1.0 INTRODUCTION

This test plan ensures that the Spacecraft Operation Center (SOC) hardware and software complies with the system requirements and constraints. The verification process involves code analysis, subsystem testing, and system level testing on site. Each of these areas is planned to be as comprehensive as feasible within the schedule and financial limits of this program.

1.1 Scope

This test plan covers the custom software developed by SwRI. Specifically excluded from this test plan is the Commercial Off The Shelf (COTS) hardware and software used in the system:

- PC Decom computer system used for the Decommutation System (DCS).
- Sun workstation hardware used for the Data Handling System (DHS) and the display workstations.
- Printers for the workstation system.
- Operating system software for the DCS, DHS, and workstations.

Included in this test plan is the custom software and custom configuration of the COTS hardware, software, and network components:

- Informal testing will occur at SwRI in the following forms:
    - Design and code analysis.
    - Module and process level testing.
    - Subsystem level testing.
    - System level testing.
- Informal system level testing will also occur at Johnson Space Center (JSC) and at Kennedy Space Center (KSC). Details and results of informal testing are documented in the chapter titled "Informal Tests".
- For formal subsystem and system level testing, all software will be baselined.
- Formal subsystem testing will be performed at SwRI prior to shipping of the complete system. A set of recorded data tapes shall be available for each data stream. The data will cover a period sufficient for subsystem testing. This includes CAS, Satellite PDI, and SFMDM PDI.
- For formal subsystem testing, 1 Decommutation system, 1 Data Handling System, several workstations, and 1 color printer shall be available. The necessary hardware will be available for the networks connecting the three system levels.
- Abbreviated formal system testing will occur at SwRI prior to shipping the complete system. A set of recorded data tapes shall be available for each data stream. The data will cover a period sufficient for system level testing. The pre-ship testing will be abbreviated due to lack of a CIP and redundant DCS and DHS systems.
- Complete formal system testing will occur at JSC once the complete system is installed.

This test plan does not verify the following:

- ? CAS data paths.
- All possible instrument mode changes.

- The validity of data from a engineering or scientific perspective. This test plan verifies that the data is processed, but cannot determine if the values are correct in terms of what is expected by an engineer or scientist.
- Effects of all types of hardware and software failures.

1.2 Schedule

The scheduled formal tests defined by this test plan include the following:

- Pre-ship subsystem level testing of the Decommutation System.
- Pre-ship subsystem level testing of the Data Handling System.
- Pre-ship subsystem level testing of the Workstation System.
- Pre-ship system level testing.
- On-site system level testing.

1.3 Organization

This test plan is organized into the following sections:

- A listing of applicable documents.
- A description of terminology and listing of acronyms.
- A description of informal test procedures.
- A description of the detailed formal test procedures.
- Attachments.

2.0 APPLICABLE DOCUMENTS

This section references additional reference and information documents which are either directly referred to by this test plan or provide additional information:

- SOC-DR-1A   Design Requirements.
- SOC-SDS-1   System Design Specifications.
- SOC-DDD-1   Display Definition Document

3.0 TERMINOLOGY AND ACRONYMS

This section provides descriptions of terminology which is used throughout this test plan. Also included is a list of commonly used acronyms.

3.1 Terminology

The following definitions are provided to aid the user of this test plan in the understanding of the SOC system:

- The software and hardware are divided into three levels of subsystems:
    - Level I is the telemetry decommutation subsystem. Also referred to as the DCS.
    - Level II is the data handling subsystem. Also referred to as the DHS.
    - Level III is the science and POCC display subsystem (workstations).
- The data levels are represented in a four-tiered fashion, but these levels are labeled A, B, C, and D to avoid confusion with the subsystem descriptions:
    - Level A contains the raw telemetry and CAS data. The CAS data at this level are contained in NASCOM blocks. This level is a 1 input only interface to the SOC.
    - Level B represents the minor frame-synchronized and blocked data messages sent to the archive subsystem. It is a unidirectional stream produced and ingested within the SOC.
    - Level C holds the processed data messages that are sent to the display subsystems. This is a bidirectional data stream accommodating the archive playback requests coming from the display subsystem.
    - Level D refers to data on LANs attached to the secondary Ethernet ports of workstations at Level III.

