Records
- Equipment Logs
- Operations Plans
- Standard Operating Procedures

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LSD M&O Procedures

FUNCTION	NO. OF PROCEDURES IDENTIFIED
Production Control	13
Orbital Operations	35
Data Processing Operations	11
Engineering Support	14
Quality Assurance	10
Total	83

Status — Initial Issue by May 1
— Update and Add to as Required

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VII. Operational Activation Period

A. Key Events

B. Integration and Test

C. Preparation for Launch

D. System Activation

E. Post-Launch Calibration and Validation

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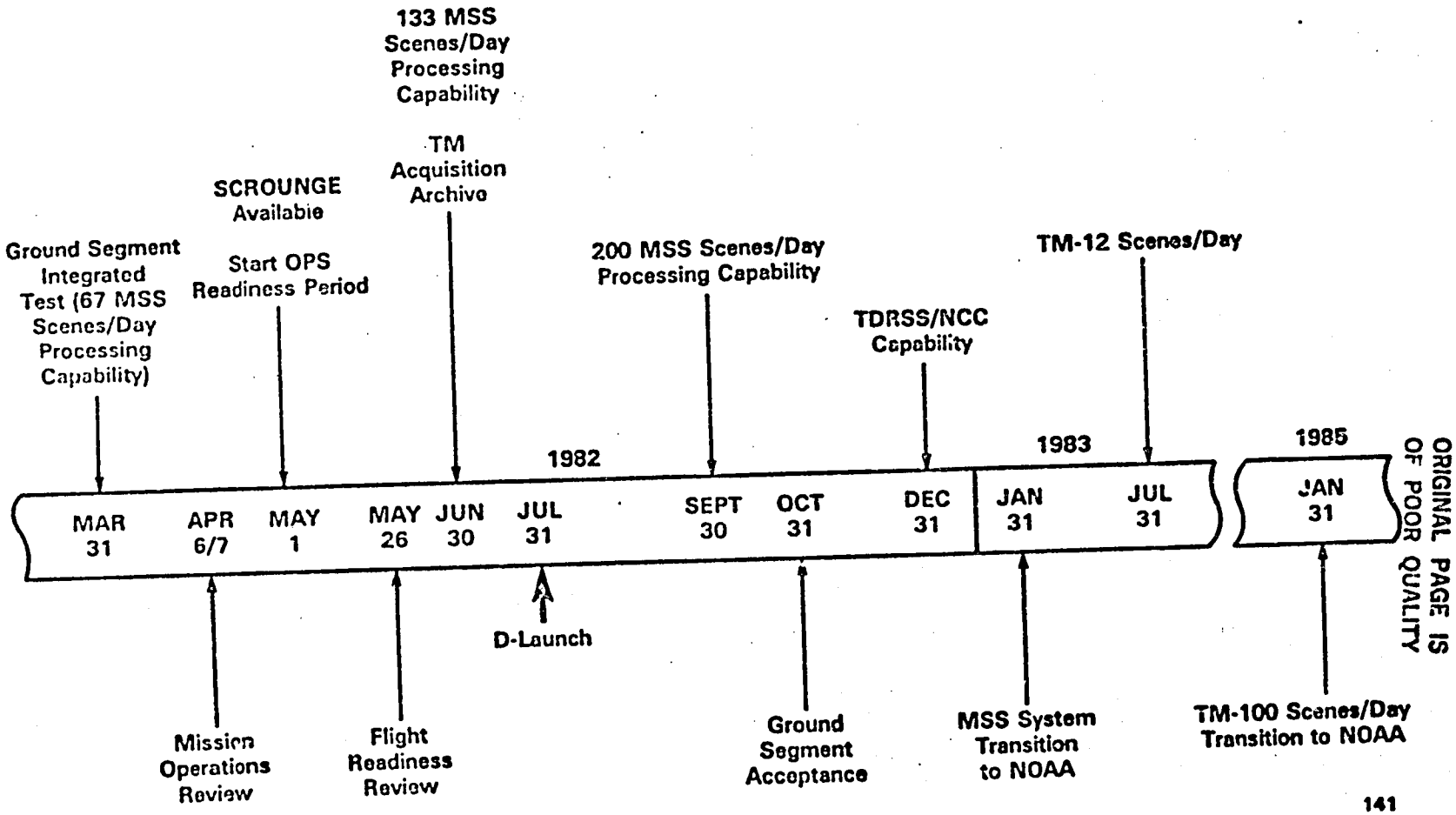
Landsat-D
Key Events



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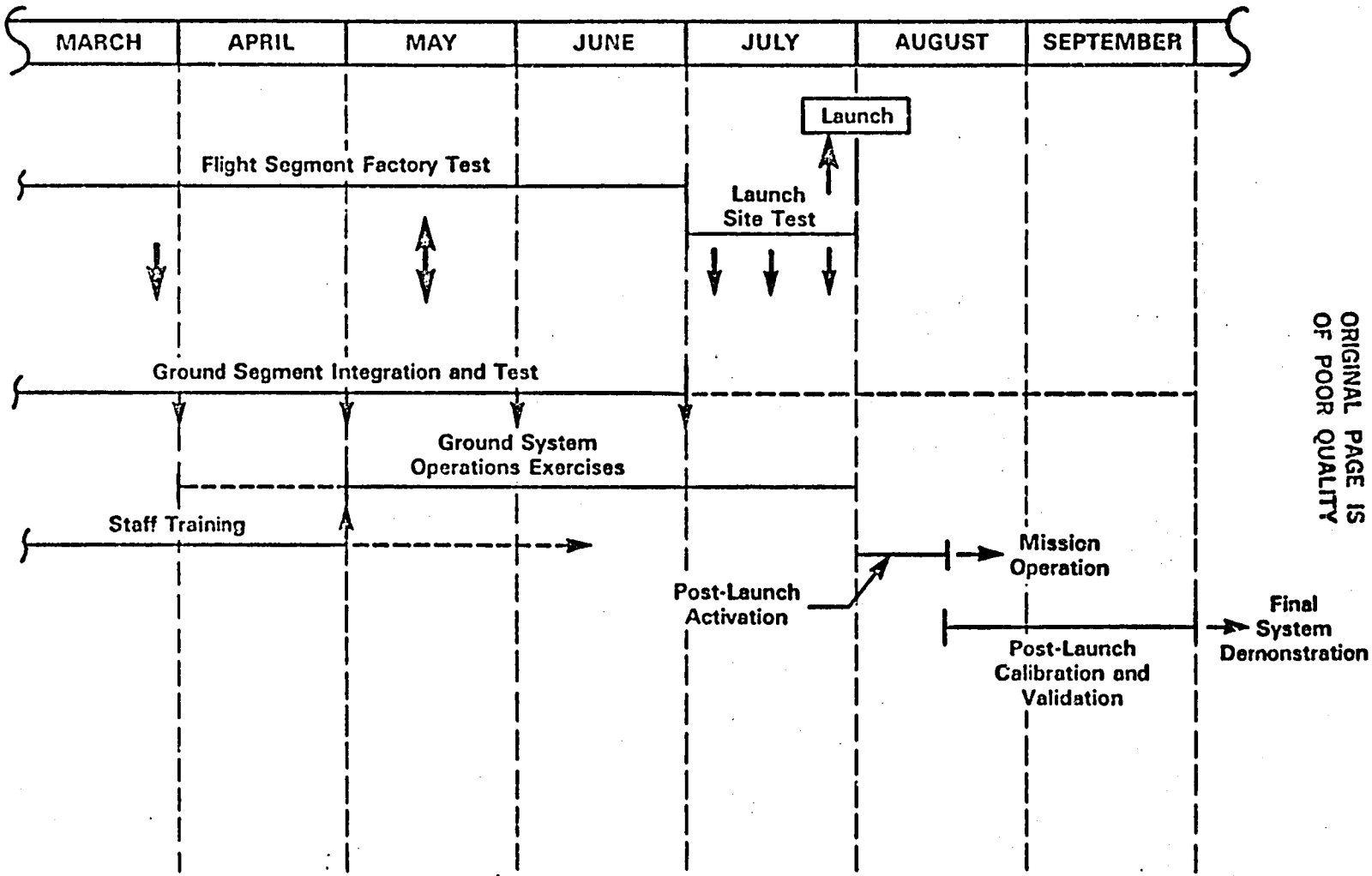
Operational Activation Schedule



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Integration and Test

Objectives:
- To Demonstrate Functional and Performance Capability
- To Verify Compliance With Specification Requirements

Approach: Progressive Testing Throughout Integration Phases
- Sub-Segment Level
- Segment Level
- System Level

Status: Flight Segment—Thermal Vacuum Tests Complete

Ground Segment—GSIT Baseline Tests Underway

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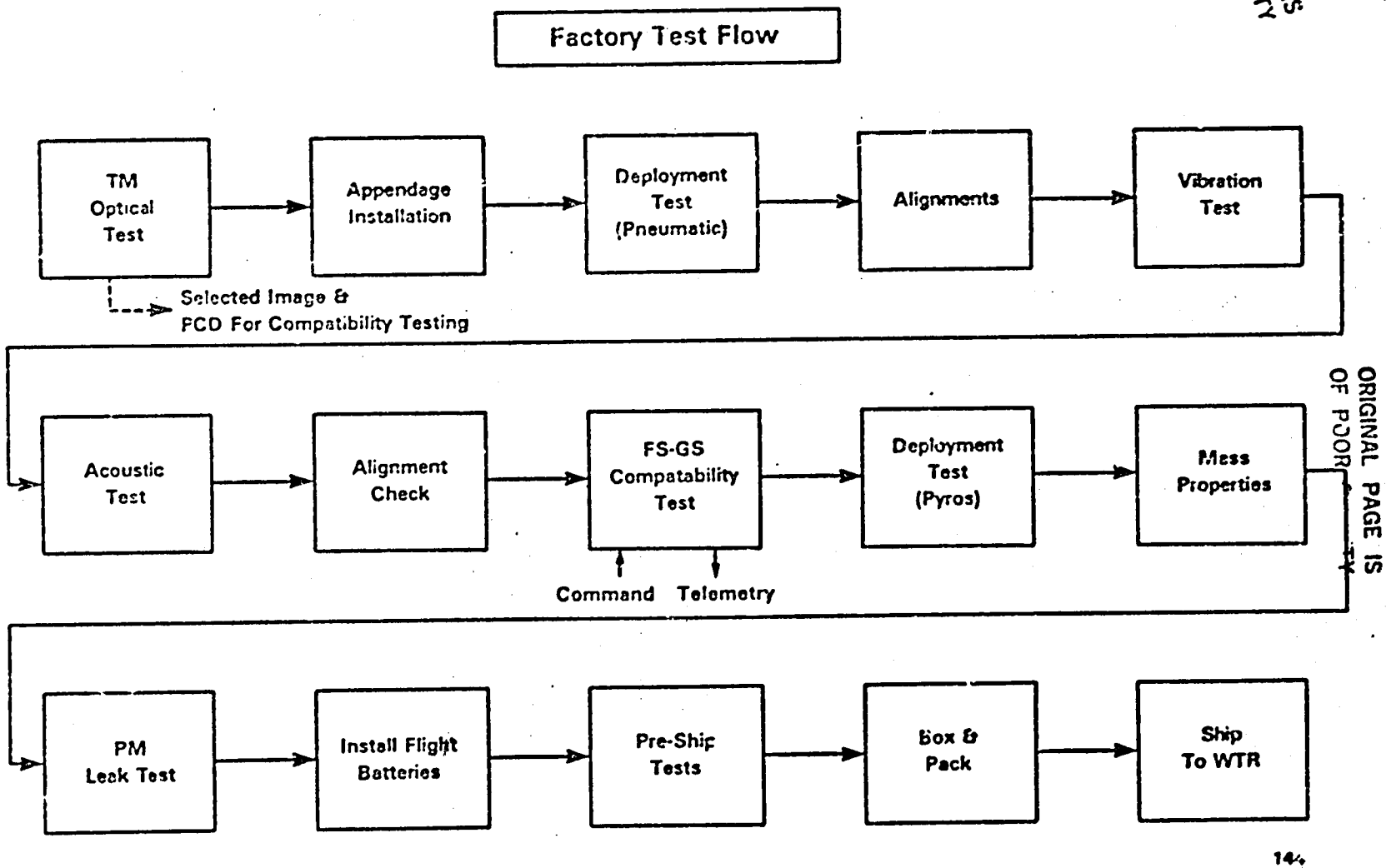
Integration and Test—Flight Segment



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Integration and Test—Ground Segment

Ground Segment Baselines

GSIT · D-LAUNCH · MSS OPS · NOAA TURNOVER NCC/TDRSS · TM R&D

Functional Capability	1982 JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	1983 JAN	FEB	MAR	APR	MAY
User Request Processing	Full Capability																
Automated Production and Shipping Control	MSS														TM		
Management Reporting	MSS														TM		
Flight Operations	Full Capability for D—No NCC											NCC Scheduling and 2nd S/C					
Simulation	Full Capability for D																
Image Data Acquisition	MSS 200 Scenes/Day (No TDRSS)					TM 100 Scenes/Day (No TDRSS)						TDRSS					
Image Data Product Generation	MSS 67 Scenes/Day					MSS 134 Scenes/Day			MSS 200 Scenes/Day			Correction Performance Verified			TM 12 Scenes/Day		
Image Data Product QA	MSS														TM		
Product Distribution	MSS														TM		
APCS	I&T					Full Capability											
GPS	Full Capability																

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Integration and Test—System Level

Initial FS-GS Van Compatability Test — Completed January 28, 1982

- Commands
  - 125 BPS TDRSS
  - 1000 BPS TDRSS
  - 2000 BPS GSTDN
- Telemetry
  - 1 KBPS—TDRSS & GSTDN
  - 8 KBPS—TDRSS & GSTDN
- OBC Load and Dump
  - Stored Commands
  - System Tables
  - Hardware
  - Fixed Banks
- GPS Load and Dump
  - Blocks
  - Words
  - Memory Diagnostic
  - Memory Bit Map
- Standard Tape Recorder
  - Record During Test
  - Playback to Van
  - Tape Playback to CSF
- Ephemeris
  - Uplink
  - GPS
  - Strip Tape to OSCF

Final FS-GS Van Compatibility Test

- Objectives
  - Verify CSF Software and Procedures
  - Demonstrate End-to-End Ephemeris Validity
  - Demonstrate System Telemetry and Command Compatibility
- Schedule
  - Week of May 10

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Integration and Test—System Level (Continued)

- TM Geometric Performance Testing
  - — Geometric Test of TM, ADS, and Processing
  - — TM on Instrument Module
  - — Multiwedge Collimator Provides Target and Scan Profile
  - — Process Imagery and Payload Correction Data Through a Modified Version of Accelerated Payload Correction Subsystem
  - — Perform Resampling Using TM Geometric Correction Simulator
  - — Test Data Collection Completed 3/24/82
  - — Data Processing to be Completed 6/1/82
- Radiometric Testing
  - — Thermal Vacuum Flooding Lamp Data
    - Determine TM Stability
    - Determine Within-Band Correction Capability
  - — Integrating Sphere Data
    - Determine TM and MSS Correction Parameters

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Preparation for Launch—Flight Segment

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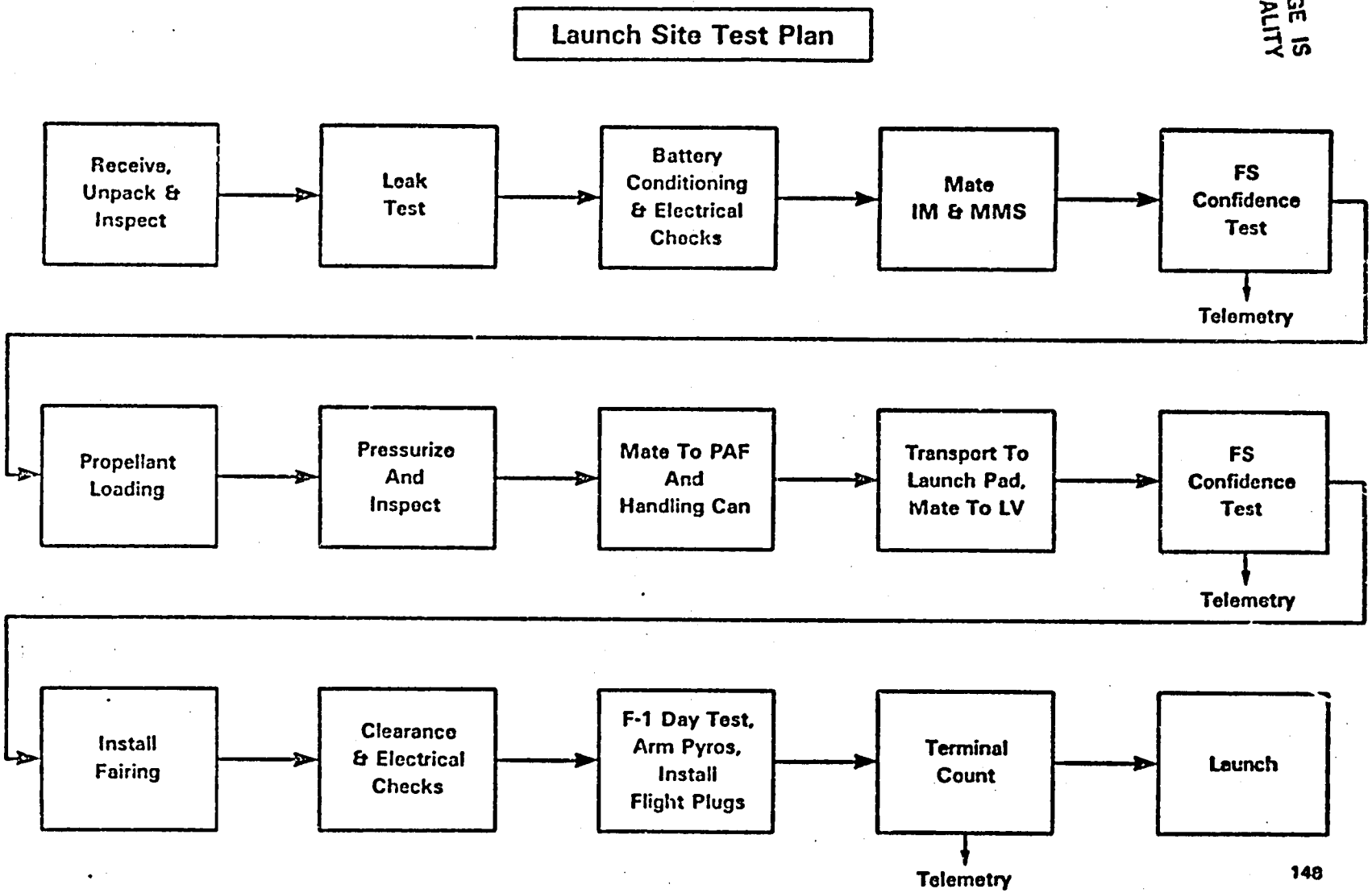
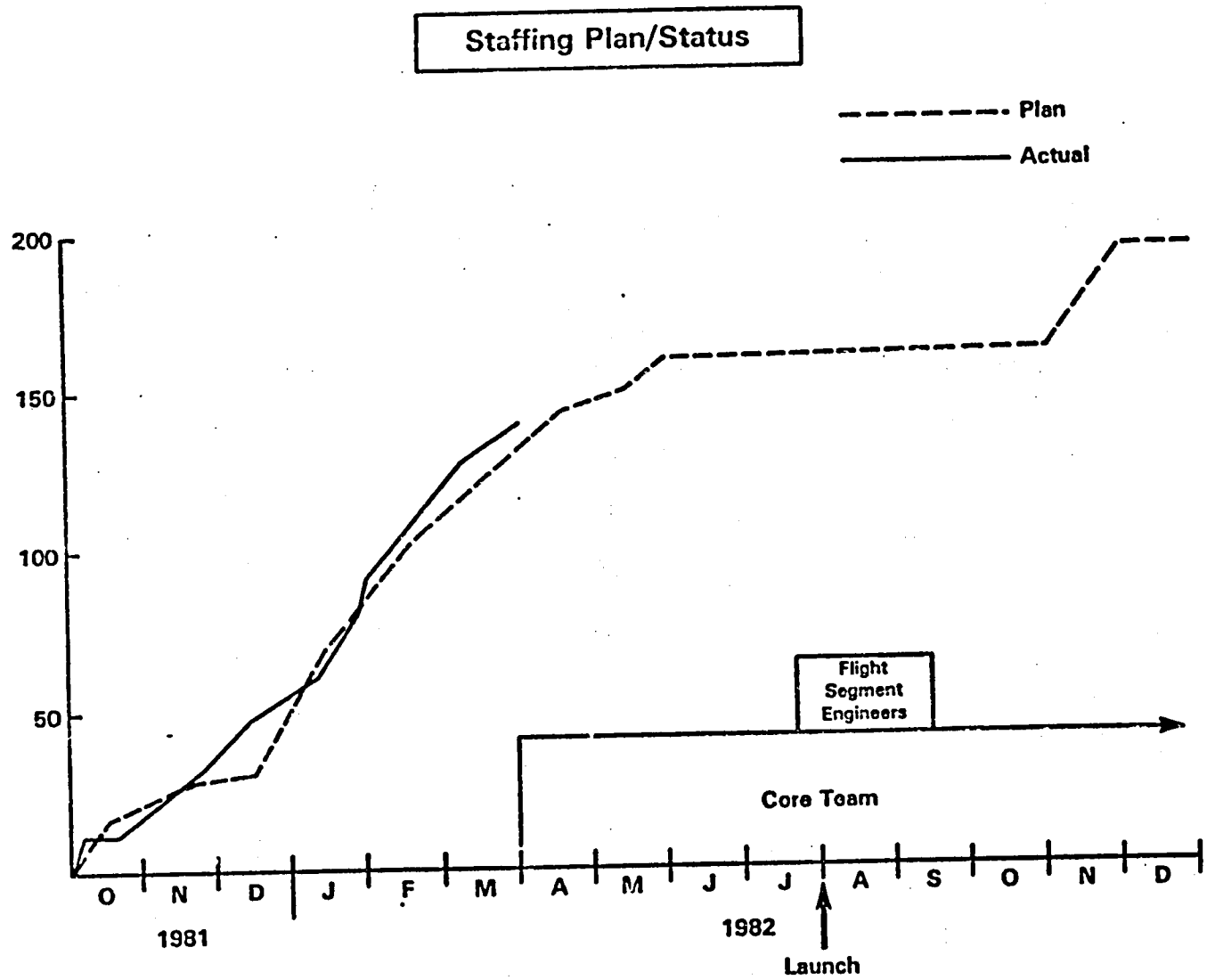