3.2 Acronyms

4.0 INFORMAL TESTS

This section discusses informal tests. Informal tests do not include test procedures, but rather verification and testing performed on the system during design and implementation. Informal tests are conducted on individual modules, processes, subsystems, and on the entire system. Informal tests are not a substitute for formal testing, but aid in the verification of the system. The types of informal testing performed for the SOC include:

- Design analysis.
- Peer level code analysis (code walk throughs).
- Automated module level verification (use of automated analysis tools).
- Module and process testing.
- Subsystem testing.
- System level testing on site at JSC and KSC.

Each of these forms of informal testing are described in more detail in the following subsections.

4.1 Design analysis?

-

4.2 Peer level code analysis?

- Assure that all code complies with coding standards.
- Proper use of available networking, OS, and graphic resources.

4.3 Automated module level verification?

- Use of "lint" and other tools for static verification.
- Use of CodeCenter for run time verification.

4.4 Module and process testing?

- Exercise all executable statements in each unit.
- Test all options at each branch in each unit.
- Test for nominal, extreme, and erroneous input and output values.
- Test for error detection and recovery, including appropriate error messages.
- Test each option and format for all units with data output.Exercise all statements.

4.5 Subsystem testing?

-

4.6 System level testing on site at JSC and KSC?

- Extended system testing at JSC.
- Extended system testing at KSC.

5.0 FORMAL TEST PLANS

This section contains the formal test procedures which are the basis of this test plan. The system will be tested first at the subsystem level, including how a subsystem interacts with other subsystems, followed by an integrated system test. Specifically, this includes the following:

- Decommutation Subsystem test.
- Data Handling Subsystem test.
- Workstation Subsystem test.
- System test (which will occur pre-ship at SwRI and on site).

5.1 Test Execution

Each test listed above will include a required minimum configuration of hardware required for the test. This hardware must be in place before the test is executed. Each test in turn consists of a series of "Test Procedures", each of which tests a process or some logical collection of functions. Each test procedure will include the following information:

- Functions tested - a description of the functions which are verified by the test procedure. If applicable, this will also include the actual requirements from the SOC-DR-1A document.
- Input data - a listing of the data, files, or tapes which are required for the test procedure.
- Output data - a listing of the data, files, and tapes generated by the test procedure.
- Detailed steps - a set of detailed instructions which states the required actions to be taken by the test operator followed by a description of the desired results. The required actions are numbered starting at 1.0 for each test procedure for easy reference.

Attachment A includes for each test, a table which allows the test operator to record whether or not each step of the test procedure passed or failed. This table is detached from the test procedures in order to improve readability and to centralize the results of the test plan. As the test operator is executing the test plan, all results and comments should be written in the tables provided in Attachment A.

5.2 Decommutation Subsystem (DCS) Test

5.3 Data Handling Subsystem (DHS) Test

The test for the Data Handling Subsystem will consist of three logical parts:

- Testing for the Ingest, Special Comps, Network Distribution, Database, and Archive processes. These processes represent the primary data flow of the DHS, include data is ingested from the Level B LAN, archived, converted to IDFS format, archived, and then distributed on the Level C LAN for the workstations. Portions of the Manager process will also be tested.
- Testing of the Manager, which is the interactive interface to the DHS.
- Testing of the Playback, Redelivery, and Ping processes, which deal with requests from the level C LAN.

The basic test approach for the DHS is to load recorded data onto the DCS system and use the DCS to generate simulated data streams.

Unless otherwise noted, all action and verification steps are to be performed on the DHS. Steps and verification to be performed on the DCS or workstation will be explicitly stated.

5.3.1 Required Hardware Configuration

The required hardware configuration for the DHS subsystem test includes the following:

- 1 DCS system connected to the Level B LAN.
- 1 DHS system connected to the Level B and Level C LANs.
- 2 workstations connected to the Level C LANs. More workstations may be present.