Preparation for Launch—Ground Segment



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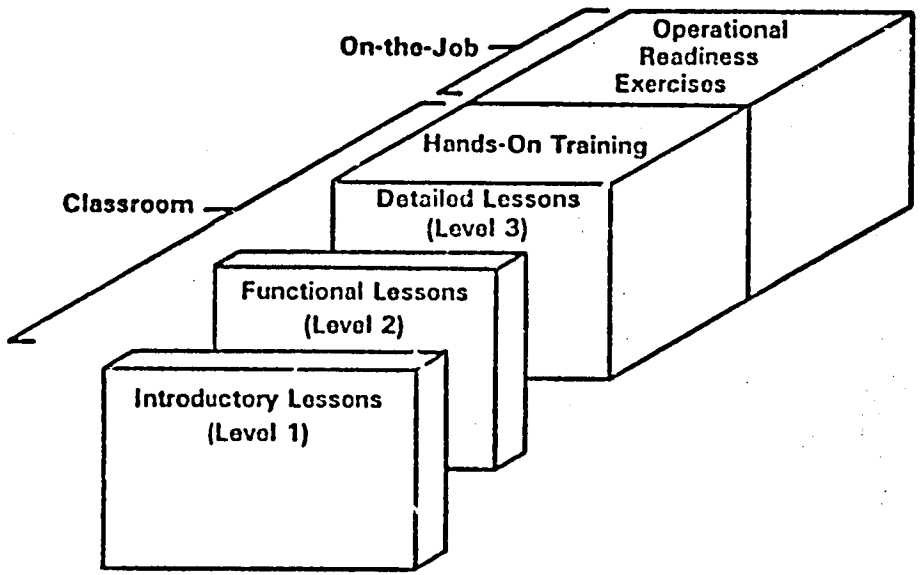
Preparation for Launch—Ground Segment

Personnel Training



- Classroom: 76 Class Lessons
- On-The-Job: 25 OJT Courses
- Instructors From:
  - Mission/Systems
  - Flight Segment
  - Ground Segment
  - Operations

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Preparation for Launch—Ground Segment

Operations Readiness Exercises

Purpose: Develop M&O Operational Readiness

Approach: Conduct Operational Scenarios to Demonstrate That

- Performance can be Maintained Under Operational Conditions
- Operations Plans and Processing Procedures are Adequate and Effective
- M&O Personnel are Adequately Prepared

Schedule: Three Planned Exercise Periods Coordinated With Ground Segment Releases

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Preparation for Launch—Ground Segment

Orbital Operations Exercises

- Spacecraft Scheduling
- On-Line Spacecraft Control
- Launch/Early Orbit Activation

Data Processing Exercises

- Data Acquisition
- MSS Archive Generation
- Product Generation
- Control Point Processing

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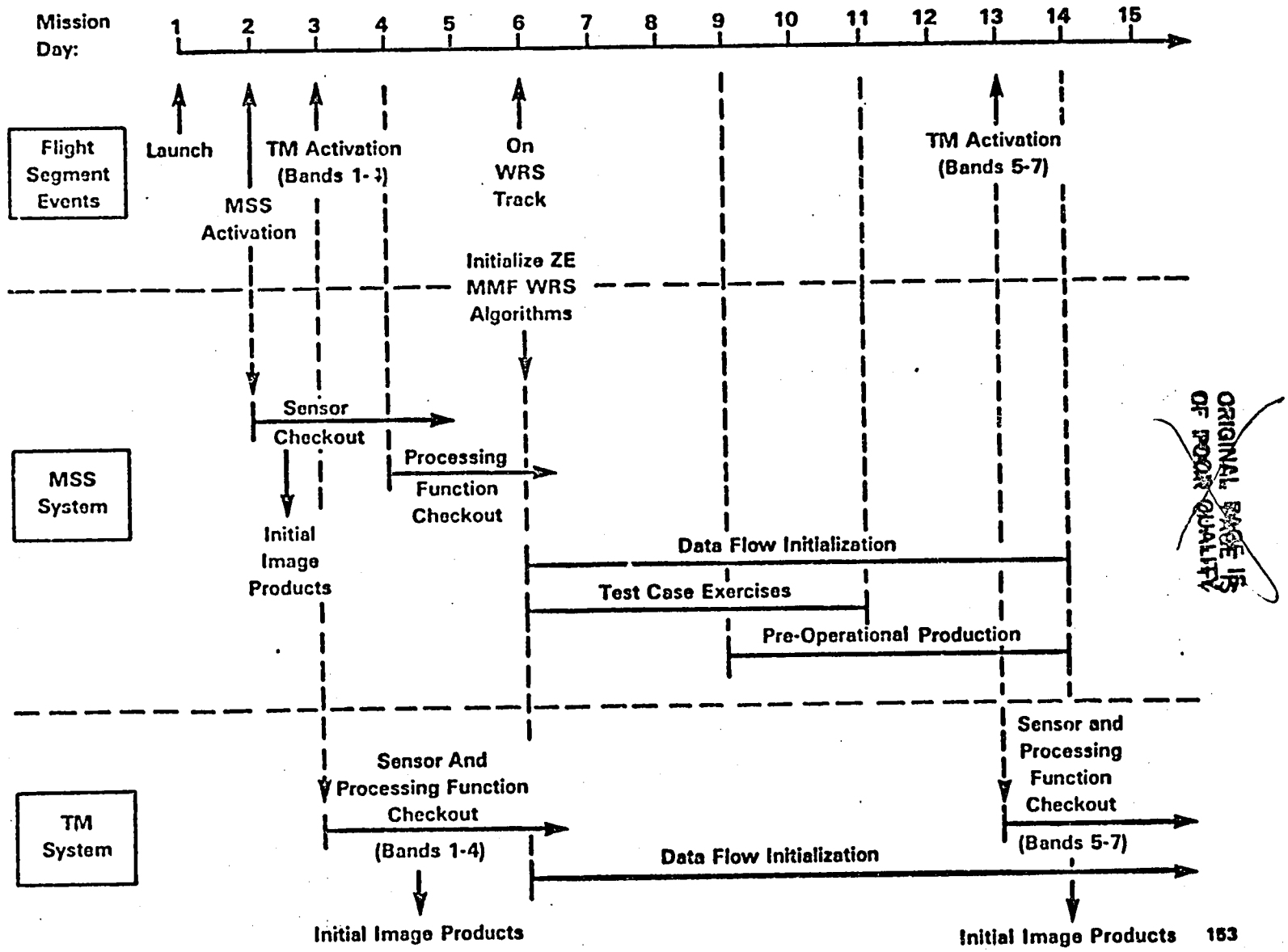
System Activation



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MSS System Activation

- First Data
  - — MIPS Engineering Mode Processing
  - — Nominal Corrections
  - — Nominal Ephemeris
- System Checkout Steps:

  Sensor
  - — Unity-Gain Radiometric Correction
  - — No Line-Length Substitution
  - — Digital Dumps (Including CAL Wedge)

  Radiometric Correction
  - — Forced Nominals
  - — With/Without Histogram Correction
  - — Nominal Value Updates
  - — Regression Coefficient Updates

  Geometric Correction
  - — With/Without Control Points
  - — Systematic Correction Offsets

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MSS System Activation (Continued)

- Data Flow Initialization:

  Test Case Exercises

  - — Initial Use of WRS
  - — Coverage Requirements to Create Selected Test Cases
  - — Establish End-to-End Flow

  Pre-Operational Production

  - — Initial Use of EDC Requirements
  - — Pipeline Primed to Begin Production
  - — Initial Transmission to EDC Before Scheduled Start of Production Processing

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Post Launch Calibration and Validation

- Geometric Calibration
  - — Measure Detector/Band Offsets, Scan Profiles, Instrument to Attitude Control System Alignment
  - — Evaluate Control Point Correlation Parameters
  - — Evaluate Control Point Filter/Smoother Parameters
  - — Update Processing Parameters
- Geometric Validation
  - — Measure Band-to-Band, Temporal Registration and Geodetic Rectification Accuracy
- Radiometric Calibration
  - — Derive Processing Parameters From Calibrated Ground Targets
  - — Update Processing Parameters
- Radiometric Validation
  - — Measure Residual Within-Band Radiometric Accuracy

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VIII. Overview of Thematic Mapper (TM) Operations During the Scrounge Period

A. Introduction

B. Science Office

C. Accelerated Payload Correction System (APCS)

D. Applications Developmental Data System (ADDS)

E. Landsat Assessment System (LAS)

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A. Introduction

- Organization
- Functions
- Data Flow
- Accounting and Management Reporting
- Test and Integration

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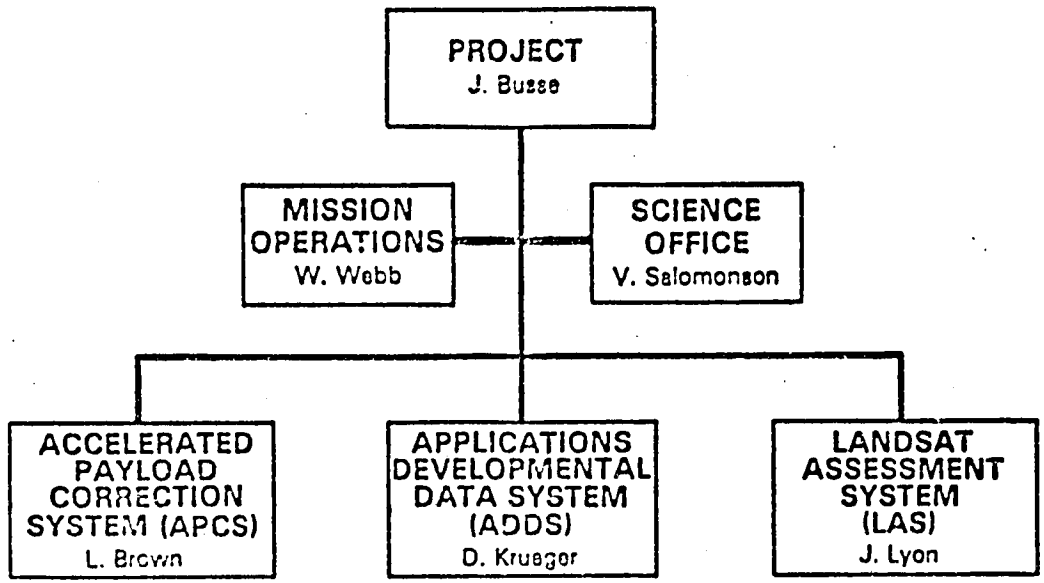
Organization



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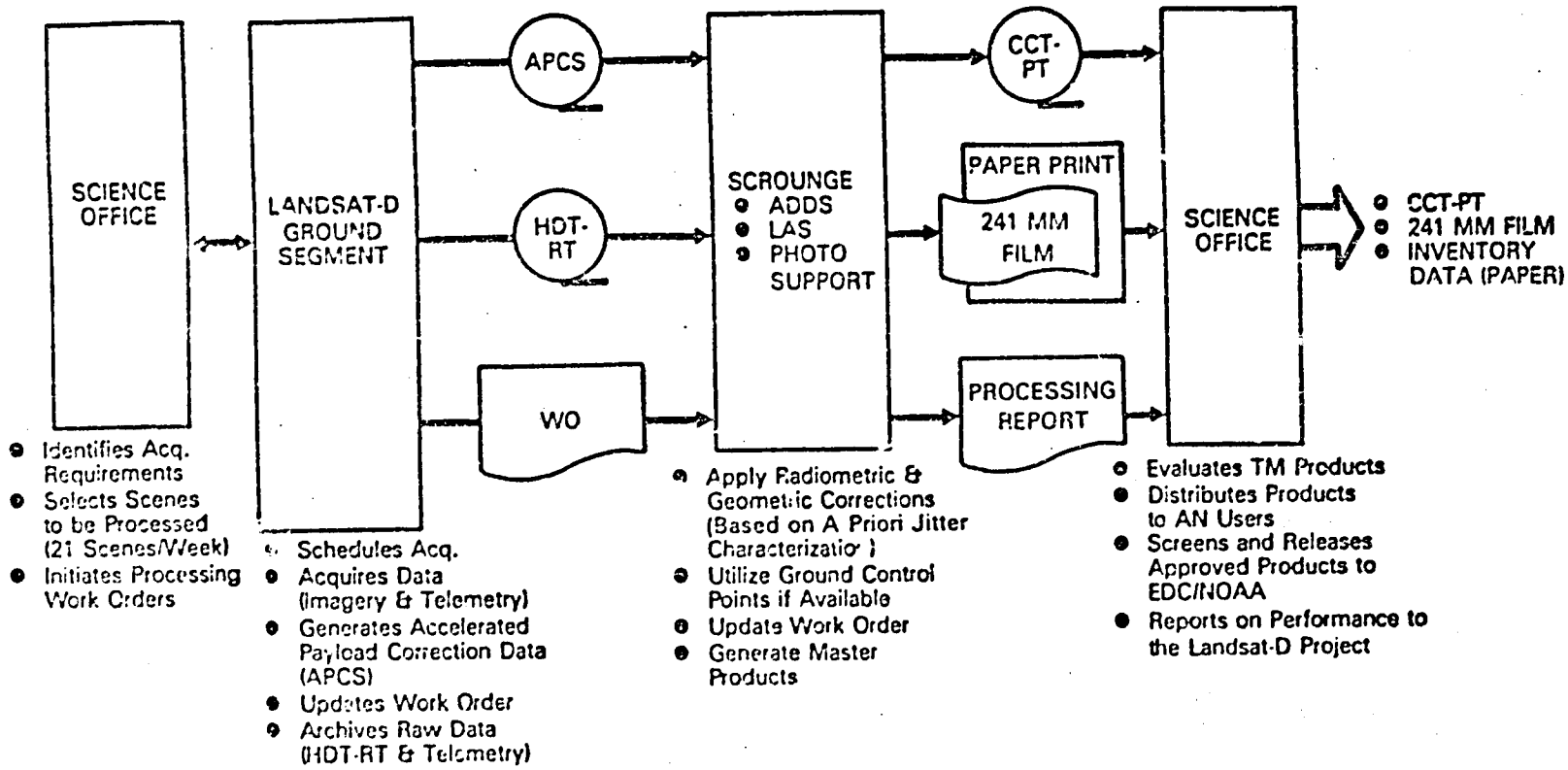
Scrounge System Level Functions



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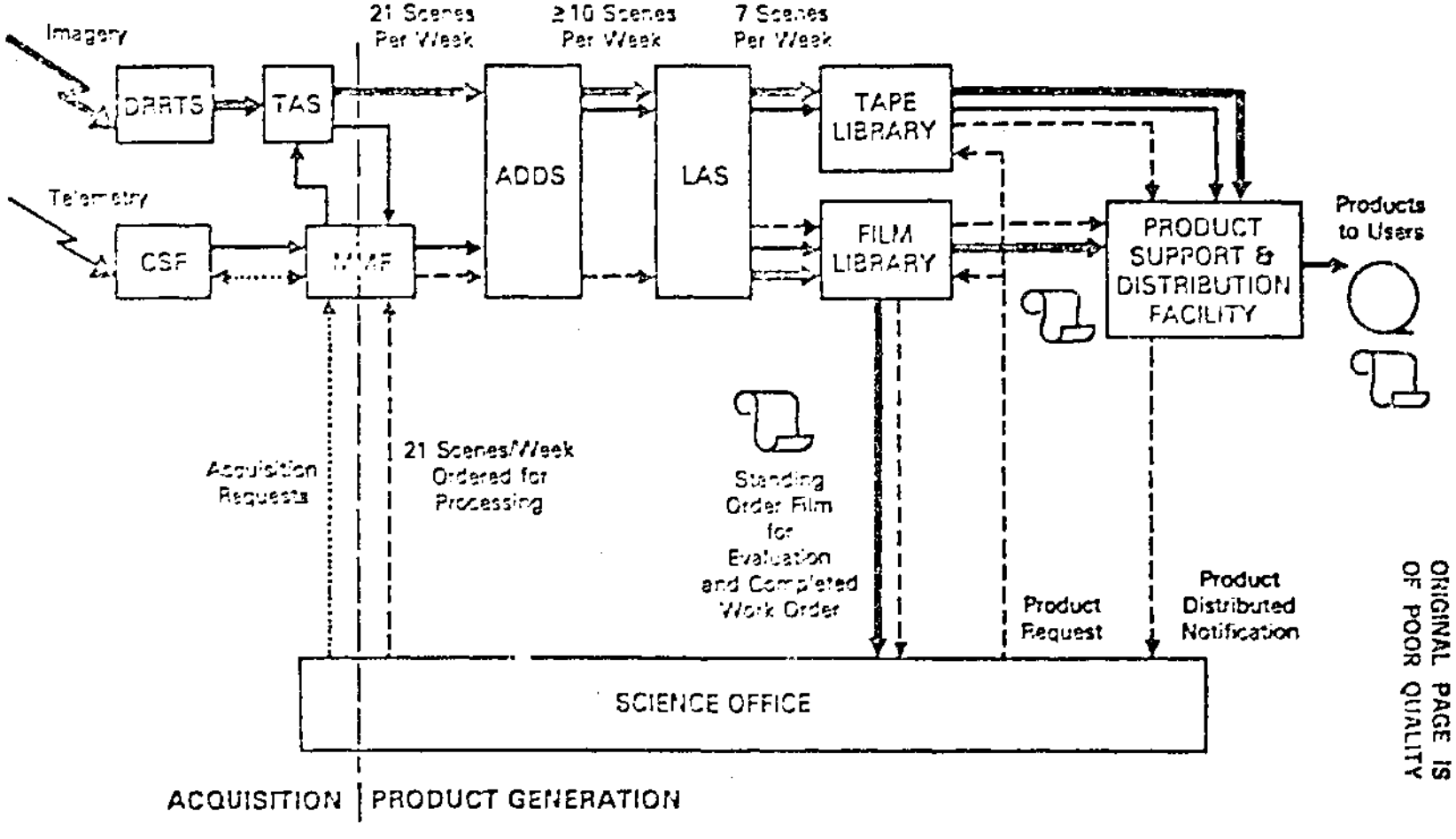
End-to-End Scrounge Data Flow



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Scrounge Data System
Test and Integration

- Emphasis Placed on Engineering Testing at Facility Level Prior to May 1, 1982
  - APCS
  - LAS
  - ADDS
- End-to-End Tests Performed to Demonstrate the Ability of the System to Meet the Following Requirements:
  - Produce Output Products at the Rate of 7 Scenes/Week
  - Produce a Destriped Image Using the "A Priori" Radiometric Algorithm
  - Validate the Interfaces Between the Scrounge Elements
  - Train Operations Personnel
- Demonstrate the End-to-End Data Flow and System Compatibility by Using Thematic Mapper Thermal VAC Data to Output Actual Products

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Scrounge Accounting & Reporting

- All Tracking & Accounting for Scrounge is Manual
- Each Organization Will Provide Processing Statistics Information for Its Functional Responsibilities
- Science Office Will Co-ordinate Tracking on a Work Order Basis for Scene-Specific Accounting

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B. Science Office

- Organization
- Interfaces
- Data Flow
- Functions

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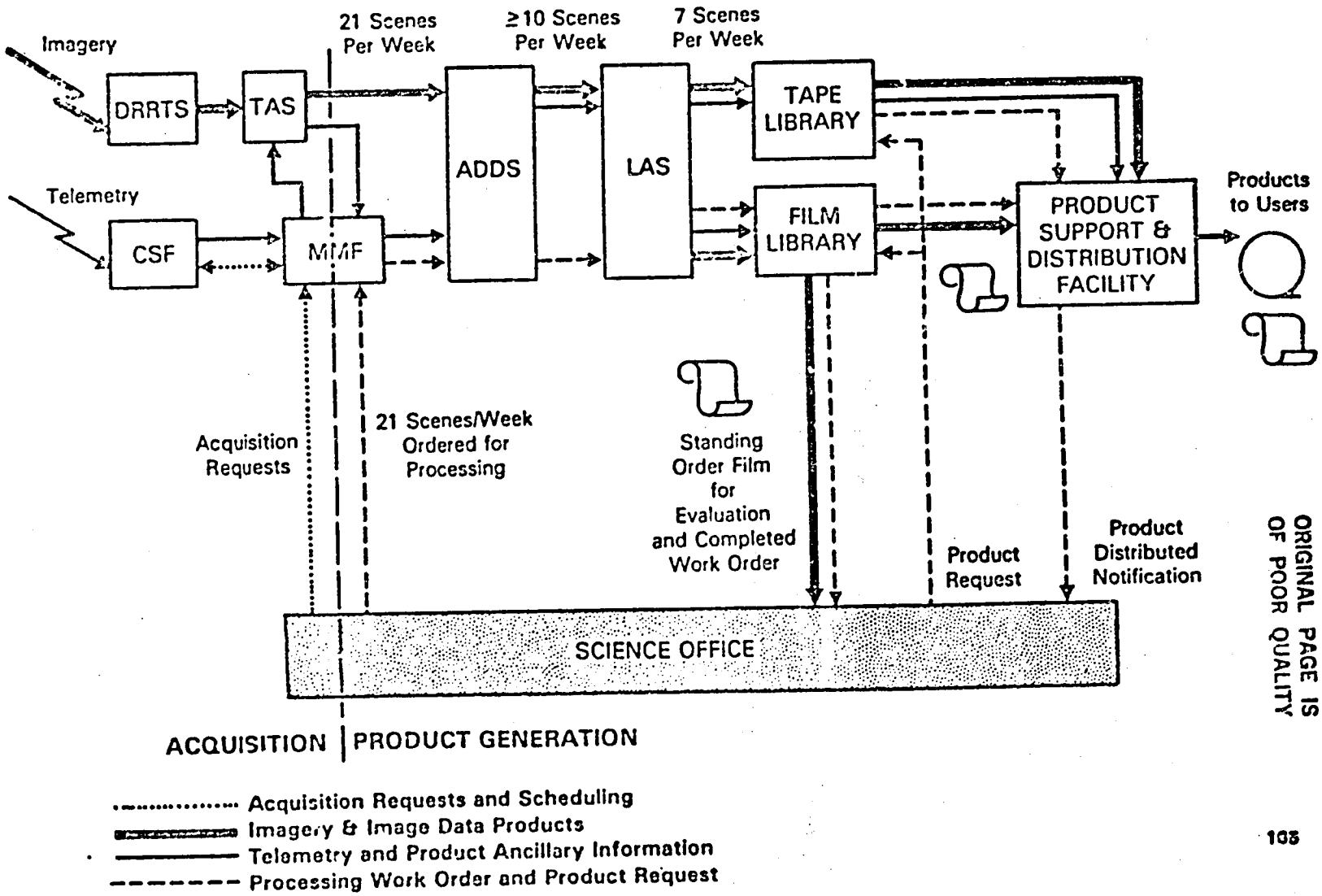
End-to-End Scrounge—Science Office



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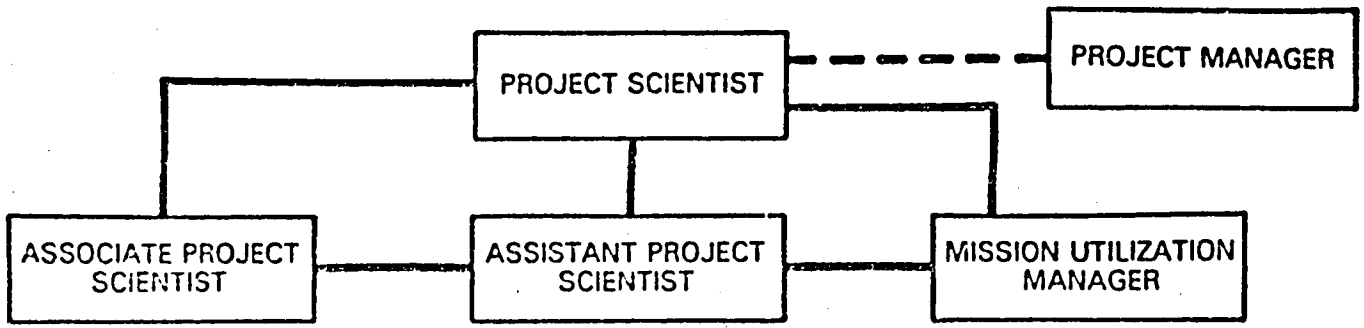
Science Office Organization



- Day to Day Representation to the Project
- Systems Performance
  - Flight Segment
  - Ground Segment
- Systems Contractor Management (SBRC*, GE) for Science Contracts

- Science Monitors
- Science Resources
  - Manpower
  - Dollars

- Scene/Data Selection
  - Acquisition
  - Processing
  - Distribution
- Out-of-House Investigators Management
  - Contracts
  - Grants
  - MOU's
  - Scientific Monitors
  - Contract Monitors

— Responsibilities are distributed among key individuals in Code 900
- Project Scientist — V. Salomonson (920)
- Mission Utilization Manager — S. Freden (902)
- Associate Project Scientist — J. Barker (923)
- Assistant Project Scientist — D. Williams (923)

— All responsibilities require close contact and frequent communication with all elements of the Project: e.g. LAS, ADDS, Software Manager, Mission Operations Manager, etc.

*Santa Barbara Research Center

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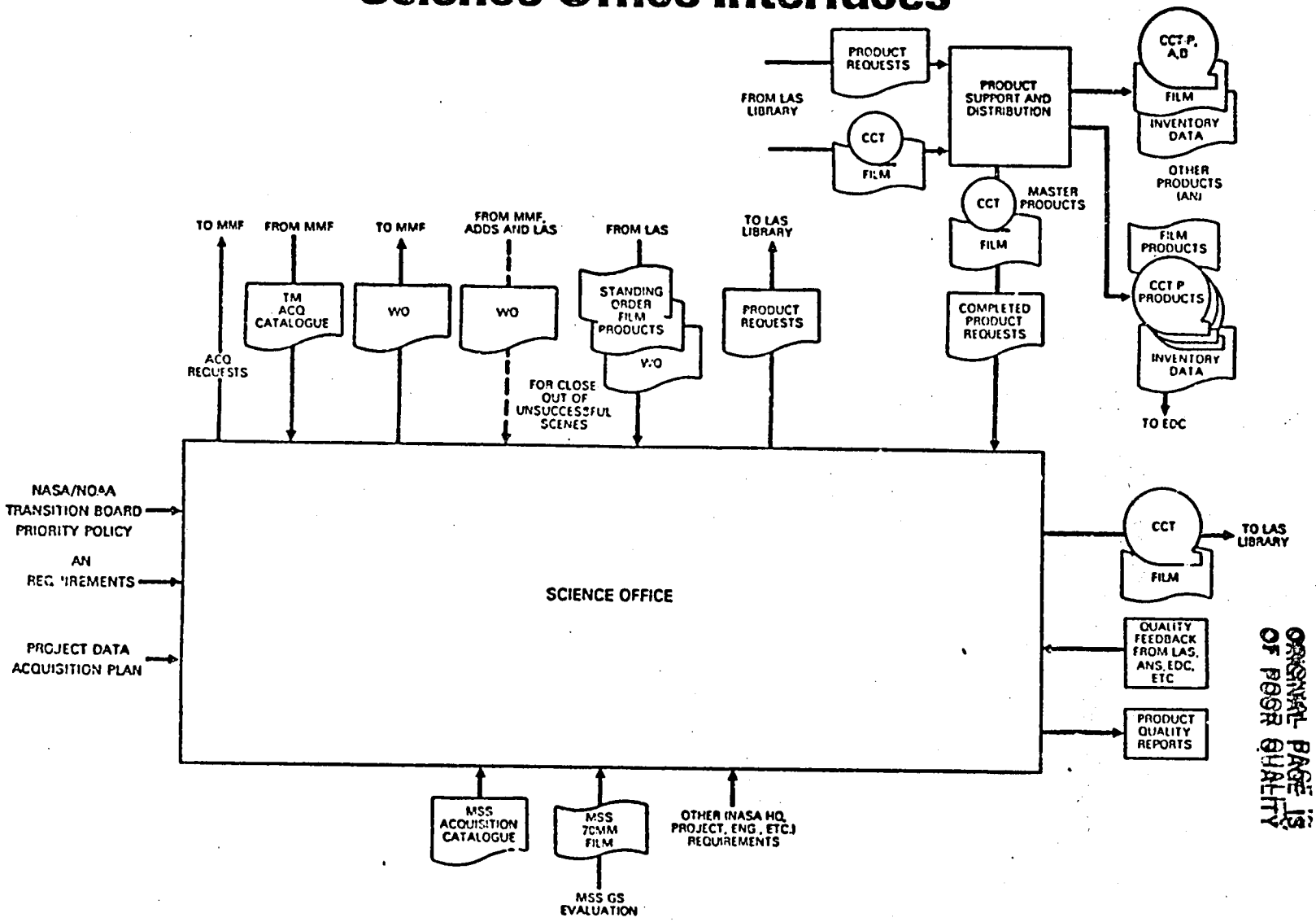
Science Office Interfaces



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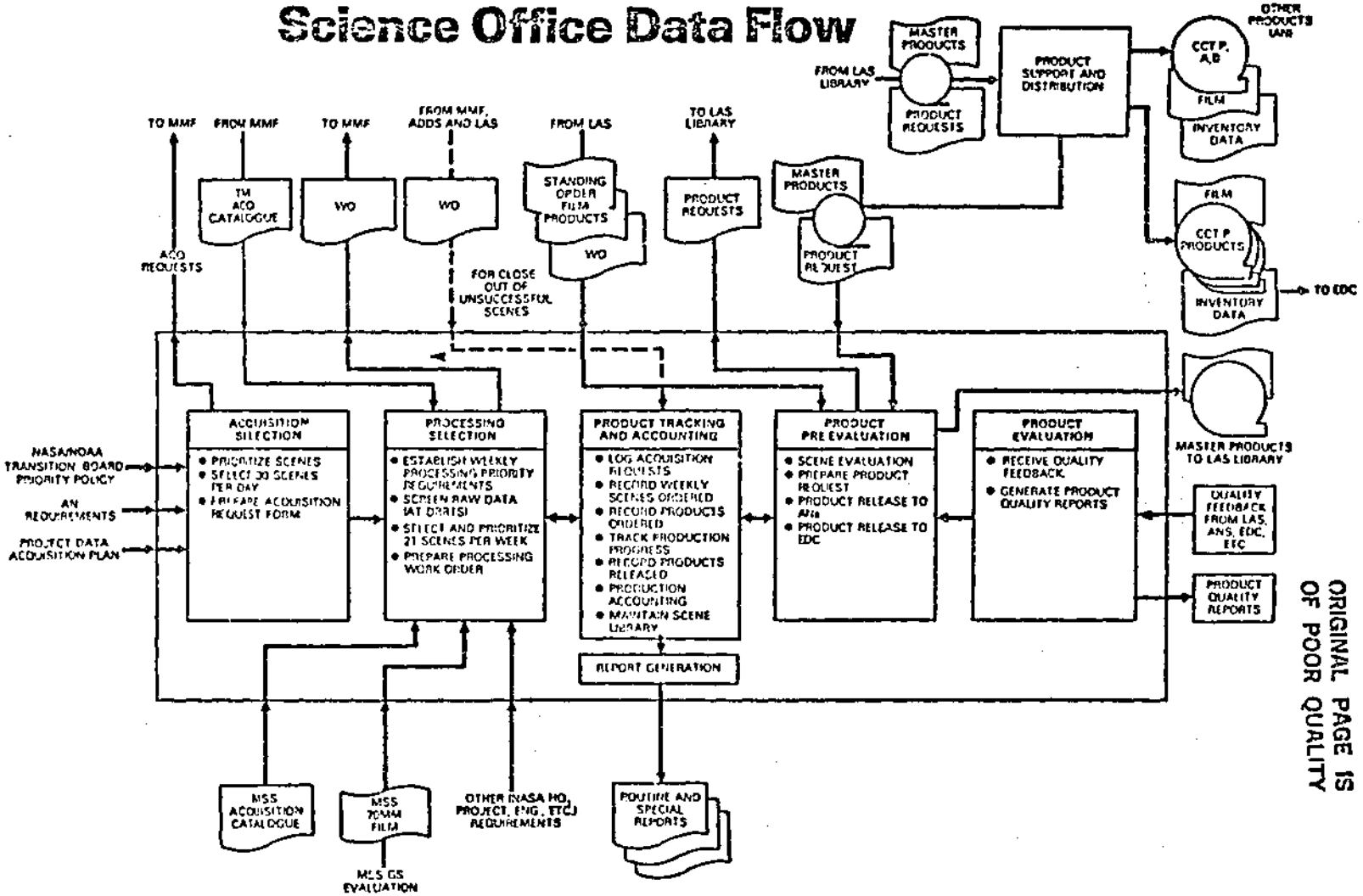
Science Office Data Flow



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Science Office Functions

- Acquisition Selection
- Processing Selection
- Product Tracking and Accounting
- Product Pre-evaluation
- Product Evaluation

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Acquisition Selection

- Prioritize Scenes
  - Set Priorities for Each Day's Swaths
  - Priority System Based on:
    - Number of Users Requesting Scene, Requester's Assigned Priority, etc.
    - Cloud Cover Predicts
    - Scene/Site Acquisition History
- Select 30 TM Scenes Per Day (Average)
  - Acquisition Sites: TGS/GSFC and Land Resources Management (LRM)/Las Vegas, New Mexico
  - Acquisition Coverage: Contiguous U.S. (Some Foreign Possible)
  - Daily Coverage: 2-3 Swaths
- Prepare Acquisition Request Form for MMF

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Processing Selection

- Establish Weekly Processing Priority Requirements
- Screen Raw Data (at DRRTS)
- Select and Prioritize 21 Scenes Per Week
- Prepare Processing Work Order

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Product Tracking and Accounting

- Log Acquisition Requests
- Record Weekly Scenes Ordered
- Record Products Ordered
- Track Production Progress
- Record Products Released
- Production Accounting
- Maintain Scene Library

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Product Pre-Evaluation

- Scene Evaluation
- Prepare Product Request
- Product Release to ANs
- Product Release to EDC

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Product Evaluation

- Receive Quality Feedback From LAS, ANs, EDC, etc.
- Generate Product Quality Reports

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C. APCS

- Interfaces
- Data Flow
- Functions
- Schedule/Status

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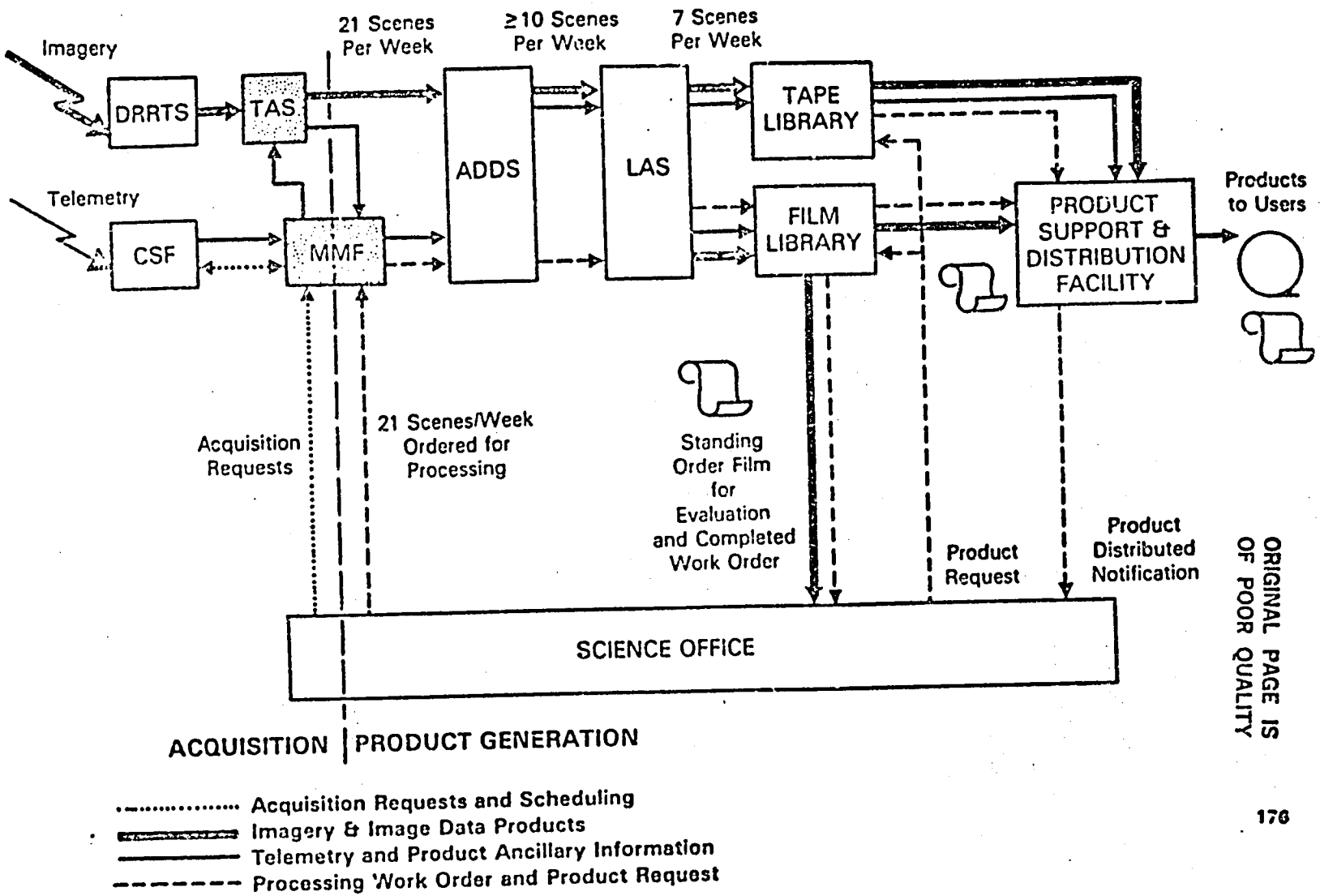
End to End Scrounge — APCS



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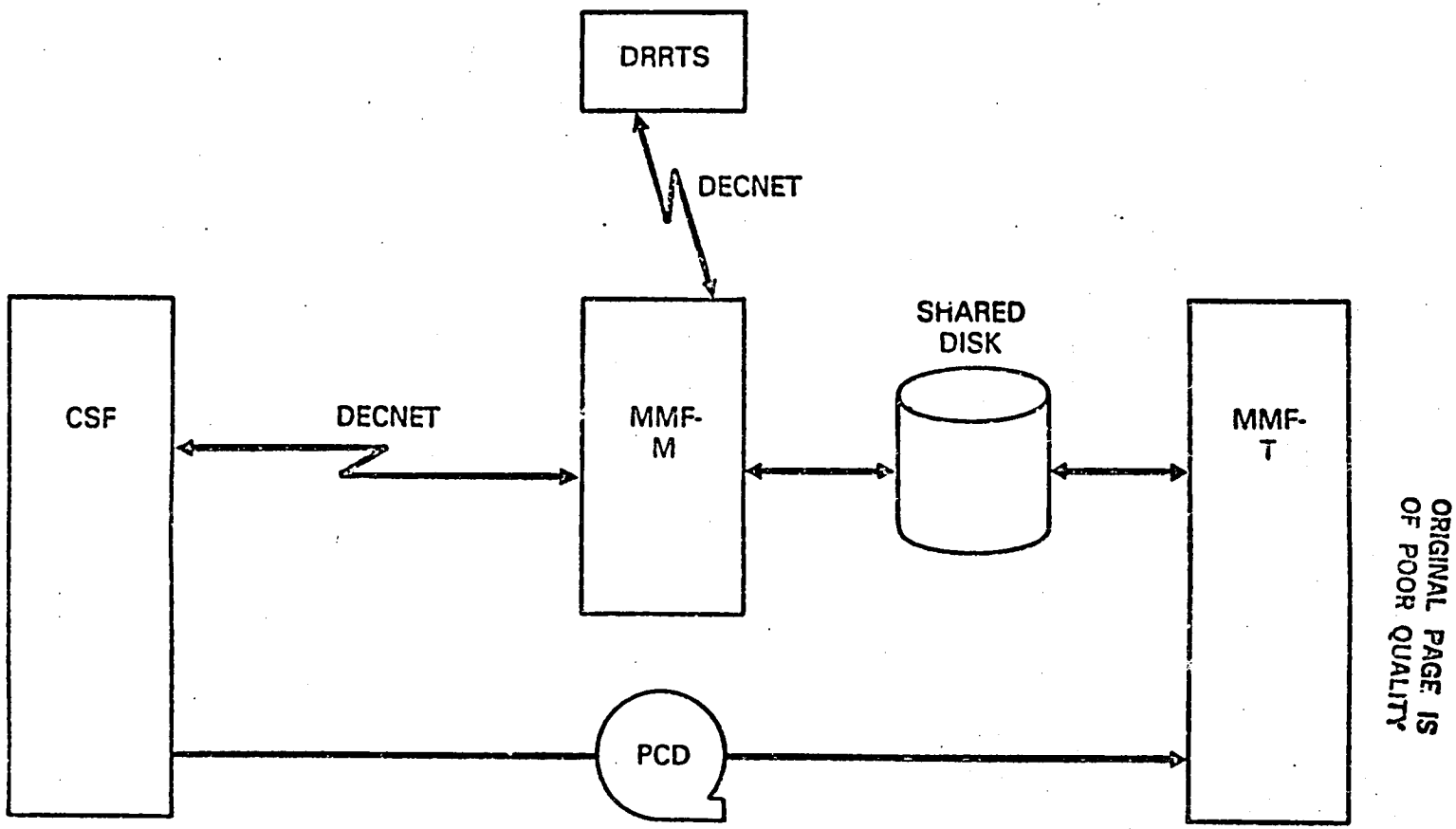
DRRTS/CSF/MMF-M/MMF-T
Configuration



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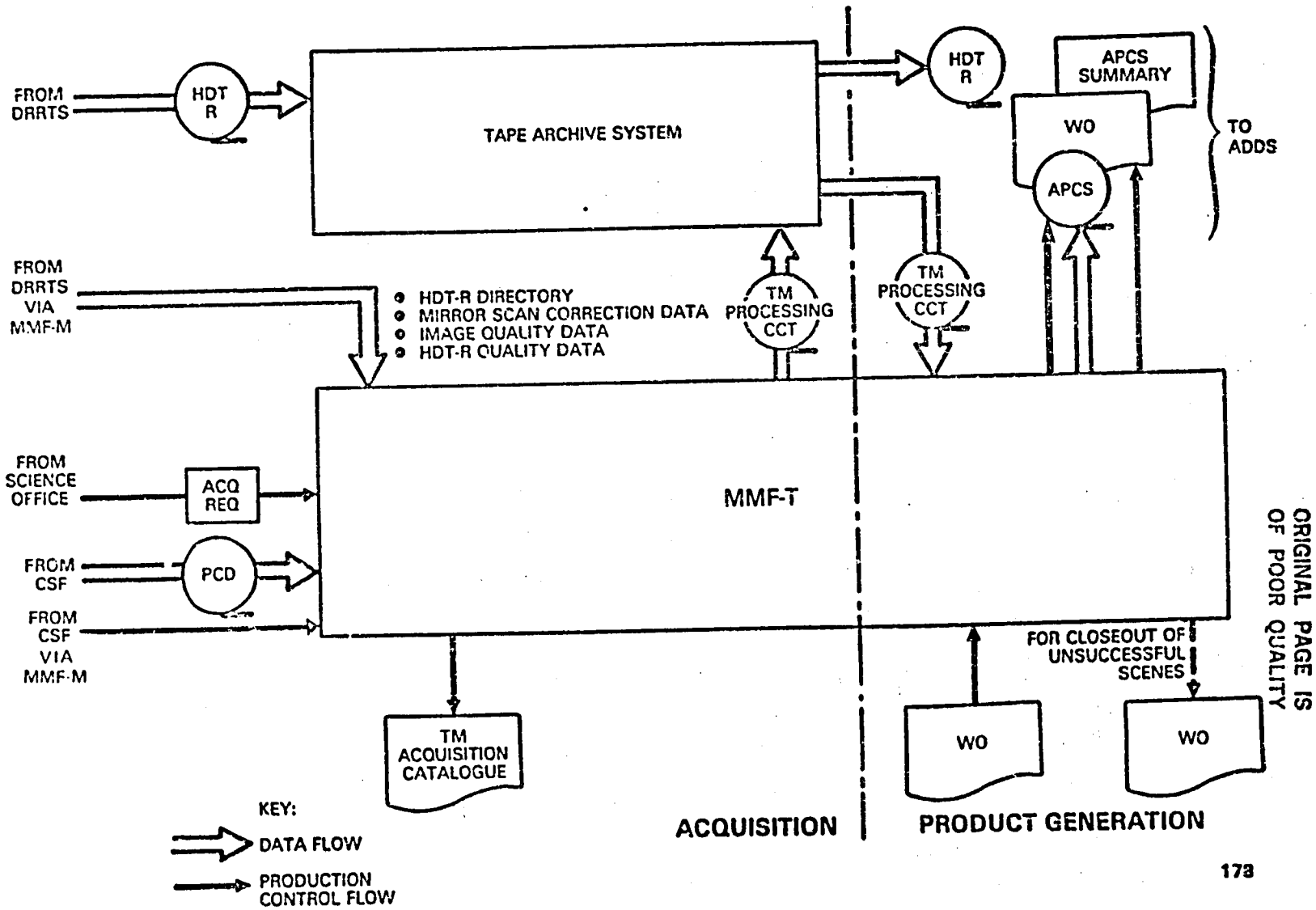
APCS Interfaces