5.3.2 Test Procedure 1

The purpose of this test procedures is to verify nominal operations of the Ingest and Special Comps processes of the DHS. Specific functions tested include:

- Creation of archive database files.
- Manager process start-up and display of parameters when no data is present on the Level B LAN.
- Manager process display of parameters when data is present on the Level B LAN, but the DHS is muted.
- Archive of real time TLM and IDFS files.

Specific requirements verified include:

REQ (14)   PDI and CAS data streams will be decommutated into distinct data streams at Data Level C for each of the following: CAS, RPOPE, RETE, SETS, SPREE, TEMAG, DCORE, SCORE, DRB, Deployer, and Satellite Housekeeping. Synchronization words and satellite data stream transition words will be discarded from the IDFSs.

REQ (26)   The archival data shall be organized in an experiment-independent manner (i.e., the software must handle each type of data without special customization). the data will be recorded in a canonical format called the Instrument Data File Set (IDFS).

REQ (63)   Ingest telemetry will be recorded at System Level II for post-mission use.

5.3.2.1 Input Data

Input data required for this test procedure includes the following:

- MDC - get the names/descriptions of the raw files from Dave Anderson.

5.3.2.2 Output Data

Output data generated by this test procedure includes the following DHS files:

- TLM real time data files located in /TSS/Data/<stream>/.
- IDFS real time data files located in /TSS/Data/<experiment>/.
- Database files located in /TSS/Database/.
- Error and status files in /TSS/Ops/

5.3.2.3 Detailed Steps

1.0   *Log in to the Data Handling System as user "TSS".*

1.1   *Execute the command "/TSS/Bin/Cleanup" to cleanup IPC resources, to delete log files, delete data files, delete database files, and create new blank databases.*

Verify: Verify that the following database files have been created in the /TSS/Database/ directory (TLM database files):

CASD.T.DBF	CASD.T.NDX
SATL.T.DBF	SATL.T.NDX
SFMD.T.DBF	SFMD.T.NDX

IDFS database files:

CAS.D.DBF	CAS.D.NDX	CAS.H.DBF	CAS.H.NDX
DCORE.D.DBF	DCORE.D.NDX	DCORE.H.DBF	DCORE.H.NDX
DPLY.D.DBF	DPLY.D.NDX	DPLY.H.DBF	DPLY.H.NDX
DRB.D.DBF	DRB.D.NDX	DRB.H.DBF	DRB.H.NDX
EMP.D.DBF	EMP.D.NDX	EMP.H.DBF	EMP.H.NDX
RETE.D.DBF	RETE.D.NDX	RETE.H.DBF	RETE.H.NDX
ROPE.D.DBF	ROPE.D.NDX	ROPE.H.DBF	ROPE.H.NDX
SAHK.D.DBF	SAHK.D.NDX	SAHK.H.DBF	SAHK.H.NDX
SCORE.D.DBF	SCORE.D.NDX	SCORE.H.DBF	SCORE.H.NDX
SETS.D.DBF	SETS.D.NDX	SETS.H.DBF	SETS.H.NDX
SPREE.D.DBF	SPREE.D.NDX	SPREE.H.DBF	SPREE.H.NDX
TEMAG.D.DBF	TEMAG.D.NDX	TEMAG.H.DBF	TEMAG.H.NDX

2.0   *On the workstation, execute the "netstat 1" command. Observe the number of packets received on the Ethernet interface attached to the Level C LAN. Make a note of this value.*

2.1   *Execute the command "/TSS/Bin/Manager" with the configuration file "shake.config".*

Verify: Once the Manager process is fully initialized, it will begin updating various system parameters. The following parameters on the screen will be updated at 5 second intervals:

- GMT and MET times.
- CPU activity. Idle time should be approximately 99%.
- Disk operations will be 0.
- Directories are 0.0% full.
- Archive tapes are 0.0% full.
- No playback or RDS requests.
- The manager will indicate an LOS period and MUTE.
- For the ingest layer, the SFMD, SATL, and CASD streams parameters will be 0.
- For the special comp layer, all experiment streams (11) will be 0. Sync will be "No".
- For the network distribution layer, all experiment streams (11) will be 0.

- The manager will report the presence of all workstations.