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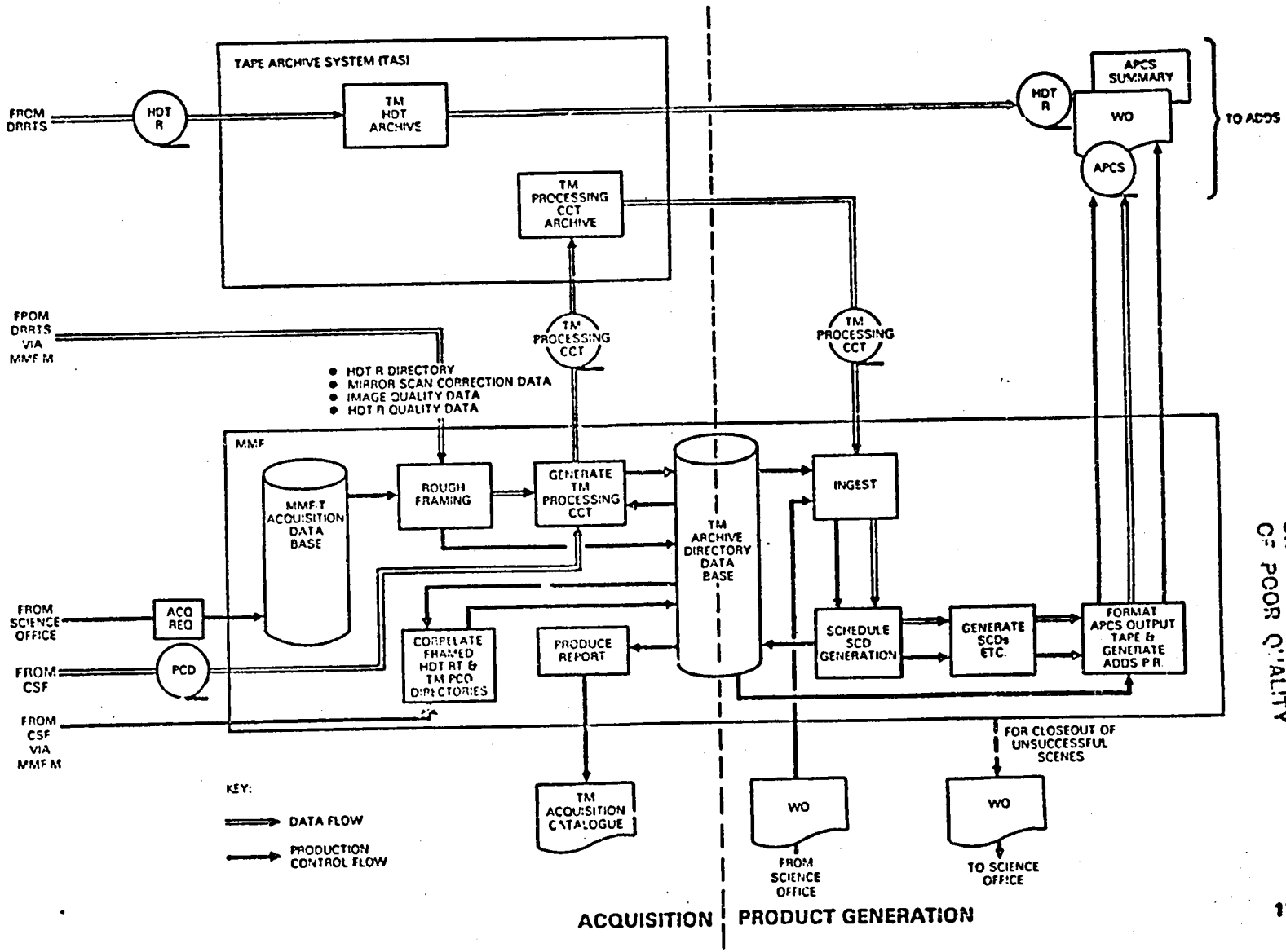
APCS Data Flow



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APCS Functions

- Store Correlated HDT-RT Information and TM PCD on TM Processing CCT
  (HDT-RT Directory File, Mirror Scan Correction Data File, Image Quality Data File, HDT-RT Quality Data File and TM Payload Correction Data File)
- Produce Report of Scenes on TM Processing CCT's
  (Path/Row, Predicted Scene Center Time, Predicted Cloud Cover)
- Manually Select Scenes to be Processed by Scrounge (From Science Office Work Order)
- Ingest Archived Data for Selected Scene(s)
- Generate TM SCD and Ancillary Data for Selected Scene(s)
- Format APCS Output CCT Containing Process Request and TM SCD/Ancillary Data
- Forward APCS Tape and Summary and Annotated Work Order Along with HDT-R to ADDS

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APCS

SCHEDULE/STATUS

- Facility Testing
  - — Includes All APCS Software; Scheduled to Complete April 9, 1982
  - — APCS Output Tape: In New Format With Simulated Data; Delivered April 2, 1982.
- Integration of APCS Into Ground Segment
  - — Schedule for "Operational Integration" Is April Thru May 1982

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D. ADDS

- Interfaces
- Data Flow
- Functions
- Schedule/Status

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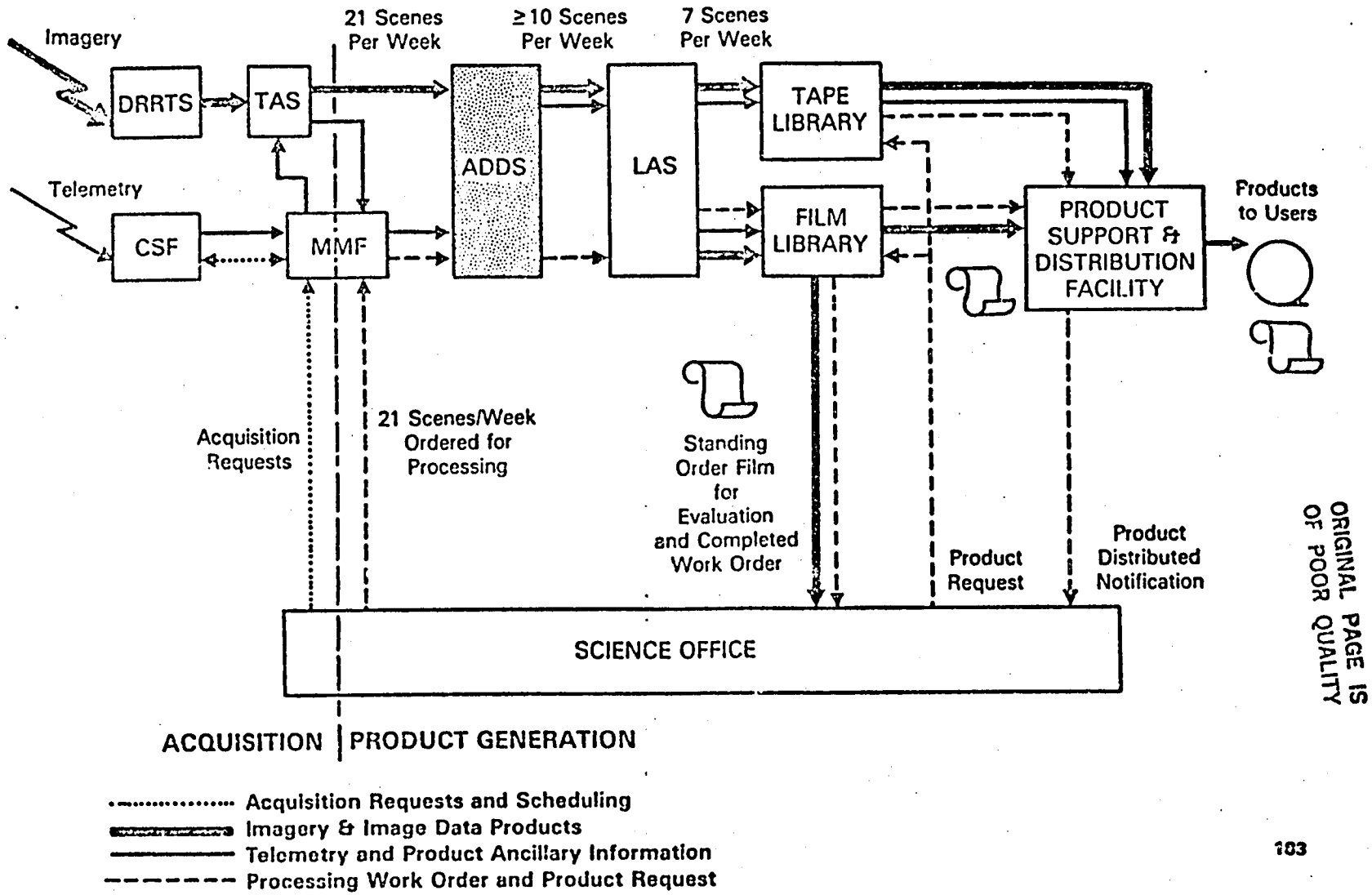
End-to-End Scrounge—ADDS



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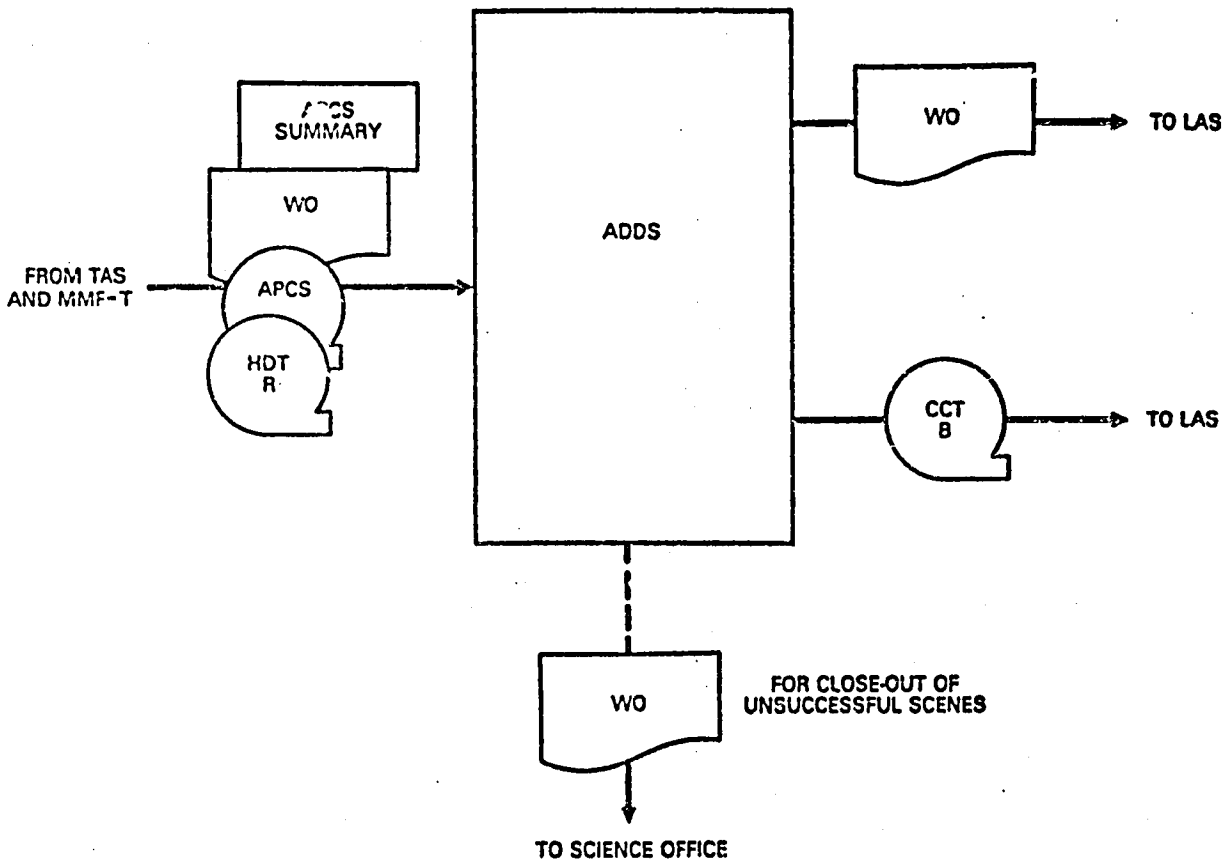
ADDS Interfaces



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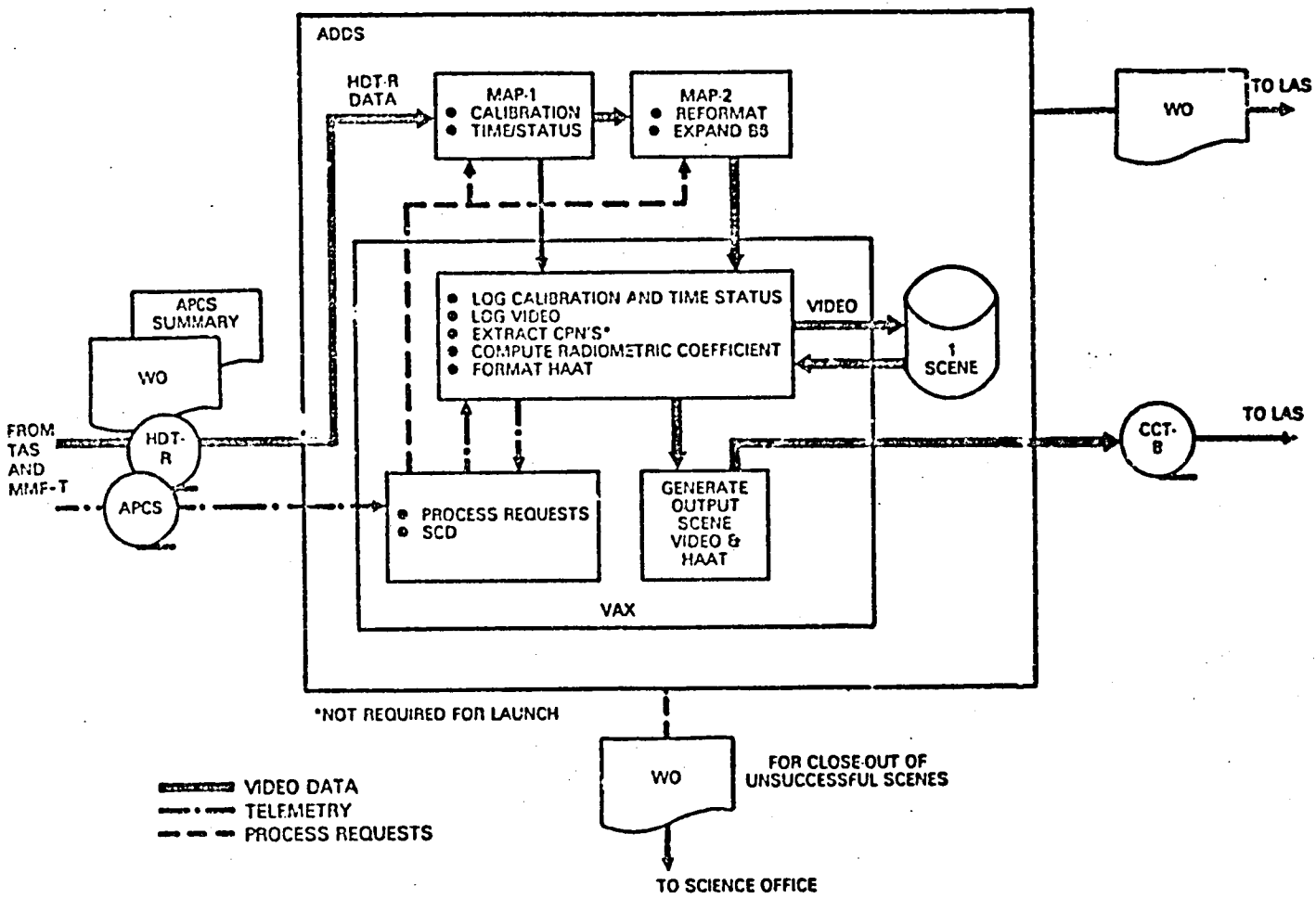
ADDS Internal Data Flow



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ADDS Functions

(WEEKLY VOLUMES)

- Receive HDTs Containing up to 21 Raw TM Scenes
- Receive Corresponding APCS Tapes
  - Scenes Will Be Prioritized From 1 to 21
  - 1 Work Order Per Scene
- Process Raw TM Scenes (up to 21) and Generate ≥10 Scenes in CCT-B Format
  - Contents of CCT-B Nearly Identical to HDT-A
  - Format is Same as HDT-A for HAAT, With a BSQ Pattern and No Radiometric Corrections
- Images Not Screened for Cloud Cover, Quality or Detector/Instrument Malfunction
- Forward CCT-B and Updated Work Order to LAS

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ADDS Status

- All In-Line-to-Launch Hardware Delivered and Integrated
- Software — 95 Percent Complete Through Unit Test
  - Subsystem Integration Has Started
- Produced Formatted CCT-B; Delivered Copies to Both GE and LAS
- Interface Test Using GE-Provided APCS Tape Scheduled for First Week in April
- Mission Readiness Test Plan Has Been Approved
  - Procedures in Progress

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E. LAS

- Interfaces
- Data Flow
- Functions
- Schedule/Status

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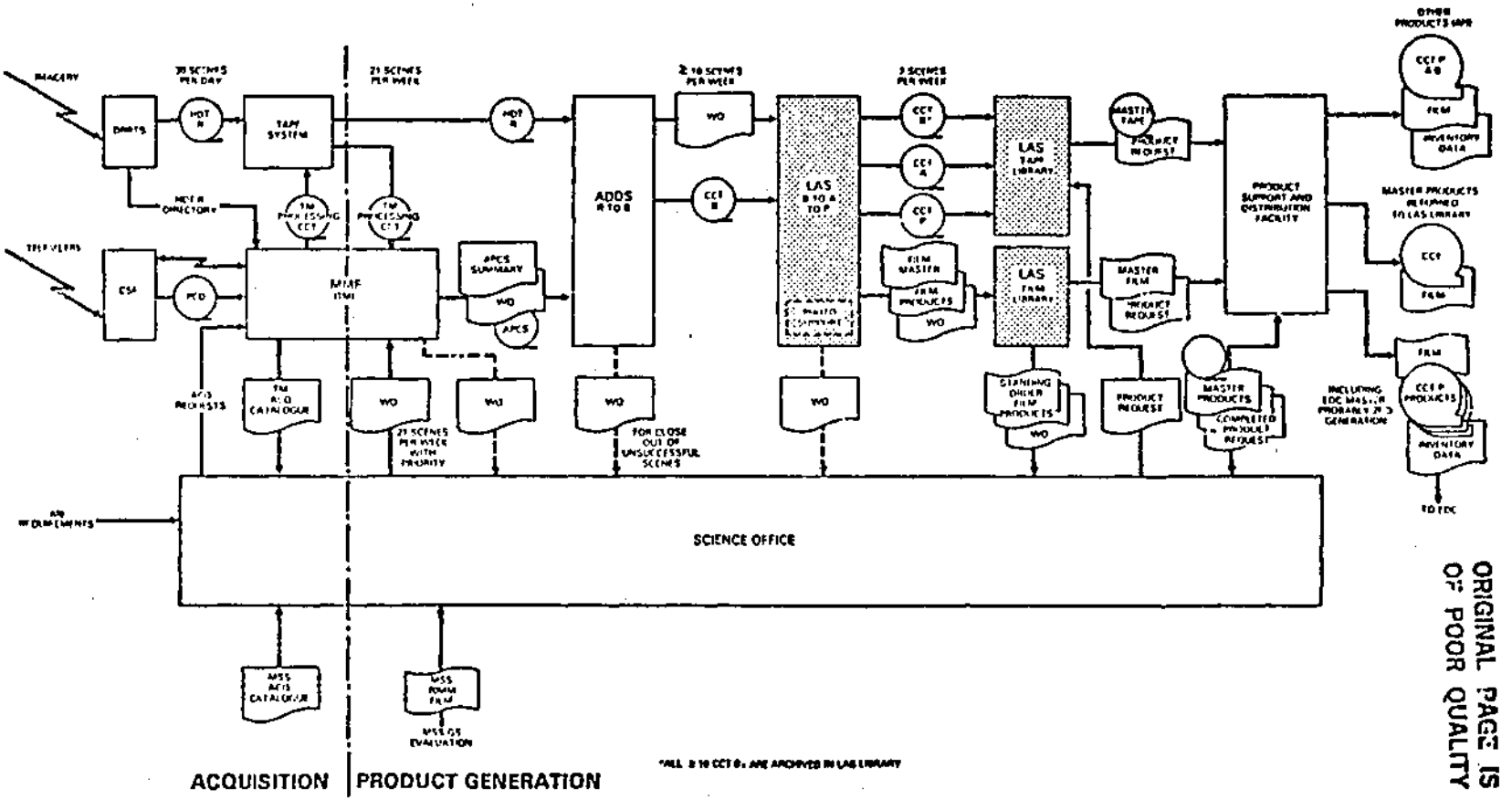
End to End Scrounge — LAS



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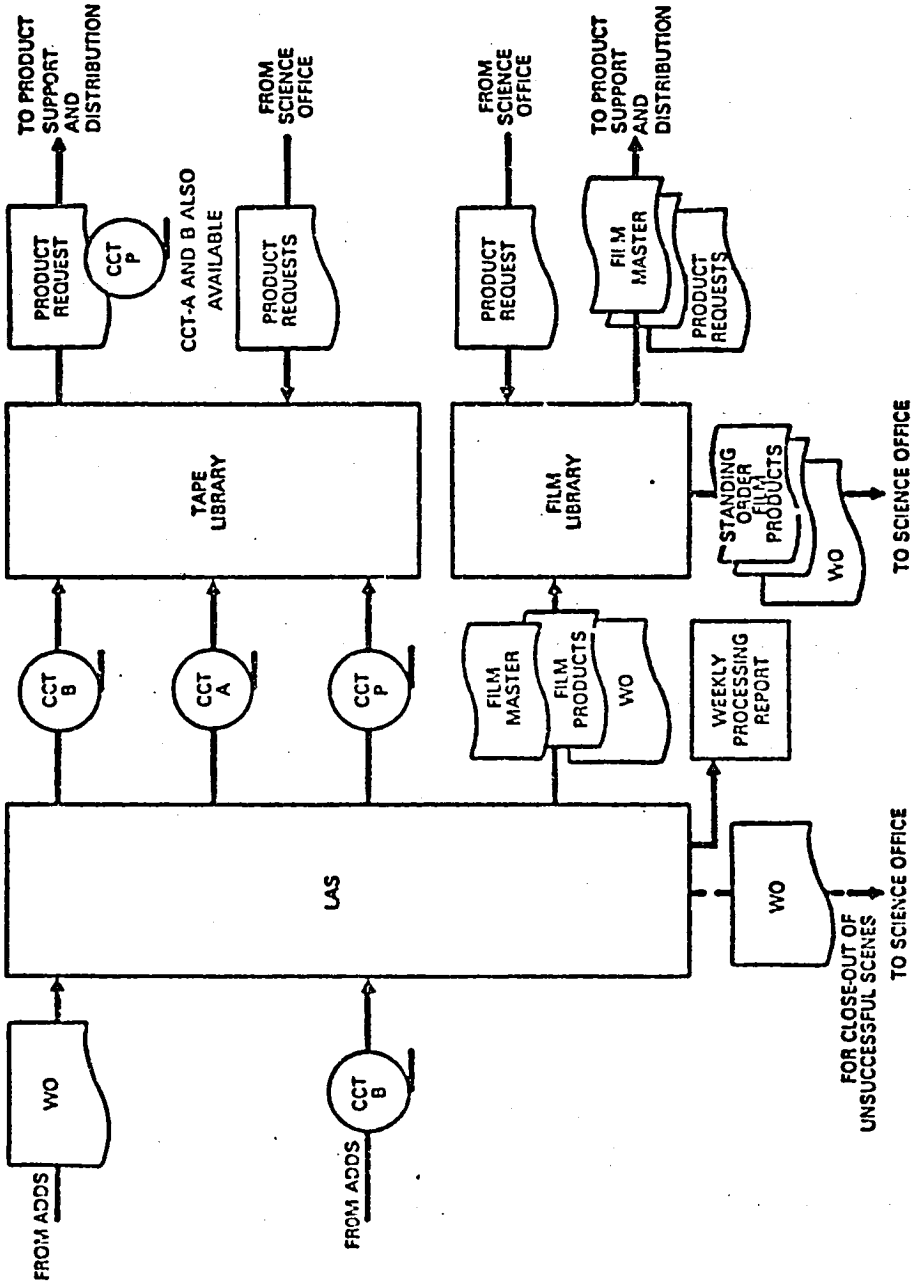
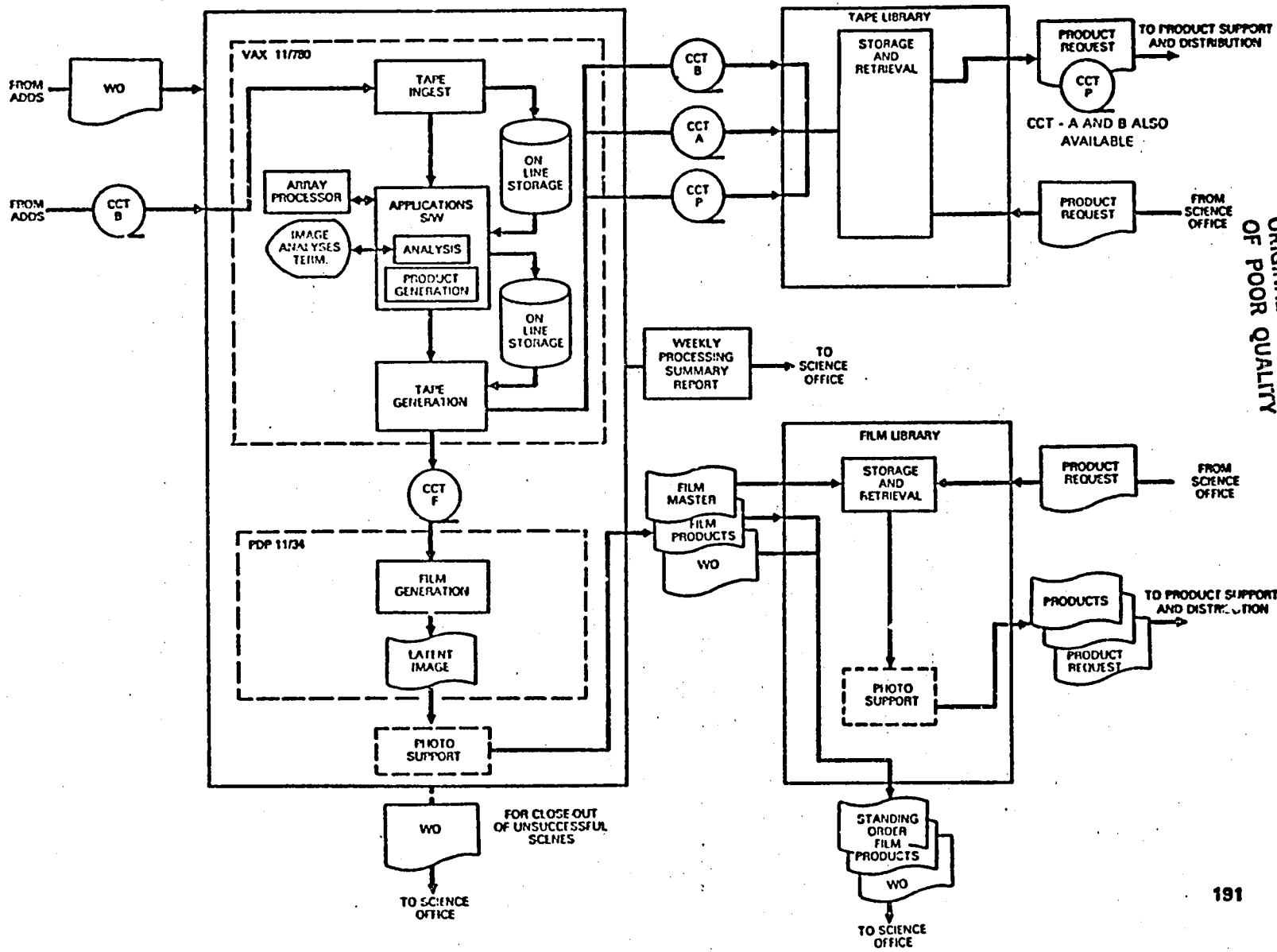
LAS Interfaces



LAS Internal Data Flow



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LAS Functions

- Receive a Minimum of 10 and up to 21 TM Scenes Per Week in CCT-B Format
- Receive Corresponding Work Orders and Scene Priorities
- Apply Radiometric and Geometric Corrections to TM Data as Required to Produce CCT-A and P Products
- Produce TM P-Film Master and Associated Products for 7 Scenes Per Week
- Forward Standing Order Film Products and Updated Work Orders to Science Office
- Store Tape and Film Master in Respective Libraries
- Supply Film and Tape Masters to Product Support and Distribution (According to Product Requests) for Preparation of Output Products
- Provide Science Office with Weekly Processing Summary Report

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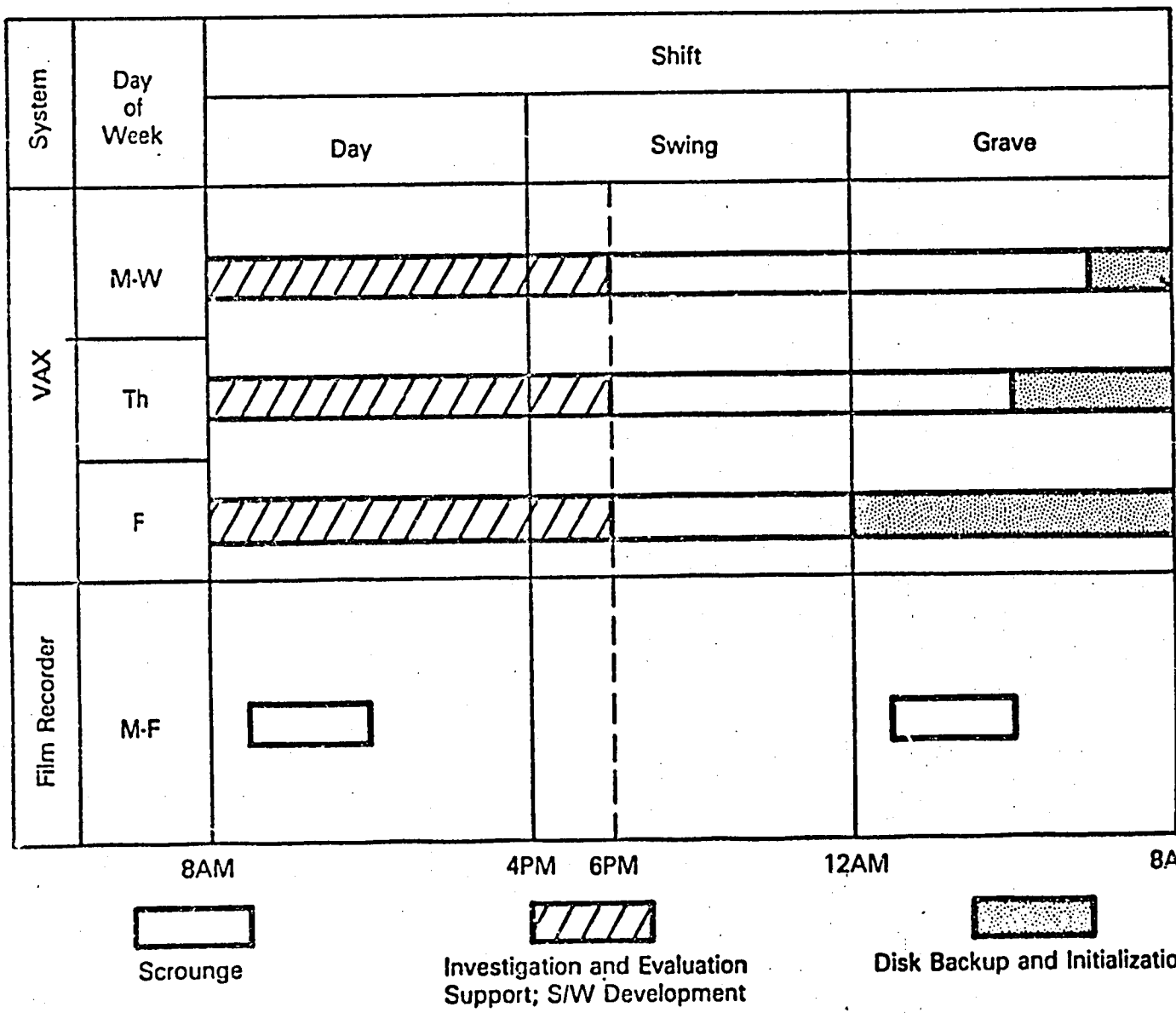
LAS Scrounge Operations Schedule



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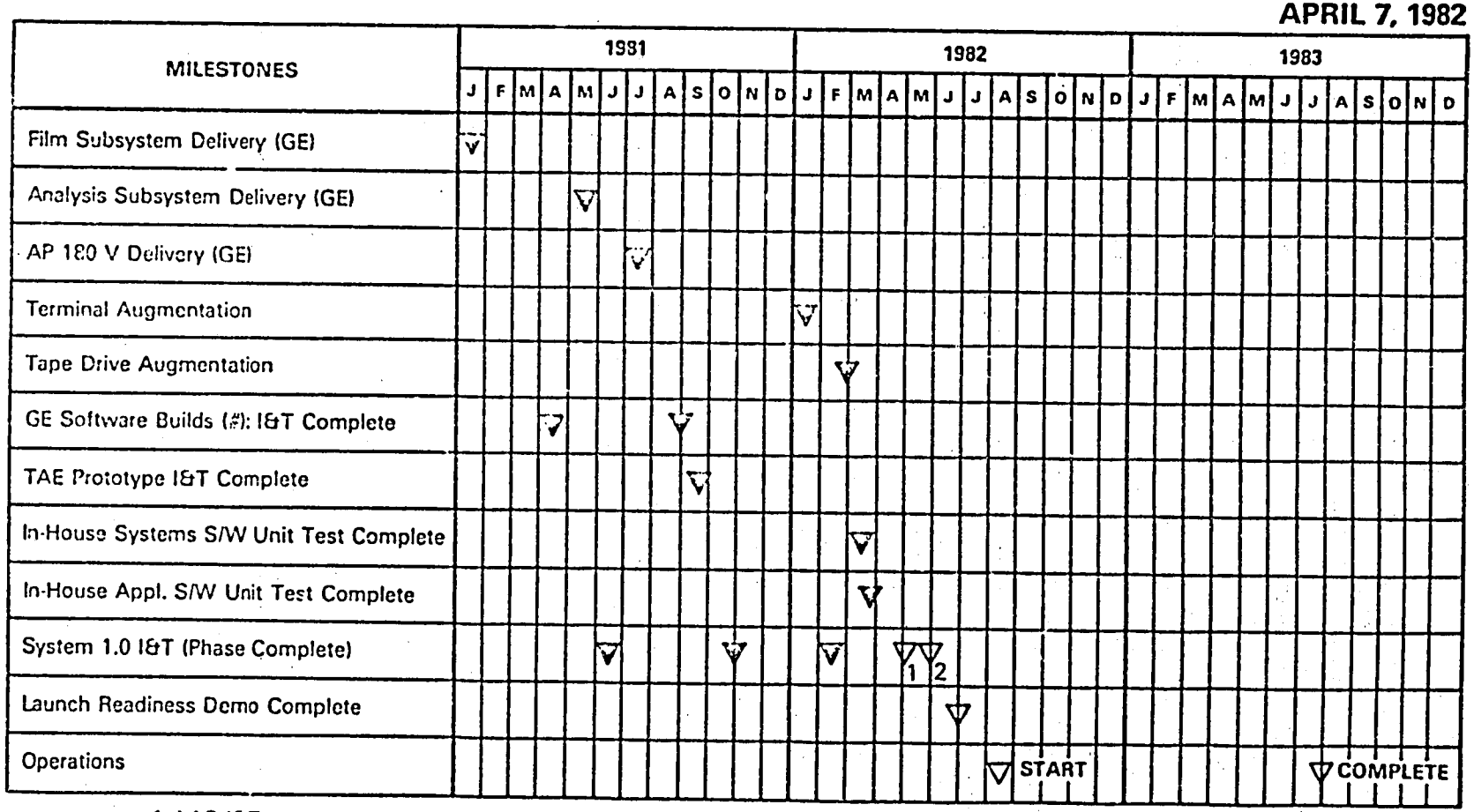
Landsat Assessment System Master Schedule

APRIL 7, 1982



1. LAS I&T
2. ADDS and LAS I&T

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IX. Landsat-D Performance Evaluation

A. Objectives
B. Scope
C. Organization
D. Approach
E. Requirements
F. Schedule

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A. Objectives

- Landsat-D Project Objectives
- Objectives of Staged Evaluation

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Landsat-D Project Objectives

- Assess Capabilty of TM
- Provide Transition from MSS to TM
- Demonstrate Operational System Feasibility
- Provide Continuity of MSS Imagery
- Permit Continued Foreign Access

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Objectives of Staged Evaluation

ENGINEERING (STAGE 1)
Verify System and Facility Performance to Specifications

SCIENCE (STAGE 2)
Characterize Product and Information Content

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Evaluation Emphasis by Project Objective

Project Objective	ENGINEERING Verify System and Facility Performance to Specifications	SCIENCE Characterize Product and Information Content
Assess Capability of TM	Sensor and Ground Processing QC	Major
Provide Transition from MSS to TM	Product and Facility Documentation	Major
Demonstrate Operational System Feasibility	Major	Product QA Support
Provide Continuity of MSS Imagery	Major	MSS Quick Reaction Studies
Permit Continued Foreign Access	Major	LTWG Support

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B. Scope

- Scope by Stage
- Out-of-Scope

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Scope by Stage

ENGINEERING
• Verify System and Facility Performance to Specifications
• Verify Product Quality Standards
• Establish Equipment and Operations Reliability

SCIENCE
• Characterize Accuracy and Precision of Imagery
• Characterize Accuracy and Precision of Derived Information
• Recommend Landsat-D System Improvements
• Communicate Capabilities to Research Community

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Out-of-Scope

POLICY EVALUATION OF:

- Cost Effectiveness of Processing System
- Utility of Landsat-D Products vs. Other Data Source Products
- Pricing and Market Considerations

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C. Organization

ENGINEERING	
Landsat-D Project	GE, SBRC*, et.al.

SCIENCE	
Science Office	ANs, GSFC Support, et. al.

*Santa Barbara Research Center

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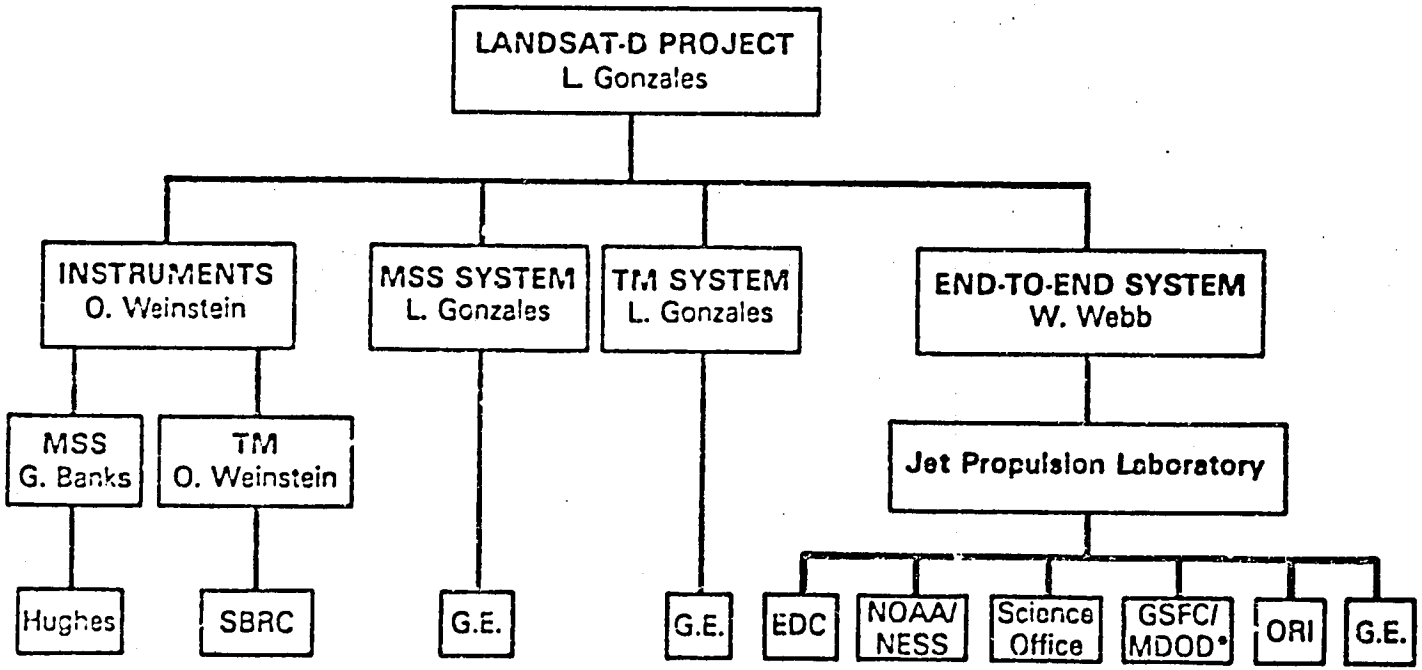
Engineering Evaluation Organization



*Mission and Data Operations Directorate

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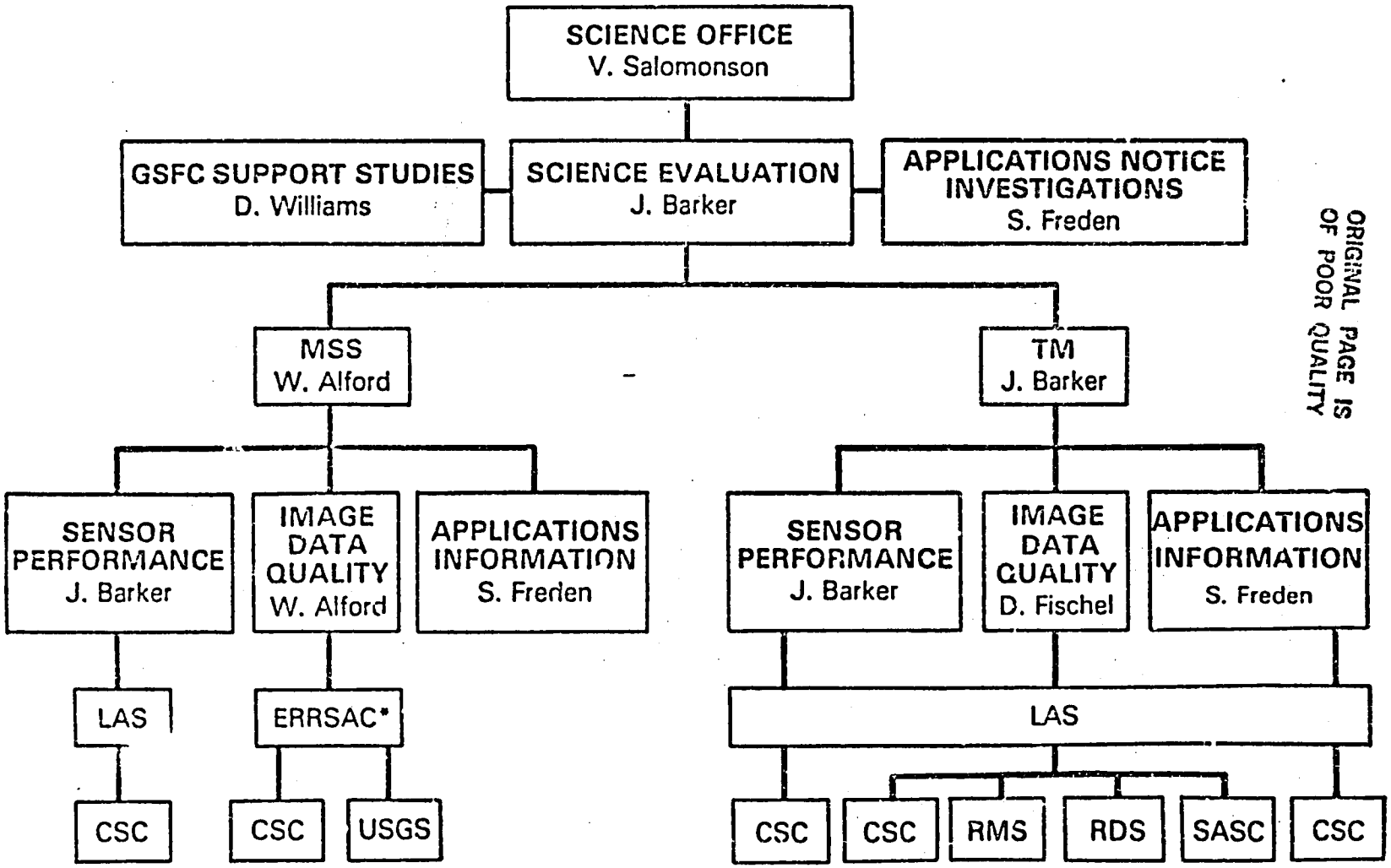
Science Evaluation Organization



*Eastern Regional Remote Sensing Application Center

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D. Approach

- Engineering
- Science

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Approach - Engineering Evaluation

- Instrument Performance
- MSS System Performance
- TM System Performance
- End-to-End System Performance

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Instrument Performance

Responsibilities

MSS - Protoflight and Flight (PF and F)

- Hughes-Sensor System Level Tests

TM (PF and F)

- Santa Barbara Research Center (SBRC) - Sensor System Level Tests

Reports

- Technical Memos
- Pre-Ship Review
- Final Report

- Technical Memos
- Pre-Ship Review
- Post-Launch Support

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MSS & TM System Performance

GE RESPONSIBILITIES

Pre Launch

- TM Radiometric Test Data Reduction
- Integrating Sphere Test Data Reduction
- TM Geometric Performance Testing

Post Launch

- Geometric Calibration and Validation
- Structural Jitter Evaluation
- Radiometric Calibration and Validation

REPORTS

Technical Memos

Preship Review

Processing White Papers

Technical Memos

Postlaunch Support

Processing Parameter Update

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End-to-End System Performance