Verify that the Manager process created the files "Error.<date>" and "Status.<date>" in the current directory. Using the Manager, verify that the contents of these files matches the list of status and error messages currently displayed.

3.0   *On the Decommutation system, initiate transfer of data for all three streams.*

Verify: Verify that the Manager is properly reporting the arrival of data. Arrival of data will be indicated as follows:

- CPU activity. Idle time should be approximately 80%.
- Disk operations will increase.
- The disk usage percentage will gradually increase. Because data will be stored on multiple disks, both percentages will increase.
- Archive tapes remain 0.0% full.
- No playback or RDS requests.
- The manager will indicate an AOS period and MUTE.
- For the ingest layer, the SFMD, SATL, and CASD streams parameters will indicate arrival of data. The data rates for SFMD are ~8 frames per second and ~2000 bytes per second. The data rates for SATL are ~16 frames per second and ~4000 bytes per second. The data rates for CASD are ~X frames per second and ~X bytes per second.
- For the special comp layer, all experiment streams (11) will indicate transfer of data. Sync will be "Yes".
- For the network distribution layer, all experiment streams (11) will be 0 (because the systems is muted).

Examine the directories containing the TLM data files. Verify that the following files are present and do contain data:

- /TSS/Data/SFMD/SFMDT
- /TSS/Data/SATL/SATLT
- /TSS/Data/CASD/CASDT

Examine the directories containing the IDFS files. The files will be located in separate directories named for each experiment. Within each directory, a separate file for header (H) and data (D) will be present for each logical instrument in the experiment. The directories (experiments) and logical instrument files which should be present include the following:

	/TSS/Data/CAS/	-	CSEA	CSEB	CSSA	CSSB	CSSC
			CSMA	CSMG	CSAA	CSAB	CSTA
			CSCA				
-	/TSS/Data/DCORE/	-	DCGA	DCGB	DCGC	DCSA	DCSB
			DCTA	DCDV	DCMA	DCMB	DCMC
			DCMD	DCME	DCTM		
-	/TSS/Data/DPLY/	-	DPMA	DPMB	DPMC	DPMD	DPME
			DPMF	DPMG	DPMH	DPMI	DPMJ
			DPMK	DPTA	DPTB	DPSA	DPSC
			DPSD	DPSE	DPSF	DPSG	DPSH
			DPSI	DPSJ	DPHA	DPHB	DPHC
			DPHD	DPHE			
-	/TSS/Data/DRB/	-	DBTA	DBSA	DBSB	DBSC	DBPO

- /TSS/Data/EMP/ -	EPMA	EPMB	EPMC	EPMD	EPME
	EPMF	EPMG	EPMH	EPSA	EPSB
	EPSC	EPSD	EPSE		
- /TSS/Data/RETE/ -	RTLA	RTLB	RTMC	RTMD	RTME
	RTMF	RTHF	RTCA	RTCB	RTCC
	RTCD	RTCE	RTCF	RTCH	RTLP
	RTAC	RTIP	RTDP	RTEF	RTFP
	RTBW	RTBT	RTKA	RTKB	RTKC
	RTKD	RTKE			
- /TSS/Data/ROPE/ -	RPEA	RPIA	RPEB	RPIB	RPDP
	RPHF	RPBB	RPEM	RPHA	RPHB
	RPHC	RPHD	RPHE	RPHG	RPSA
	RPSB	RPSC	RPSD	RPDM	
- /TSS/Data/SAHK/ -	SHSA	SHSB	SHSC	SHSD	SHSE
	SHSF	SHSG	SHSH	SHSI	SHSJ
	SHTA	SHTB	SHTC	SHAA	SHAB
	SHAC	SHAD	SHAE	SHAF	SHAG
	SHPA	SHMA	SHBM	SHMC	SHMD
	SHME	SHHA	SHHB	SHHC	SHHD
	SHHE	SHHF	SHTM		
- /TSS/Data/SCORE/ -	SCAF	SCAC	SCSA	SCSB	SCMA
	SCMB	SCMC			
- /TSS/Data/SETS/ -	STSA	STSB	STSC	STCA	STCB
	STCC	STCD	STFA	STFB	STTA
	STTB	STTC	STTD	STAA	STMA
	STMB	STDA	STDB	STDC	STTM
- /TSS/Data/SPREE/ -	SPIA	SPIB	SPIC	SPID	SPIE
	SPIF	SPEA	SPEB	SPEC	SPED
	SPLA	SPLB	SPLC	SPLD	SPFA
	SPFB	SPHA	SPHB	SPHC	SPHD
	SPHE	SPMF	SPOP	SPSA	SPSB
	SPSC	SPSD	SPBA	SPTM	
- /TSS/Data/TEMAG/ -	TMMI	TMMO	TMHA	TMHB	TMTA