RESPONSIBILITY

Fred Billingsley, JPL

REPORTS

Pre-Launch Publication of Landsat-D End-to-End System Performance Study

STUDY OBJECTIVES

- Determine to What Extent Intended System Performance is Possible
- Estimate Image Technical Performance to be Expected
- Determine if Adequate Ancillary Information is Present
- Trace Effects of System Functions and Operations Through the System
  - Determine End-to-End System Operability
  - Estimate Cumulative Errors/Output Performance

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End-to-End System Performance (Continued)

DIRECT SUPPORT AND PRINCIPAL CONTACTS

- ORI (Lynn Buhler)
  - Administrative
  - System Flows
  - User Information Documentation
- EDC (R. J. Thompson)
  - Operability and Quality Assurance
  - User Information — CCT and Data User Handbook
- NOAA (Levin Lauritson)
  - System Data Flow and Processing Timelines
  - Operational Contingencies
- GSFC/MDOD (Joe Heinig)
  - System Quality Assurance
  - Geodetic Accuracy Factors
- Science Office (John Barker)
  - Radiometric Correction Process
  - Geometric Correction Process

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Approach - Science Evaluation

- Sensor Performance
- Image Data Quality
- Applications Information

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Sensor Performance - MSS and TM
Topical Organization

RADIOMETRY

Spectral Regions
- Pre-Launch Spectral Matching
  - — Filters
  - — Detectors
  - — System
- Post-Launch Verification

Radiometric Sensitivity
- Absolute Integrating Sphere Calibration
  - — Dynamic Range
  - — Linearity
  - — Signal-to-Noise
- External Calibration
  - — Precision (Reproducibility)
- Internal Calibration
  - — Precision (Reproducibility)
  - — Signal-to-Noise
- Flooding Lamp Calibration
  - — Uniformity Over Scan

GEOMETRY

Spatial Resolutions of Pixels
- Rise Time and Decay Time
- Bright Target Recovery Time
- MTF (IFOV) or Frequency Response
  - — Pre-Launch External Calibrator
  - — Post-Launch Verification
- Bowtie Scan Angle Effect
- Altitude Effects

Geometric Resampling of Images
- Band-to-Band Registration
- Jitter
  - — Calculated
  - — Observed
- Global Positioning System (GPS)
- Alignment of Sensor
- Scan-to-Scan Alignment (Gap and Overlap)
- Scan Non-Linearity

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Image Data Quality - MSS and TM

Topical Organization

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RADIOMETRY

Spectral Regions
- Detector Replacement Algorithms
- Band Compression Algorithms

Radiometric Sensitivity
- Internal Calibration Algorithms
  - Channel-to-Channel
  - Band-to-Band
- Scene Histogram Calibration Algorithms
  - Radiometric Destriping
- Absolute Scene Radiance Calibration Algorithms
  - Reflective Bands
  - Thermal Band
- Noise Correction Algorithms

GEOMETRY

Spatial Resolution of Pixels
- Edge Response Algorithms

Geometric Resampling of Images
- Single Scene Correction Algorithms
- Systematic Correction Grid
  - Attitude
  - Emphemeris
  - Jitter
  - Scan Profile
- Geodetic Correction Grid
  - Ground Control Points
- Scene-to-Scene Registration Algorithms
- Scene-to-Map Rectification Algorithms

Applications Information — MSS and TM

Areas of Interest

RENEWABLE RESOURCES	NON-RENEWABLE RESOURCES	PLANNING/ENVIRONMENTAL MANAGEMENT
Agriculture Inventory Yield Condition Irrigation Episodal Event	**Geology** Structure Landforms Lithology Thermal Anomalies Geobotanical Anomalies Topography (Stereo) Episodal Event	**Regional/Urban Land Use** Cover Classification Cover Change Environmental Impact
Soils Classification Erosion Moisture	**Image-Science** Pattern Recognition Information Extraction	**Coastal Zone** Monitoring
Forests Inventory Stand Evaluation Condition Episodal Event		**Hydrology** Drainage Patterns Inland Water Inventory Snow Pack Parameters Ice—Inland & Near Shore Water Quality—Inland & Near Shore Wetland/Estuaries Inventory Episodal Event
Range Vegetation Inventory Condition Episodal Event		**Wildlife Habitat** Inventory Evaluation
		Oceans Currents (Near Shore) Tides Bathymetric Charts Ocean Pollution (Near Shore)

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E. Requirements

- Acquisition
- Mission
- Products

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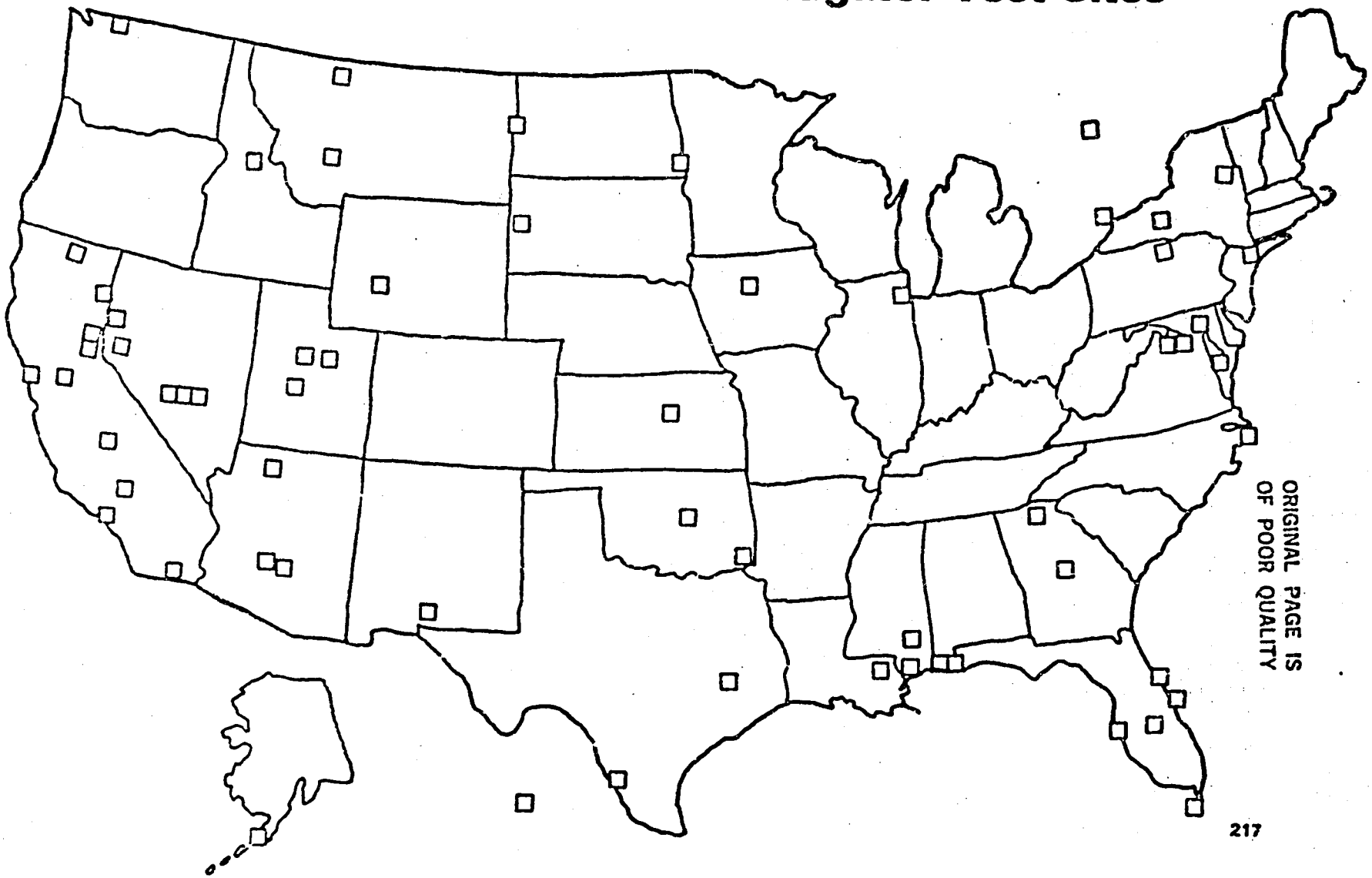
Landsat-D Provisional Investigator Test Sites



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Illustrative Landsat-D Mission Requirements

- MSS On Alone
- TM On Alone
- MSS and TM On Together
- Daytime and Nighttime
- Choice of MSS Configuration
- Choice of TM Configuration

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MSS Tape Products Required

FACILITY	PROCESSING LEVELS				
	NONE	RADIOMETRIC		GEOMETRIC	
	RAW	INTERNAL CALIBRATION	SCENE HISTOGRAM	SYSTEMATIC	GEODETIC
MIPS					
CCT-AM	X	X	X		
CCT-PM				X	X
EDC					
CCT-PM			X	X	X

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TM Tape Products Required

FACILITY	PROCESSING LEVELS				
	NONE	RADIOMETRIC		GEOMETRIC (NN OR CC RE-SAMPLING)	
	RAW	INTERNAL CALIBRATION	SCENE HISTOGRAM	SYSTEMATIC	GEODETIC
SCROUNGE					
(BEFORE JULY 83)					
CCT-BT	X				
CCT-AT		X	X		
CCT-PT		X	X	X	X
TIPS					
CCT-AT	X	X	X		
CCT-PT		X	X	X	X

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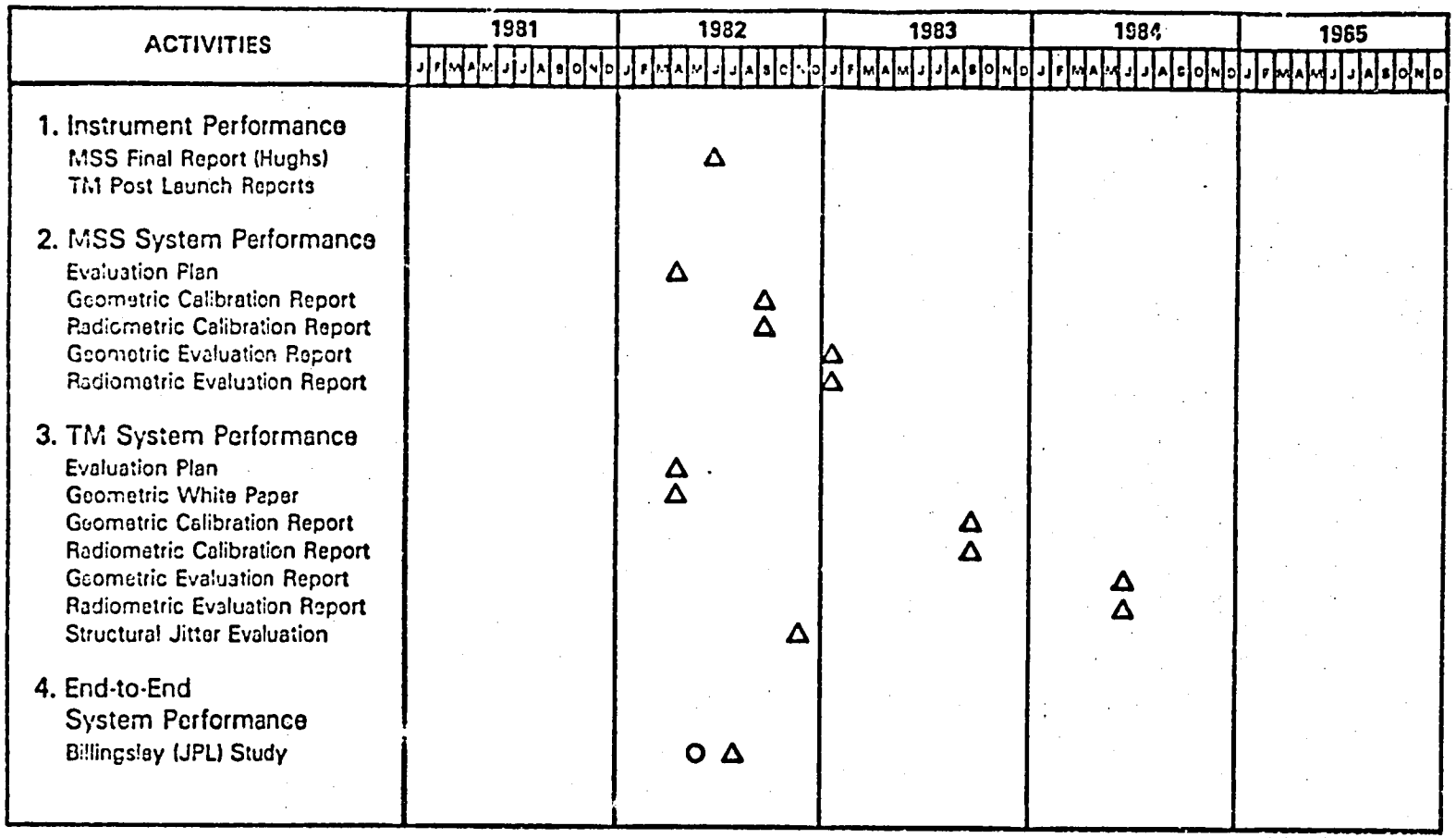
Landsat-D Engineering Evaluation Activities



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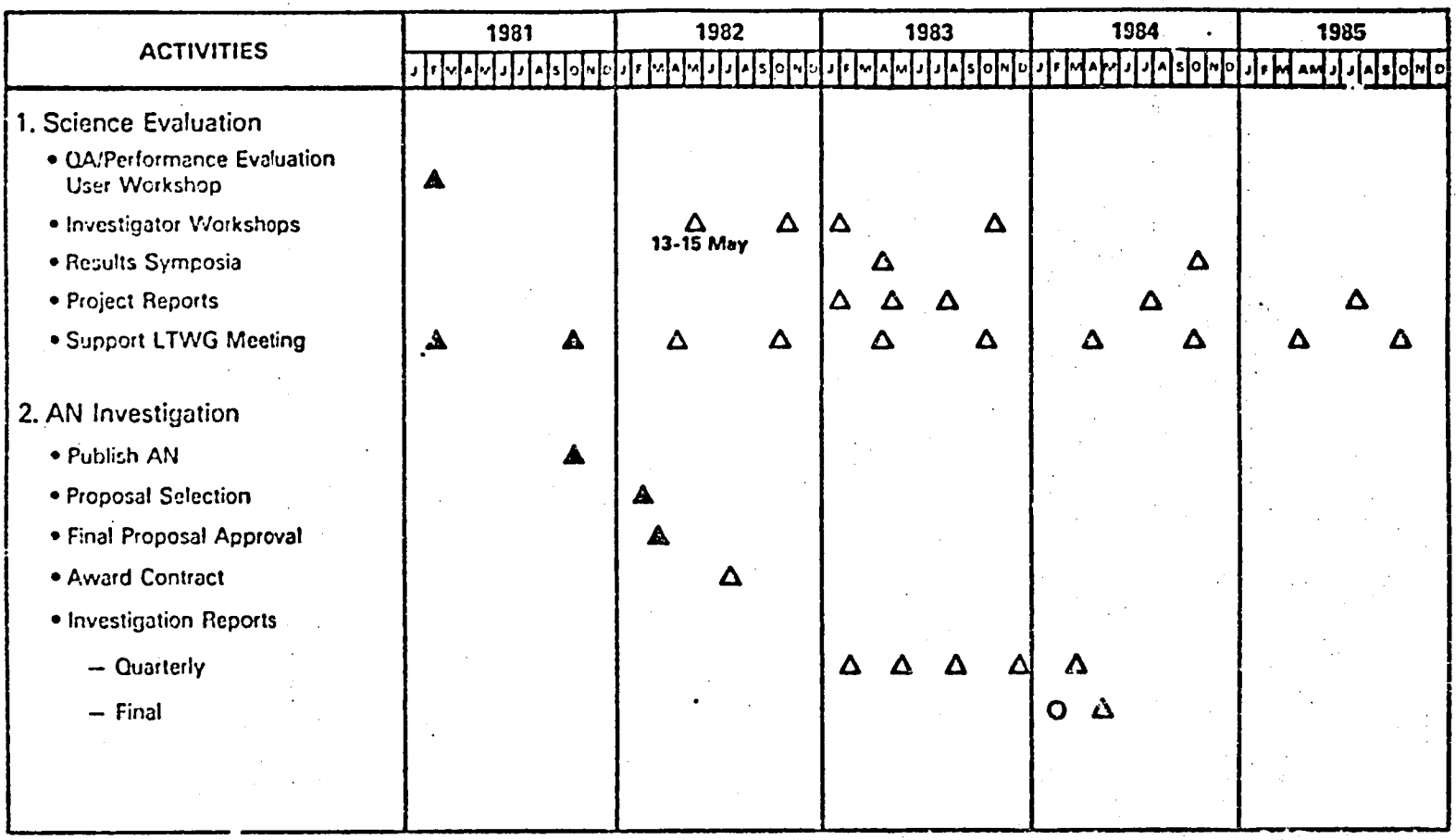
Landsat-D Science Evaluation Activities



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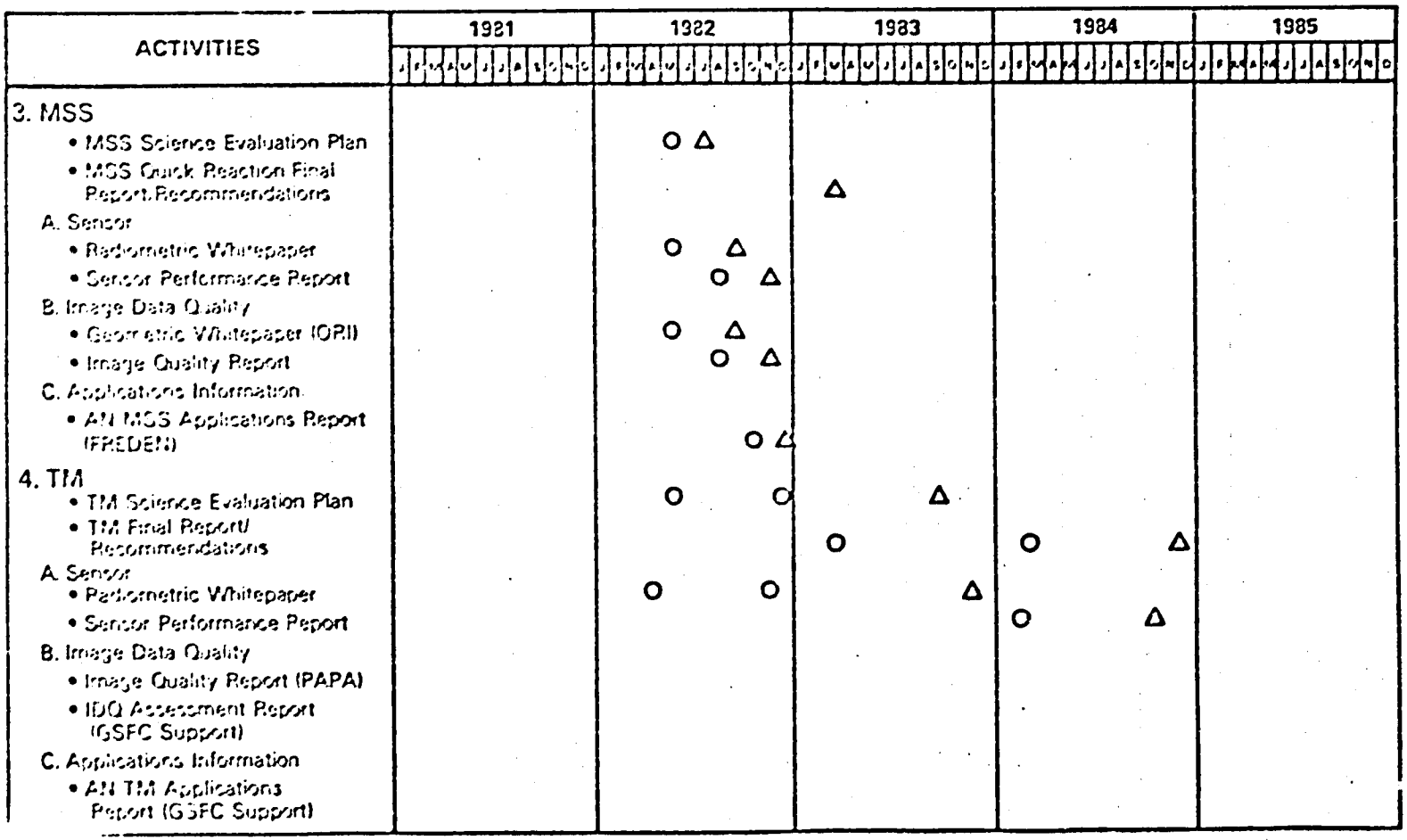
Landsat-D Science Evaluation Activities (Continued)



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X. Wrap-Up

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APPENDIX A

MASTER ACRONYM LIST

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INTRODUCTION

The Master Acronym List is intended to be a central reference document for the General Electric Space Division Lanham Operations Center. The entries were gathered by the Data Systems Software Engineering Techniques group from a variety of sources including: Landsat-D Flight Segment and Ground Segment specifications, the Commonly Used Space Division Abbreviation Reference Dictionary (CUSDARD) and government-issued documents.