This list will serve as the official listing of IDFS files. This list will be referred to throughout the DHS test.

4.0   *On the workstation, execute the "netstat 1" command.*

Verify: Observe the number of packets received on the Ethernet interface attached to the Level C LAN. The number of packets should be minimal, with an occasional heartbeat and ping request.

5.3.3 Test Procedure 2

The purpose of this test procedures is to verify nominal operations of the Ingest, Special Comps, and Network Distribution processes of the DHS. Specific functions tested include:

- Output of IDFS data to the Level C LAN when the DHS is in ACTIVE mode (instead of MUTE, as in the previous test procedure).

5.3.3.1 Input Data

Input data required for this test procedure includes the following:

- MDC - get the names/descriptions of the raw files from Dave Anderson.

5.3.3.2 Output Data

Output data generated by this test procedure includes the following workstation based files:

- IDFS data files located in /we/tss_1/data/.

5.3.3.3 Detailed Steps

1.0 *On any of the available System Level II workstations, log in as user "TSS".*

1.1 *On the workstation, execute the command "/we/tss_1/bin/Cleanup" to delete data files, delete database files, and create new blank databases.*

1.2 *On the workstation, set up a configuration file to cause the "listener" process to access data for all experiments. Execute the command "/we/tss_1/bin/listener" with the configuration file.*

1.3 *Use the Manager to change from "MUTE" to "ACTIVE".*

Verify: The Manager reports that the system is "ACTIVE". Use the Manager to view the second page, which will show that the network distribution layer is actively sending data to the Level C LAN.

2.0 *On the workstation, execute the "netstat 1" command. Observe the number of packets received on the Ethernet interface attached to the Level C LAN. The number of packets should increase significantly, which indicates that data is being received by the workstation.*

Verify: On the workstation, verify that data is being saved in the /we/tss_1/data/ directory. For each logical instrument, a header (H), data (D), and instrument description (I) file will be present. Refer to step 3 in test procedure 1 for a listing of the IDFS logical instruments.

5.3.4 Test Procedure 3

The purpose of this test procedure is to verify that an LOS is properly handled by all processes of the Data Handling System. Specific functions tested include:

- Verify that labels are requested for TLM and IDFS tapes when the first LOS is received.
- Verify archive of real time TLM and IDFS files when an LOS is received.
- Verify that database entries are made for TLM and IDFS files when the LOS is received.
- Test the Manager interface for labeling the TLM and IDFS tapes.
- Verify that the Distribution process accurately distributes the IDFS data.

5.3.4.1 Input Data

Input data required for this test procedure includes the following:

- MDC - get the names/descriptions of the raw files from Dave Anderson.

5.3.4.2 Output Data

Output data generated by this test procedure includes the following Data Handling System based files:

- TLM real time and archive data files located in /TSS/Data/<stream>/.
- IDFS real time and archive data files located in /TSS/Data/<experiment>/.
- Database files located in /TSS/Database/.
- TLM and IDFS files output to tapes.

Output also includes the following workstation based files:
- IDFS data files located in /we/tss_1/data/.
- IDFS archive data files located in /we/tss_1/data/NON_REAL_TIME/.

5.3.4.3 Detailed Steps

1.0 *On the Decommutation system, terminate all data streams.*

1.1 *Wait until the data received is reduced to 0. Use the Manager to initiate an LOS condition.*

Verify: Verify that the Manager reports the LOS condition. The Manager will also highlight the "TAPE 1" and "TAPE 2" strings, indicating that the tapes need attention. The Manager will also report the following:

- CPU activity. Idle time should be approximately 99%.
- Disk operations will be 0.
- The manager will indicate an LOS period and ACTIVE.
- For the ingest layer, the SFMD, SATL, and CASD streams parameters will be 0.
- For the special comp layer, all experiment streams (11) will be 0. Sync will be "No".
- For the network distribution layer, all experiment streams (11) will be 0.

Verify that the LOS causes the real time files to be properly archived and new real time files created. The TLM data files will be:

- /TSS/Data/SFMD/SFMD<GMT date>T
- /TSS/Data/SATL/SATLT<GMT date>T
- /TSS/Data/CASD/CASDT<GMT date>T
- /TSS/Data/SFMD/SFMDT
- /TSS/Data/SATL/SATLT
- /TSS/Data/CASD/CASDT

Verify that the following directories contain the appropriate IDFS files. For each logical instrument, a separate real time and archived file will be present. The Archived file names will include the GMT. Refer to step 3 in test procedure 1 for a listing of the IDFS logical instruments.

- /TSS/Data/CAS/
- /TSS/Data/DCORE/
- /TSS/Data/DPLY/
- /TSS/Data/DRB/
- /TSS/Data/EMP/
- /TSS/Data/RETE/
- /TSS/Data/ROPE/

- /TSS/Data/SAHK/
- /TSS/Data/SCORE/
- /TSS/Data/SETS/
- /TSS/Data/SPREE/
- /TSS/Data/TEMAG/

2.0 *Execute the command "/TSS/Bin/Dbm".*

Verify: Use the database manager to verify that for each of the TLM streams, an entry was made for the previous AOS/LOS period. The database should have this single entry in it for each stream

Use the database manager to verify that each experiment has the proper entries.

3.0 *Select the tapes menu in the Manager. For each of the two tapes (numbered "1" and "2"), use the new tape function to provide a label for each tape. Use the names "Test Tape 1" and "Test tape 2".*

Verify: The Manager will display the labels of each tape, will increment the number of tapes written for each tape, and after data is written to each tape, will display the amount of data on each tape. On the main menu, the percentage written to the tape will also be displayed.

4.0 *On the workstation, use the "rcp" command to copy each of the just archived IDFS files from the Data Handling System to the workstation in the directory "/we/tss_1/ data/TEST/". Create this directory if necessary.*

Verify: Using a shell script, compare the files in the following two directories:

- /we/tss_1/data/TEST/<experiment>/
- /we/tss_1/data/NON_REAL_TIME/<experiment>/

Using "cmp" for the compare, the files should be identical with the exception that the locally archived files will contain EOF information at the end of the file. "cmp" will report that the end of file was reached on the copied files, which indicates that the files matched up to the EOF record.

5.0 *Delete the temporary files from the system.*

5.3.5 Test Procedure 4

The purpose of this test procedure is to verify nominal operation of the Ingest, Special Comps, Distribution, Database, and Archive processes during normal AOS/LOS periods. Specific functions test include

- Verify processing during normal AOS/LOS periods:
    - Creation of archived files
    - Creation of database entries for archived files.
    - Output of archived files to TLM and IDFS tapes.
- Verify that the data output to the TLM and IDFS tapes is correct.

Specific requirements verified include:

REQ (3)   All required data needed for both real-time (during mission) operations and post-mission data analysis will be archived. The on-line archive (kept on disk)

will consist of three separate mission phases: pre-deployed and post-deployed. Inactive sections will be dumped to tape to provide disk storage space for the current mission phase. At no time will the on-line data space a period greater than 36 hours.

REQ (8)   The data integrity within the and through the SOC must be assured. During mission operation, all data received at System Level II will be archived. It shall be possible to note the times when the CIP output ceases, has format errors, or is rejected for other reasons. These data can then be requested after mission termination.

REQ (27)   The archive subsystem shall be able to produce copies of the data on magnetic tape after the mission operation is complete. These data tapes will be in 1/4 inch QIC-150 format per ANSI DC-600XTD. Each cartridge tape will hold up to 150mB of data, including label and volume identification data. IEEE 1003.1-1988 archive/interchange file format will be used for volume identification and data recording.