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AB	Acceptance Baseline
ACE	Attitude Control Electronics
ACK	Acknowledgement
ACS	Attitude Control System
ACT	Application Concept Test
A/D	Analog to Digital
ADCP	See ANDP
ADFS	Automated Digital Facsimile System
ADL	Applications Development Laboratory
ADP	Automatic Data Processing
ADPE	Automatic Data Processing Equipment
A&DS	Aerospace and Data Systems
ADS	Angular Displacement Sensor
AEM	Applications Exploratory Mission
AFGWC	Air Force Global Weather Central
AFOS	Automation of Field Operations and Services
AFPRO	Air Force Plant Representative Office
AG	Archive Generation
AGC	Automatic Gain Control
AGE	Aerospace Ground Equipment
AGS&PO	Aerospace Group Strategic Planning and Programs Office
Ahr	Ampere - hour
ALU	Algorithm Logic Unit
AMR	Annual Manpower Review
AN	Alteration Notice
ANCP	See ANDP
ANDP	Ancillary Data Calculation Process
ANSI	American National Standards Institute
ANT	Ascending Node Table
AO	Announcement of Opportunity
AOIPS	Atmospheric and Oceanographic Image Processing System
AOP	Advanced Onboard Processor
AOS	Acquisition of Signal
AP	Applications Processor
AP	Array Processor
APFO	Aerial Photography Field Office
APL	Applied Physics Laboratory (Johns Hopkins Univ.)
APM	Assistant Project Manager
APS	Antenna Positioning System
A/R	As Required
ASCII	American Standard Code for Information Interchange
ASPR	Aerospace Strategic Programs Representation
ASPR	Armed Services Procurement Regulations
ASR	Automatic Send/Receive
AST	Asynchronous System Trap
ASVT	Applications System Verification and Transfer Project
AT	Acceptance Test
ATL	Applications Technology Laboratory

ATM	Antenna Test Model
ATM	Apollo Telescope Mount
ATP	Acceptance Test Plan
ATS	Applications Technology Satellite
AWG	American Wire Gauge
BARDJA	Boom Antenna Retention Deployment and Jettison Assembly
BAT	Bench Acceptance Test
BB	Build Baseline
BCU	Bus Coupling Unit
BDF	Block Data Format
BER	Bit Error Rate
BESS	Biological Experiment Scientific Satellite
BFR	Browse Film Recorder
BIC	Band Interleaved by Cylinder
BIL	Band Interleaved by Line
BIP	Band Interleaved by Pixel
BOL	Beginning of Life
BOT	Beginning of Tape
B&P	Bid and Proposal
BPA	Bus Protection Assembly
bpi	Bits per Inch
BPI	Bytes per Inch
BPO	Best Possible Offer
bps	Bits per Second
BPS	Bytes per Second
BSE	Broadcast Satellite Experimental
BSQ	Band Sequential
BSR	Back Surface Radiator
BTC	Bench Test Cooler
BTCE	Bench Test and Calibration Equipment
BTE	Bench Test Equipment
B/U	Backup
B&W	Black and White
CAL	Configured Articles List
CAL	Calibration
CARETS	Central Atlantic Regional Ecological Test Site
CASH	Catalog of Available and Standard Hardware
CAT	Catalog
CCA	Cloud Cover Assessment
CCB	Configuration Control Board
CCC	Camera Controller Combiner
CCD	Charge Coupled Device
CCL	Closed Circuit Loop
CCN	Contract Change Notice
CCP	Cloud Cover Assessment Process
CCT	Computer Compatible Tape

CCT-A	CCT Containing Partially-Corrected Data
CCT-AT	CCT Containing Partially-Corrected TM Sensor Data
CCT-P	CCT Containing Fully-Corrected Data
CCT-PT	CCT Containing Fully-Corrected TM Sensor Data
C&DH	Communication and Data Handling
CDHSS	Communication and Data Handling System Simulator
CDHSS I/U	CDHSS Interface Unit
CDP	Company Development Project
CDR	Conceptual Design Review
CDR	Critical Design Review
CDRB	Conceptual Design Review Board
CDRL	Contract Data Requirements List
CEM	Controlled Environment Module
CFOV	Clear Field-of-View
CFSR	Contract Financial Status Report
CG	Center of Gravity
CI	Configuration Item
CLL	Corrected Line Length
CM	Center of Mass
C.M.	Configuration Management
CMD	Command
CMI	Configuration Management Instruction
CMM	Command Memory Management
CMMD	Corporate Manager Manpower Development
CMO	Configuration Management Office
COBOL	Common Business Oriented Language
COMP	Computer
C.P.	Center of Pressure
CP	Communication Processor
CP	Control Point
CPC	Control Point Chip
CPCI	Computer Program Configuration Item
CPD	Control Point Directory
CPDS	Computer Program Design Specification
CPG	Correction and Product Generation Software
CPL	Control Point Library
cpm	Cards Per Minute
CPM	Computer Personality Module
CPN	Control Point Neighborhood
CPPT	CZCS Preprocessor Performance Tape
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
CRIS	Cosmic Ray Ionization Spectrometer
CRT	Cathode Ray Tube
CSA	Cropping, Subsampling and Averaging
CSE	Contractor Supplied Equipment
CSF	Control and Simulation Facility
CSS	Coarse Sun Sensor

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CTC	Cost to Complete
CU	Central Unit
CY	Calendar Year
CZCS	Coastal Zone Color Scanner
DA	Development Authorization
D/A	Digital-to-Analog
DAS_3	Data Base Administration Subsystem
DAS^3	De-Centralized Automated Service Support System
DBIP	Data Base Interface Process
dBi	Antenna gain in decibels referenced to an Isotropic Antenna
dBm	Power in decibels referenced to one millimeter
DBMS	Data Base Management System
DBMS-10	DEC-10 System Software for Data Base Management
DC	Direct Current
DCP	Data Collection Platform
DCS	Data Collection System
DCST	Data Collection System Tape
DDD	Days
DDG	Digital Display Generator
DDI	Digital Data Interconnect
DDL	Data Description Language
DDP	Digital Data Processor
DDP-C	Controlled Environment Module DDP
DDP-W	Wire-Wrapped DDP
DDR	Detailed Design Review
DDRB	Detailed Design Review Baseline
DEC	Digital Equipment Corporation
DEC-10	DEC-10 Computer
DEC-20	DEC-20 Computer
DECnet	Digital Equipment Corporation Communications Network
DECOM	Decommutator
DECOM	Decommutation Hardware Device
DEMUX	Demultiplexer
DFS/ADFS	Digital Facsimile System/Automated Digital Facsimile System
DI	Design Issue
DIAL	Digital Image Analysis Laboratory
DICOMED	Film Recorder
DICOMED	Film Recorder Vendor
DID	Digital Image Data
DIP	Dual Inline Package
DIPS	Digital Image Processing System
DIIO	Large Image Access Routines
D/L	Downlink
DMA	Direct Memory Access
DMF	Data Management Facility
DML	Data Management Language
DML	Data Manipulation Language

DMS	Data Management System
DMSP	Defense Meteorological Satellite Program
DO	DRRTS Operator
DOC	Data Operations Control
DOD	Department of Defense
DOD	Depth of Discharge
DOI	Department of the Interior
DOI/EDC	Department of the Interior/EROS Data Center
DOMSAT	Domestic Communications Satellite
DPM	Drafting Practices Manual
DPR	Design Problem Report
DPS	Data Processing System
DPS	DRRTS Process Software
DPSE	DRRTS Process Software Executive
DPU	Digital Processing Unit
DR11C	Programmed Input Output Interface Device for DEC Unibus
DR70	Direct Memory Access Interface Device for DEC Massbus
DR780	Direct Memory Access Interface Device for DEC VAX-11/780
DRRTS	Data Receive, Record and Transmit Subsystem
DS	Dimension (Telephone) System
DSC	Data Collection System
DSCS	Defense Satellite Communications System
DSCS	Desk Side Computer System
DSI	Deliverable Software Item
DSI	Digital Subsystem Interface Unit
DSL	Data Service Laboratory
DSM	Downlink Synchronization Module
DSSCI	Data Stripper-Serial Controller Interface
DSU	Digital Switching Unit
DTD	Digital Terrain Data
DTG	Digital Tape Generation
DTR	Daily Test Report
DTS	Digital Transmission System
DUT	Document Update Transmittal
DV	Digital Voltmeter
DX20	DEC Peripheral Interface Device
DXFP	Data Extraction and Formatting Process
EAGE	Electrical Aerospace Ground Equipment
EBCDIC	Extended Binary Coded Decimal Interchange Code
EBR	Electron Beam Recorder
EBRIC	Electronic Beam Recorder Image Correction
ECC	Error Correction Capability (HDDR)
ECEF	Earth-Centered-Earth-Fixed
ECI	Earth-Centered-Inertial
ECL	Emitter Coupled Logic
ECP	Engineering Change Proposal
EDC	EROS Data Center

EDIPS	Electronic Digital Processing System
EDIPS	EDC Digital Image Processing System
EDP	Electronic Data (Digital) Processing
EDPS	Electronic Data Processing System
EED	Electro-Explosive Device
EEO	Equal Employment Opportunity
EGRET	Explorer Gamm Ray Experiment Telescope
EGSE	Electrical Government Supplied Equipment
EI	Engineering Instruction
EIA	Electronic Industries Association
ELE	Elevation at Entry
ELS	End-of-Line Sync
ELX	Elevation at Exit
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
ENA/DISA	Enable/Disable
EOB	End of Buffer
EOF	End of File
EOL	End of Life
EOM	End of Mission
EOP	Earth Observatory Program
EOP	End of Process
EORT	End-of-Roll Target
EOS	Earth Observation Systems
EOS	Earth Observations Satellite
EOS	End of Set
EO&SP	Earth Observatory and Shuttle Programs
EOT	End of Tape
EOV	End of Volume
EPA	Environmental Protection Agency
EPC	Electrical Power Conditioner
EPHEM	Ephemeris
EPI	Euler Parameter Integration
EPS	Electrostatic Plotting Software
ER	Early Release
ER	Equipment Room
ERCN	Early Release Change Notice
EREP	Earth Resources Equipment Package
EROS	Earth Resources Observation System
ERS	Earth Resources Survey
ERTS	Earth Resources Technology Satellite
ESA	European Space Agency
ESTEC	European Space Research and Technology Center
EU	Expander Unit
EVA	Extra-Vehicular Activity
EVAL	Earth Viewing Applications Laboratory
EWO	Engineering Work Order

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FAIRS	Full Aperture Infrared Source
F&AO	Financial and Administrative Operations
FAS	Foreign Agricultural Service
FCS	File Control Service
FDR	Final Design Review
FFP	Federation of Functional Processors
FGS	Fine Guidance System
FHST	Fixed-Head Star Tracker
FID	Final Instrument Definition
FIFO	First-In, First-Out
FIPS	Federal Information Processing Standards
FM	Frequency Modulation
FM	Flight Model
FMEA	Failure Mode and Effects Analysis
FMS	Flight Segment Management Subsystem
FO	Flight Operations
FOC	Faint Object Camera
FORTRAN	Formula Translation
FOS	Field Operations Service
FOS	Flight Operations Subsystem
FOS	Faint Object Spectrograph
FOV	Field-of-View
FPA	Focal Plane Assembly
FPP	Floating Point Processor
FPS	Focal Plane Structure
FRD	Facilities Requirement Document
FRUSA/HASP	Flexible Roll-Up Solar Array/Hardened Solar Power System
FS	Flight Segment
FSCM	Federal Supply Code for Manufacturers
FSDF	Flight Segment Development Facility
FSEC	Fairchild Space and Electronics Company
FSK	Frequency Shift Keying
FSS	Flight Scheduling Subsystem
FSS	Flight Segment Simulator
FSS	Flight Support System
FSS	Fine Sun Sensor
FSSA	Foreign Service Salary Adjustment
FSS S/W	Flight Segment Simulator Software
FT	Fourier Transform
FTS	Federal Telephone System
FW	Fiscal Week
FY	Fiscal Year
FYI	For Your Information
G	Generation
GACA	Goodyear Aerospace Corporation, Arizona Division
GCM	Geometric Correction Matrix
GCO	Geometric Correction Operator

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GCOVS	GCO Verification System
GCP	Geodetic Control Point
GCP	Ground Control Point
GDBS	Ground Data Handling System
GDT	Graphics Display Terminal
GE	General Electric
GE70	GE Interface Device for DR780
GECP	Geometric Correction Process
GEOREF	Geographic Reference
GES	Ground Electronic Specification
GETSCO	General Electric Technical Service Company
GFE	Government Furnished Equipment
GFIT	Goddard Film Inventory Tape
GFP	Government Furnished Property
GHIT	Goddard HDT Inventory Tape
GHz	Gigahertz (10^9)
GIA	Government Inspection Agency
GM	General Manager
GMF	GCO Microcode File
GMP	Geometric Correction Matrix Calculation Process
GMS	Ground Segment Management Subsystem
GMT	Greenwich Mean Time
GOES	Geostationary Operational Environmental Satellite
GOES/SDHS	Geostationary Operational Environmental Satellite/Satellite Data Handling System
GPC	General Purpose Console
GPE	Ground Processing Equipment
GPIP	General Purpose Information Processor
GPS	Global Positioning System
GPT	General Purpose Transformation
GRE	Gamma Ray Explorer
GRFP	Graphite Filled Epoxy
GS	Ground Segment
GSE	Ground Support Equipment
GSFC	Goddard Space Flight Center
GSSS	Ground Support System Software
GSTDN	Ground Spaceflight Tracking and Data Network
HAC	HDDR Assignment and Control
HAL	High-Order Aerospace Language
HCMM	Heat Capacity Mapping Mission
HDDR	High Density Digital Recorder
HDDT	High Density Digital Tape
HDE	HDT-R Directory Extractor
HDT	High Density Tape
HDT-A	HDT-Archive Format (Partially corrected)
HDT-AM	HDT-A for MSS Sensor Data
HDT-AMC	Copy of HDT-A for MSS Sensor Data

HDT-AT	HDT-A for TM Sensor Data
HDT-ATC	Copy of HDT-A for TM Sensor Data
HDT-I	HDT (Data) Interval
HDT-P	HDT-Product Format (Fully corrected)
HDT-PT	HDT-P for TM Sensor Data
HDT-PTC	Copy of HDT-P for TM Sensor Data
HDTR	High Density Tape Recorder
HDT-R	HDT-Raw Data
HDT-RM	HDT-R for MSS Sensor Data
HDT-RT	HDT-R for TM Sensor Data
HDT-S	HDT Recorded at White Sands
HDT-SM	HDT-S for MSS Sensor Data
HDT-ST	HDT-S for TM Sensor Data
HgCdTe	Mercury Cadmium Telluride
HIPO	Hierarchy Input Process Output
HRFR	High Resolution Film Recorder
HSCE	High Speed Control Element
HUD	Department of Housing and Urban Development
HV	Host Vehicle (Landsat-D)
H/W	Hardware
Hz	Hertz (cycles per second)
IAC	Image Analyzer Console
IAP	Integrated Analysis Plan
IAT	Image Analysis Terminal
IAT	Image Annotation Tape
IB	Integration Baseline
ICCD	Intensified Charge Coupled Device
ICD	Interface Control Document
ICS	Image Correction Support Software
ICS	Interactive Computer Simulator
ID	Identification
IDB	Identification Burst
IDBS	International Data Base Systems
IDS	Image Data System
IDT	Investigation Definition Team
IDT	Image Display Terminal
IDT	Industrial Data Terminal Corporation
I/F	Interface
IF	Intermediate Frequency
IFD	In-Flight Disconnect
IFOV	Instantaneous Field-of-View
IG	Initial Gap
IGF	Image Generation Facility
IIGS	Initial Image Generation Subsystem
IIRV	Improved Inter-Range Vectors
IIS (I^2S)	International Imaging Systems
IM	Information Management

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IM	Instrument Module
IMPAC	Image Processing and Analysis Center
IMS	Information Management Subsystem
IMSC	Information Management Subsystem Computer
IMSFCC	Information Management Subsystem FFP Control Computer
IMU	Image Memory Unit
InSb	Indium Antimonide
INTRALAB	Information Transfer Laboratory
I/O	Input/Output
IPC	Initial Product Creation
IPCS	Information Production Control System
IPD	Information Processing Division
IPF	Image Processing Facility
ips	Inches per Second
IPS	Image Processing Subsystem
IPS-1	IPS String #1 Computers
IPS-2	IPS String #2 Computers
IPSC	IPS Computer
IQL	Interactive Query Language
IR	Infrared
IRB	Integrated Requirements Board
IR&D	Independent Research and Development
IRD	Interface Requirements Document
IRFPA	Infrared Focal Plane Assembly
IRG	Inter-Record Gap
IRIG	Inter-Range Instrumentation Group Time Code
IRIG-A	IRIG Time Code Series A
IRP	Infrared Photometer
IRQ	Interrupt Request
IRU	Inertial Reference Unit
IS	Input Subsystem
ISA	Instrument Standard of America
ISAM	Index Sequential Access Method
IS&CC	Information Systems and Computer Center
I&SE	Installation and Service Engineering Business Division
ISM	Interface Switching Module
ISS	Image Generation Facility Software Subset
ISU	Input Scanner Unit
IT	Integration Test
I&T	Integration and Test
ITD	Inception-to-Date
ITD	Incurred-to-Date
ITP	Integration Test Plan
IU	Interface Unit
IUE	International Ultraviolet Explorer
IUS	Interim Upper Stage

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JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
K	A Thousand
K	1024 (Memory Usage Only)
Kb	Kilobit
KB	Kilobyte
Kbps	Kilobits per Second
KBPS	Kilobytes per Second
KCRT	Keyboard Cathode Ray Tube
KL10	CPU for DEC-10 Computer
km	Kilometer
KSA	Ku-band Single Access
KSC	Kennedy Space Center
KW	Kilowords
LA36	DEC Hardcopy Terminal
LACIE	Large Area Crop Inventory Equipment
LANDSAT	Land Satellite
LaRC	Langley Research Center
LAS	Landsat-D Assessment System
LAT	Latitude
LBP	Library Build Process
LBR	Laser Beam Recorder
LCP	Left-hand Circularly Polarized
LDDPM	Load DDP Module
LED	Light-Emitting Diode
LFC	Left-Fill Count
LIDU	Large Image Display Utility
LIFO	Last-In, First-Out
LLA	Adjusted Line Length
LLC	Line Length Code
LM	Line Monitor
LMM	Landsat Mission Management
LMSC	Lockheed Missile and Space Corporation
LOE	Level of Effort
LONG	Longitude
LOS	Line of Sight
LOS	Loss of Signal
LPC	Longitudinal Parity Check
LPM	Line Point Marker
LPM	Lines per Minute
LPM	Load Point Marker
LRA	Laser Retrodirector Arra
LRC	Longitudinal Redundancy
LRD	Laser Retrodirector
LSB	Least Significant Bit

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LSD	Landsat-D
LTC	Light Transfer Characteristics
LTTS	Long-Term Tape Storage Facility
LTU	Line Test Unit
LUN	Logical Unit Number
LV	Launch Vehicle
M	Mega-
M	Million
MA	Multiple Access
MACS	Modular Attitude Control System
MAG	MSS Archival Product Generation
MAP	Macro Array Processor
MASSBUS	High Speed Bus for DEC Equipment
MATSCO	Management and Technical Services Company
Mb	Megabit
MB	Megabyte
MBA	MASSBUS Adaptor
MCC	Mission Control Center
MCCA	Manual Cloud Cover Assessment Package
MCR	Monitor Console Routine
MCTF	Mission Contractor Test Facility
M&DO	Mission and Data Operations
M&DOD	Mission and Data Operations Directorate
MDM	Multiplex-Demultiplex
MDP	Master Data Processor
MEM	Module Exchange Mechanism
MERITS	Marshall Earth Resources Information Transfer System
METSAT	Meteorological Satellite
MFB	Major Frame Buffer
MFD	Master File Directory
MFS	Major Frame Synchronization
MGSE	Mechanical Government Supplied Equipment
MHS	MSS/HDDR Service
MHW	Multi-Hundred Watt
MHz	Megahertz (10^6)
MIF	Master Information File
MIP	Management Information Process
MIPS	Mega-Instructions per Second
MIS	Mission Interface Subsystem
MIT	Master Information Table
mm	Millimeter
MM	Minutes
MMF	Mission Management Facility
MMFCC	Mission Management Facility Control Computer
MMS	Mission Management Subsystem
MMS	Multi-Mission Modular Spacecraft
MMU	Memory Management Unit

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NASTRAN	NASA Structural Analysis (Program)
NASTRAN	NASA Transient Analysis System
NBTR	Narrow Band Tape Recorder
NCC	National Climatic Center
NCC	Network Control Center
NCCS	Network Control Center Subsystem
NCIC	National Cartographic Information Center
ND	Networks Directorate
NDF	Neutral Density Filter
NDPF	NASA Data Processing Facility
NDS	Navigation Data Satellite
NDS	Navigational Development Satellite
NESS	National Environmental Satellite Service
NMI	NASA Management Instructions
NOAA	National Oceanic and Atmospheric Administration
NOCC	Network Operations Control Center
NOSS	National Oceanographic Satellite System
NRC	Nuclear Regulatory Commission
NRZ	Non-Return to Zero
NRZI	Non-Return to Zero Incrementing
NRZ-L	Non-Return to Zero-Level
NSCI	NASA Serial Controller for Input (now PSDI)
NSCO	NASA Serial Controller for Output (now SPDO)
NSSC-1	NASA Standard Spacecraft Computer - Model 1
NSSDC	National Space Science Data Center
NTR	New Technology Representative
NTSC	National Television System Committee
NTTF	Network Test and Training Facility
OAO	Orbital Astronomy Observatory
OAO	OAO Corporation
OAOCO	OAO Corporation
OAS	Orbit Adjust Subsystem
OBC	Onboard Computer
OBP	Onboard Processor
OCB	Operational Configuration Baseline
OCC	Operations Control Center
OCD	Operator Control and Display
OCG	Orbit Computations Group
OCR	Optical Character Reader
ODF	Orbit Determination Facility
ODP	Online Display Process
ODT	Online Debugging Tool
O&M	Operations and Maintenance
OFLS	Offline System
ONLS	Online System
OPS	Operations
O/S	Operations Supervisor

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MNFS	Minor Frame Synchronization
M&O	Maintenance and Operations
MODEM	Modulator/Demodulator
MOI	Moments of Inertia
MOL	Manned Orbiting Laboratory
MOM	Mission Operations Manager
MOPS	Mega-Operations per Second
MOR	Mission Operations Room
MOU	Memorandum of Understanding
MPP	MSS Preprocessor
MPS	Mission Planning System
MPS	Modular Power Subsystem
MPT	Maximum Power Tracker
MPY	Multiply
MR	Material Requisition
MRA	Maintenance Requirements Analysis
MRAM	Maintenance Requirements Analysis Matrix
MRC	Master Reference Cube
MRS	Module Reference System
MSB	Most Significant Bit
MSC	Manned Space Center
MSCO	Mission Support Coordination Office
MSC	Matrix Switch Control
MSEC	Millisecond
MSFC	Marshall Space Flight Center
MSR	Monthly Status Review
MSS	Module Support Structure
MSS	Multi Spectral Scanner
MSW	Matrix Switch
MT	Magnetic Tape
MT	Management Tax
MTBF	Mean Time Between Failures
MTF	Modulation Transfer Function
MTL	Material
MTM	Mechanical Test Model
MTM	Modification Transmittal Memorandum
MTP	MSS Telemetry Processor
MTTR	Mean Time to Repair
MTU	Magnetic Tape Unit
MUX	Multiplexer
MW	Megawords
N_2	Purified and Filtered Gaseous Nitrogen
N/A	Not Applicable
NAK	Negative Acknowledgement
NAPPS	Nimbus/AEM Preprocessor System
NASA	National Aeronautics and Space Administration
NASCOM	NASA Communications Network

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OS	Operating System
OSO	Orbiting Solar Observatory
OSR	Optical Solar Reflector
OSS	Office of Space Science
OSS	Operating System Software
OTA	Optical Telescope Assembly
OTDA	Office of Tracking and Data Acquisition
PA	Public Address
PAGASA	Philippines Atmospheric, Geological and Astronomical Science Administration
PAL	Potentially Applied Labor
PALM	Product Assurance List of Materials
PAM	Pulse Amplitude Modulation
PAPE	Product Assurance Project Engineering
PAR	Program Appraisal and Review System
PARAM	Parameter
PATH	Orbital path
P/B	Playback
PBX	Private Branch Exchange
PC	Production Control
PC	Program Counter
PC	Printed Circuit
PCB	Printed Circuit Board
PCD	Payload Correction Data
PCD	Photon Counting Detector
PCM	Pulse Code Modulated
PCP	Product Control Procure
PCP	Program Control Procedure
PCS	Payload Correction Subsystem
PCU	Power Control Unit
PD	Payload Disconnect
PD	Program Directive
PD	Programmable Decommutator
PDF	Programmable Data Formatter
PDL	Program Design Language
PDP	Programmable Digital Processor
PDP	Peripheral Data Product
PDR	Preliminary Design Review
PDR	Problem/Defect Report
PDSS	Precision Digital Sun Sensor
PDU	Power Distribution Unit
PE	Performance Evaluation
PE	Phase Encoded
P&E	Plant and Equipment
PES	Performance Evaluation Subsystem
PET	Predicted Ephemeris Tape
P/F	Protoflight

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PFD	Pre-Flight Disconnect
PFI	Program Funding Instructions
PGCOP	Product Generation CCT Output Process
PGHTP	Product Generation HDT Input Process
PGHSM	Product Generation HDT-P Simulator
PGLOP	Product Generation LBR Output Process
PGLSM	Product Generation LBR Simulator
PGM	Program Manager
PGMON	Product Generation Pipeline Monitor Process
PGP	Product Generation Process
PGS	Product Generation Subsystem
P/I	Policy/Instruction
PI	Principal Investigator
PIF	Pseudo Image File
PIGP	Pseudo Image Generation Program
PIL	Pixel Interleaved by Line
PIO	Programmed Input Output
PIP	Peripheral Interchange Program
PIR	Program Information Request/Release
PIXEL	Picture Element
PKG	Package Design Specification
P/L	Payload
PLACE	Post Landsat-D Advanced Concepts Evaluation
PM	Preventive Maintenance
PM	Propulsion Module
PMB	Program Management Budget
PMD	Post-Mortem Dump
PM/FL	Performance Monitor/Fault Location
PMM	Program Maintenance Manual
PMP	Premodulation Processor
PMT	Photomultiplier Tube
PN	Pseudo Noise
PO	Purchase Order
POCC	Payload Operations Control Center
POD	Project Operations Directors
POP	Project Operating Plan
PORTS	Preliminary Operations Requirements and Testing Support
POWO	Purchase Order Work Order
PPL	Photo Processing Lab
PPL	Preferred Parts List
PPO	Program Participation/Opportunities System
PPS	Photographic Processing Subsystem
PRMIS	Printing Resource Management Information
PRN	Pseudo Random Noise
PRO	Payload Receiving Operations
PROM	Programmable Read-Only Memory
PRP	Performance Recognition Program
PRU	Power Regulator Unit

PS	Polar Stereographic
PSDO	Parallel-to-Serial Data Output Device
PSF	Photo/Shipping Support Facility
PSK	Phase Shift Keying
PSM	Programmable Sync Module
PSR	Project Status Review
PSU	Power Supply Unit
PSU	Power Switching Unit
PVS	Pressure Vessel Spacecraft
PWB	Printed Wiring Board
PWM	Pulse Width Modulated
Q&A	Qualification and Acceptance
QA	Quality Assurance
QAP	Quality Assessment Process
QAP	Quality Assurance Procedure
QAP	Qualification and Acceptance Program
QC	Quality Code
QFP	Quality Assurance Film Generation Process
QIO	Queued Request for Input/Output
QIO	Queue Input/Output Process
QLM	Quick-Look Monitor Unit
QLP	Quick-Look Processor
QLPS	Quick-Look Processing System
QPSK	Quadrative Phase Shift Keyed
QRWO	Quick-Reaction Work Order
QSL	Quarter Scan Line
RAM	Random Access Memory
RBV	Return Beam Vidicon
RC	Radiometric Correction
RCFP	Radiometric Correction Function Calculation Process
RCHP	Right-Hand Circularly Polarized
RCP	Registration Control Point
RCP	Right-Hand Circularly Polarized
RCV	Receive
R&D	Research and Development
RDCP	Radiometric Corrected Process
RDCP	Radiometric Function Calculation Process
RDT	Raw Data Tape
REC	Record
REM	Rocket Engine Module
RF	Radio Frequency
RFC	Right-Fill Count
RFH	Request for Hire
RFOV	Resolution Field-of-View
RFP	Request for Proposal
RH780	Massbus Adaptor for DEC VAX-11/780

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RID	Review Item Discrepancy
RIU	Remote Interface Unit
RMS	Remote Manipulator System
RMS	Root Mean Square
RMS	Record Management Services
ROM	Read-Only Memory
ROW	Geographic Frame Reference
RP06	DEC 176 MB Disk or Removable Disk Storage Unit
RP07	DEC 283 MB Disk
R/PA	Receiver/Processor Assembly (GPS)
R&PA	Reliability and Product Assurance
RPM	Revolutions Per Minute
RPP	RBV Preprocessor
R&QA	Reliability and Quality Assurance
RSE	Receiving Site Equipment
RSE	Remote Site Equipment
RSS	Request Support Subsystem
RSX-11M	Multi-Tasking Operating System Software
R/T	Real-Time
RTG	Radioisotope Thermoelectric Generator
RTTS	Real-Time Test System
RX	Receive
SA	Single Access
SA	Solar Array
SAD	Solar Array Drive
SADAPTA	Solar Array Drive and Power Transfer Assembly
SAIL	Space Applications and Information Library
SARJA	Solar Array Retention, Deployment and Jettison Assembly
SB	Stage Baseline
SBC	Single Board Computer
SBI	Synchronous Backplane Interconnect
SBS	Space Background Simulator
SBU	Strategic Business Unit
S/C	Spacecraft
SC	Signal Conditioning
SCA	Signal Conditioning Assembly
SCAMA	Switching, Conferencing and Monitoring Arrangement
SCCB	Software Change Control Board
SCHS	Spacecraft Hardware Simulator (MSS Simulator)
SCI	Serial Control Interface
SCII	Serial Control Interface for Input (now SPDI)
SCIO	Serial Control Interface for Output (now PSDO)
SCL	Subcontract Labor
SCN	Specification Change Notice
SCP	Sun Calibration Process
SCR	Scaler Control Register
SCR	Software Change Request

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SC&SU	Signal Conditioning and Switching Unit (SU)
SCT	System Control Terminal
SD	Space Division
SDF	Software Development Facility
SDHS	Satellite Data Handling System
SDISS	Satellite Data Ingest and Storage Subsystem
SDSB	Satellite Data Services Branch
SEAM	Software Engineering and Management Program
Sec	Seconds of Arc
SECO	Secondary Electron Conduction Orthicon
SEID	Systems Engineering and Integration Division
SEOPS	Standard Earth Observation Package Satellite
SEOS	Synchronous Earth Observation Satellite
SHP	Shipping
SI	Science Instruments
SI	Standing Instructions
SIAT	Special Image Annotation Tape
SICM	Science Instrument Central Module
SIDU	Small Image Display Utility
SIF	Simulation Image File
SIM	Simulator
SIP	System Image Preservation
SIRD	Support Instrumentation Requirement Document
SIU	Sectorizer Ingest Unit
SLAT	Spacecraft Location and Attitude Tape
SLC	Scan Line Corrector
SLP	Source Language Input Program
SLS	Scan Line Sync
SLS	Start-of-Line Sync
SMA	S-Band Multiple Access
SMA	Scan Mirror Assembly
SMM	Solar Maximum Mission
SM&O	Support Maintenance and Operations
SMR	Software Modification Record
SMSA	Standard Metropolitan Statistical Area
S/N	Signal-to-Noise Ratio
SNR	Signal-to-Noise Ratio
SOM	Space Oblique Mercator
SOP	Standard Operating Procedure
SOW	Statement of Work
SP	Stack Pointer
SPC	Small Peripheral Controller
SPD	DEC Software Product Description
SPDI	Serial-to-Parallel Data Input Device
SPM	Sub-Project Manager
SPP	Special Purpose Processor
SPR	Software Problem Report
SPRD	Site Preparation Requirements Document

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SPS	Segment Processing Subsystem
SPU	Scene Processing Unit
SQA	Software Quality Assurance
SRCDR	Software Requirements and Conceptual Design Review
SRCDS	Software Requirements and Conceptual Design Specification
SRR	System Requirements Review
SRS	Software Requirements Specification
SRS	System Requirement Specification
SRT	Supporting Research and Technology
SS	Seconds
S/S	Subsystem
SSA	S-Band Single Access
SSC	Science Support Center
SSDA	Sequential Similarity Detection Algorithm
SSM	Support Systems Module
SSO	Space System Operations
SST	Synchronous System Trap
ST	Space Telescope
ST	Stored
STA	Station
STACC	Standard Telemetry and Command Components
STACC-CU	STACC Central Unit
STACC-STINT	STACC Interface Unit
STC	System Test Console
STD	System Task Directory
STD	Standard
STDN	Spaceflight Tracking and Data Network
STEP	Space Technology Engineering Program
STINT	Standard Interface for Onboard Computer
STINT	STACC Interface Unit
STOCC	Space Telescope Operations Control Center
STOL	System Test and Operations Language
STP	System Test Plan
STR	Standard S/C Telemetry Recorder
STR	Standard Tape Recorder
STR	System Test Review
STS	Space Transportation System
STS	Shuttle Transportation System
STSOC	Space Telescope Scientific Operations Center
SU	Switching Unit
SVS	Space Vehicle Specification
S/W	Software
SWG	Science Working Group
SYCI	System Corrected Images
TA	Transistor Adaptor
TAC	Telemetry and Command
TAG	TM Archival Product Generation

TAM	Three Axis Magnetometer
TAS	Tape Archives Subsystem
TAS	Tape Archival Storage Area
TBA	To Be Announced
TBD	To Be Determined
TBD	To Be Defined
TBR	To Be Resolved
TBS	To Be Specified
TBS	To Be Supplied
TBV	To Be Verified
T/C	Time Code
TCC	Time Code Controller
TCG	Time Code Generator
TCI/OSC	Time Code In/Oscillator
TCOM	Army Test and Evaluation Command
TCO/PAN	Time Code Out/Panel
TCS	Thermal Control System
TCU	Time Code Unit
T&D	Test and Diagnostic
TD	Test Directives
TDRS	Tracking and Data Relay Satellite
TDRSS	Tracking and Data Relay Satellite System
T&E	Test and Evaluation
TEP	Telemetry Extraction Process
TERSSE	Total Earth Resources System for the Shuttle Era
TGS	Transportable Ground Station
TIROS-N	Television Infrared Observing System
TIS	Technical Information Series
TKTN	Task Termination Notification
T&L	Travel and Hiring
TLM	Telemetry
TM	Thematic Mapper
TM	Telemetry
TMV	Telemetry Volts
TOD	True-of-Date
TOSS	TERSSE Operational System Study
TP	Telemetry Processor
TPG	Test Pattern Generator
TPL	Test Plan
TR	Tape Recorder
TRB	Test Review Board
TRF	Tracking and Receiving Facility
TRK	Track (HDDR)
TRKG	Tracking
TRP	Technical Recognition Program
TRW	TRW Defense and Space Systems Group
T/S	Thermal/Structural
TSIM	Test and Simulation Subsystem

TSSC	Technical Support Services Company
TSSF	Tape Staging and Storage Facility
TTA	Triangular Transition Adaptor
TT&C	Telemetry Tracking and Command
TTL	Transistor Logic Device
TTY	Teletype
TU45	1600 bpi Magnetic Tape Unit
TU72	6250 bpi Magnetic Tape Unit
TU78	6250 bpi Magnetic Tape Unit
TUG	Final Upper Stage
TV	Television
TWT	Traveling Wave Tube
TWTA	Traveling Wave Tube Amplifier
TX	Transmit
UARS	Upper Atmosphere Research Satellite
UBA	Unibus Adaptor
UBC	Unit Block Controller
UDDPM	Unload DDP Module
UDF	Unit Development Folder
UFD	User File Directory
UHF	Ultra High Frequency
UIC	User Identification Code
U/L	Uplink
UNIBUS	Universal Bus
UPAL	Unapplied Potential Applied Labor
UQPSK	Unbalanced Quadrature
USART	Universal Synchronous Asynchronous Receiver Transmitter
USB	Upper Side-Band
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UTC	Universal Time Coordinated
UTM	Universal Transverse Mercator
VA	Value Analysis
VAC	Volts, Alternating Current
VAP	Verification Acceptance Program
VAX-11/780	Virtual Address Extension DEC Model Computer 11/780
VCO	Voltage-Controlled Oscillator
VCRI	Verification Cross-Reference Index
VDC	Volts, Direct Current
VDD	Version Description Document
VE	Value Engineering
VECP	Value Engineering Change Proposal
VF	Valley Forge
VFSC	Valley Forge Space Center
VHF	Very High Frequency
VHRR	Very High Resolution Radiometer
VIP	Virtually Interfaced Peripheral

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VM	Value Management
VMS	Virtual Memory Operating System
VPASS	Video Processor and Sync Separator
VPIR	Video Processor/Image Recorder
V/T	Vacuum Thermal
VT	Verification Test
VT78	Intelligent CRT Terminal
VT100	Non-Intelligent CRT Terminal
VTR	Video Tape Recorder
WACA	Weeks After Contract Acceptance
W/B	Wideband
WBM	Wideband Module
WBS	Work Breakdown Structure
WBSS	Wideband Subsystem
WBVT	Wide Band Video Tape
WBVTR	Wide Band Video Tape Recorder
WCS	Writeable Control Store
WFC	Wide-Field Camera
WLM	Work Order and Label Manager
WPC	Word Processor Center
WPM	Work Package Manager
WRS	World Reference System
WS	White Sands
WSMR	White Sands Missile Range
WTR	Western Test Range
XMIT	Transmit
XMTR	Transmitter
Z	Zulu Time (GMT)
ZWC	Zero Word Count
μ	Micro-
μm	Micrometer (-10^{-6} Meter)
μP	Microprocessor
μS	Microsecond

ACRONYMS AND ABBREVIATIONS

AAT	Archival Ancillary (Data) Tape
ADT	Ancillary Data Tape
ACCA	Automatic Cloud Cover Assessment
ACS	Attitude Control System
ADS	Angular Displacement Sensor or Angle Detector Sensor
AG	Archive Generation
AGE	Aerospace Ground Equipment
AMS	Attitude Measurement System
AOIPS	Atmospheric & Oceanographic Image Processing System
ACP	Advanced On-Board Processor
ASCII	American Standardized Code-II
AZIM	Azimuth
BIC	Band Interleaved by Cylinder
BIL	Band Interleaved by Pixel
BIW	Band Interleaved by Word
BSQ	Band Sequential
CCA	Cloud Cover Assessment
CCL	Closed Circuit Loop
CCM	Color Composite Master
CCT	Computer Compatible Tape
CCT-A	CCT containing data which has been partially processed, i.e., radiometrically corrected but not geometrically corrected
CCT-AM	CCT-A containing partially processed data from the MSS sensor
CCT-AT	CCT-A containing partially processed data from the TM sensor
CCT-P	CCT containing data which has been fully processed, i.e., both radiometrically and geometrically corrected
CCT-PM	CCT-P containing fully processed data form the MSS sensor
CCT-PT	CCT-P containing fully processed data from the TM sensor
CDD	Cartridge Removable Diablo Disk Drive
CDHS	Command and Data Handling System
CDHSS	Command and Data Handling System Simulator
CLD	Cloud

CMD	Commands
CNTR	Center
CP	Control Point
CPC	Control Point Chip
CPD	Control Point Directory
CPD-U	Control Point Directory (Candidate for permenant file)
CPL	Control Point Library
CPL-U	Control Point Library (Candidate for permenant file)
CPN	Control Point Neighborhood
CPN-G	Control Point Neighborhood for Geodetic Corrections
CPN-L	control Point Neighborhood for Library Maintenance
CPN-M	Control Point Neighborhood for MSS
CPN-T	Control Point Neighborhood for TM
CPR	Cloud Physics Radiometer
CPU	Central Processing Unit
CR	Card Reader
CRT	Cathode Ray Tube (display terminal)
CSF	Control and Simulation Facility
DAS	Data Base Administration Subsystem
DB	Data Base
DBMS	Data Base Management System
DCS	Data Collection System
DDP	Digital Data Processor
DDR	Detailed Design Review
DEC	Digital Equipment Corporation
DFD	Data Flow Diagram
DFP	Data Formatter Processor
DL	Downlink
DMS	Data Management System
DOMSAT	Domestic Communication Satellite
DPU	Digital Processing Unit
DRIRU	Dry Rotor Inertial Reference Unit
DRTS	Data Recieve, Record, Transmit Subsystem

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DSC	Data Collection System
DSH	Downlink Synchronization System
EBR	Electron Beam Recorder
ECC	Error Correction Code
ECI	Earth Centered Inertial (Coordinate System)
EDC	EROS Data Center
ECCHOS	Error-Correcting CHOS
EF	Earth Fixed (Coordinate System)
EROS	Earth Resources Observation Satellite or System
FHD	Fixed (Cartridge) Diable Disk (Drive)
FFP	Federation of Functional Processor
FHS	Flight (Segment) Management Subsystem
FOS	Flight Operations Subsystem
FPG	Final Product Generation
FRD	Facility Requirements Document
FRS	Film Recorder System
FS	Flight Segment
FSS	Flight Scheduling Subsystem
GCD	Geodetic Correction Data or Geometric Correction Data
GDCG	Geodetic Correction Data Generation
GCM	Geometric Correction Matrices
GCO	Geometric Correction Operator
GCP	Geodetic Control Point or Ground Control Point
GECP	Geometric Correction Process
GFIT	Goddard Film Inventory Tape
GHIT	Goddard HDT Inventroy Tape
GI	General Instruction
GHS	Ground (Segment) Management Subsystem
GHT	Greenwich Mean Time
GPS	Global Positioning System
GSFC	Goddard Space Flight Center
GSSS	Ground Support System Software
GSTDN	Ground Spacecraft Tracking and Data Network
G/C	Geometric Correction
HAAT	Header, Ancillary, Annotation, Trailer
HAAT-L	HAAT for Library Maintenance

HAT	Header, Annotation, Trailer
HD	HDT Duplication
HDDR	High Density Digital (Tape) Recorder
HDT	High Density Tape
HDT-A	HDT containing data which has been partially processed, i.e., radiometrically corrected but not geometrically corrected
HDT-AM	HDT-A containing data from the MSS sensor
HDT-AT	HDT-A containing data from the TM sensor
HDT-P	Radiometrically and Geometrically Corrected High Density Tape
HDT-PT	HDT-P containing data from the TM sensor
HDT-R	HDT containing raw data as recorded in EDRTS
HDT-RM	HDT-R containing data from the MSS sensor
HDT-RT	HDT-R containing data from the TM sensor
HDT-S	HDT containing data recorded at White Sands
HDT-SM	HDT-S containing data from the MSS sensor
HDT-ST	HDT-S containing data from the TM sensor
HRFR	High Resolution Film Recorder
HSI	High Speed Interface
I/O	Input/Output
I&T	Intergration and Test
ICD	Interface Control Document
ID	Identification
IDA	Image Data Acquisition
IDT	Image Data Transmission
IGF	Image Generation Facility
IPC	Initial Product Creation
IPD	Image Processing Division
IPS	Information Processing Subsystem
IQL	Interactive Query Language
IR	Infrared
IRIG-A	Inter Range Instrumentation Group Format A Timecode
KCRT	Keyboard Cathode Ray Tube (display tube)
KS	Key Station
LAS	Landsat Assessment System
LBP	Library Build Process
LBR	Laser Beam Recorder

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LM	Library Maintenance
LS-D	Landsat D
LS-3	Landsat 3
LTTS	Long-term Tape Storage
MBA	Massbus Adapter
Mbps	Megabits per second
MCCA	Manual Cloud Cover Assessment
MJF	Major Frame
MIPS	MSS Image Processing Subsystem
MMF	Mission Management Facility
MNFSC	Minor Frame Synch Loss
MOU	Memoranda of Understanding
MPP	MSS Pre-processor
MS	Mirror Sweep
MSB	Most Significant Bit
MSCD-M	MSS Mirror Scan Correction Data
MSCD-T	TM Mirror Scan Correction Data
MSS	Multispectral Scanner
MSS-A	MSS Archival Data
MTU	Magnetic Tape Unit
MUX	Multiplexer
NASCOM	NASA Communication System
NCC	Network Control Center
NMI	NASA Management Instruction
NOAA	National Oceanic and Atmospheric Administration
NSCI	Renamed SPOI
NSCO	Renamed PSIO
NSSC	NASA Standard Spacecraft Computer
NTTF	NASA Tracking and Telemetry Facility
OBC	On-Board Computer
OBP	On-Board Processor
OCC	Operations Control Center
OCG	Orbit Computations Group

OCR	Optical Character Recognition
PA	Public Address
PBX	Private Branch Exchange
PCD	Payload Correction Data
PCD-M	MSS Payload Correction Data
PCD-T	TM Payload Correction Data
PCE	Pipeline Control Executive
PCS	Payload Correction Subsystem
PES	Performance Evaluation Subsystem
PGS	Product Generation Subsystem
PO	Project Office
PPL	Photographic Processing Laboratory
PS	Polar Stereographic
PSIO	Parallel to Serial Data Output device
QA	Quality Assessment
QAF	Quality Assessment Film
QC	Quality Conrol
QIO	Queued I/O (Input/Output)
QLD	Quick Look Display
QLM	Quick Look Monitor
RAA	Reformating Ancillary Annotation
RBV	Return Beam Vidicon
RCP	Registration Control Point or Relative Control Point
R/P A	Receiver/Processor Assembly (GPS Data Processor)
R/C	Radiometric Correction
RLUT	Radiometric Lookup Table
RSS	Request Support Subsystem
SBI	Synchronous Back Plane Interconnect
SCISU	Signal Conditioning and Switching Unit
SCNM	Switching, Conferencing and Monitoring Arrangement
SCO	Systematic Correction Data
SCII	IDT Serial Controller Interface-Input
SCIO	IDT Serial Controller Interface-Output
SCM	Systematic Correction Matrix
S/C	Spacecraft
S/W	Software

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SDF	Software Development Facility
SEAM	Software Engineering and Management
SHP	Shipping Facility
SLC	Scan Line Corrector
SLER	Synch Loss Error Rate
SMA	Scan Mirror Assembly
SMM	Solar Maximum Mission
SOM	Space Oblique Mercator
SPOI	Serial to Parallel Data Input device
SRR	System Requirements Review
SSO	Space Systems Operation
SSRR	Systems Software Requirements Review
STDN	Spaceflight and Tracking Data Network
STOL	System Test & Operation Language
STR	System Test & Review
TAC	TM Adaptive Capability
TAS	Tape Archive Storage
TBD	To Be Determined
TBS	To Be Supplied
TCG	Time-Code Generator
TDRS	Tracking & Data Relay Satellite.
TDRSS	Tracking & Data Relay Satellite System
TGS	Transportable Ground Station
TIPS	TM Image Processing Subsystem
TLM	Telemetry
TM	Thematic Mapper
TSIM	Test and Simulation Subsystem
TTY	Teletype operator console
UBA	Unibus Adapter
UL	Up Link
UTM	Universal Transverse Mercator
VAX	Virtual Address Extension (computer)
VICAR	Video Image Communication and Retrival
VMS	Virtual Memory (Operating) System
VP	Line Printer (VERSATEC)

WBVT	Wide Band Video Tape
WRS	World Reference System
WTR	Western Test Range
ZTS	Zoom Transfer Scope

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