REQ (30)   The archive subsystem will maintain a disk file log of the amount and quality of the data archived.

5.3.5.1 Input Data

Input data required for this test procedure includes the following:

- MDC - get the names/descriptions of the raw files from Dave Anderson.

5.3.5.2 Output Data

Output data generated by this test procedure includes the following Data Handling System based files:

- TLM real time and archive data files located in /TSS/Data/<stream>/.
- IDFS real time and archive data files located in /TSS/Data/<experiment>/.
- Database files located in /TSS/Database/.
- TLM and IDFS files output to tapes.

Also included are the following workstation based files:

- IDFS data files located in /we/tss_1/data/.
- IDFS archive data files located in /we/tss_1/data/NON_REAL_TIME/

5.3.5.3 Detailed Steps

1.0   *Using the Decommutation system and the Data Handling System, initiate 5 brief AOS/LOS periods. Attempt to make each period approximately 2 minutes to simplify create 5 short (about 60 second) AOS/LOS periods. Make a note of the starting and stopping time of each AOS/LOS period.*

Verify: Verify that the Manager properly reports the current state of the system (AOS versus LOS". Also verify that the Manager properly indicates arrival, processing, and distribution of data.

Verify that as each LOS occurs, an additional file is output to each tape drive. The Manager will report additional data being output to each tape.

Verify that all real time and archived (5 new times) TLM files are present:

- /TSS/Data/SFMD/SFMD<GMT date>T
- /TSS/Data/SATL/SATLT<GMT date>T
- /TSS/Data/CASD/CASDT<GMT date>T
- /TSS/Data/SFMD/SFMDT
- /TSS/Data/SATL/SATLT
- /TSS/Data/CASD/CASDT

Verify that the following directories contain the appropriate IDFS files. For each logical instrument, a separate real time and 6 archived files will be present. Refer to step 3 in test procedure 1 for a listing of the IDFS logical instruments.

- /TSS/Data/DCORE/
- /TSS/Data/DPLY/
- /TSS/Data/DRB/
- /TSS/Data/EMP/
- /TSS/Data/RETE/
- /TSS/Data/ROPE/
- /TSS/Data/SAHK/
- /TSS/Data/SCORE/
- /TSS/Data/SETS/
- /TSS/Data/SPREE/
- /TSS/Data/TEMAG/
- /TSS/Data/DCORE/

2.0 *Execute the command "/TSS/Bin/Dbm".*

Verify: Use the database manager to verify that for each of the TLM streams, an entry was made for each of the 5 AOS/LOS periods. the database will also contain an entry for the previous AOS/LOS period generated on the previous test.

Use the database manager to verity that the proper entries have been made for the IDFS files.

Using the "du -s" command, manually count the number of kilobytes currently used on the two disks. Use the "df" command to obtain the size of each disk and then calculate the percentage used. Verify that this is the same value as that displayed by the Manager for disk utilization.

For tape 1, calculate the kilobytes used on disk by the archived TLM files. Using the constant 150 meg (the capacity of a tape), verify that the percentage displayed for the tape is correct. Repeat for tape 2 and the IDFS archive files.

3.0 *Exit from the Manager.*

Verify: All processes are removed and the Manager screen is cleared. The TLM and IDFS tapes are rewound.

4.0 *Once all processes have been terminated and the screen has been cleared, execute the command "tar tvf /dev/rst0" to read the table of contents on the tape.*

Verify: The first file will be 0 length and will be named "Test Tape 1". The remaining 6 files will be the archived TLM files generated for this and the previous test (18 total).

5.0 *Using the command "tar xvf /dev/rst0", extract all files into a temporary directory.*

Verify: Once all files have been extracted, use "cmp" to verify that the archived files are the same as the archived TLM files currently saved on disk.

6.0 *Execute the command "tar tvf /dev/rst1" to read the table on contents on the second tape.*

Verify: The first file will be 0 length and will be named "Test Tape 2". The remaining files will be the archived IDFS files generated for this and the previous test.

7.0 *Using the command "tar xvf /dev/rst1", extract all files into a temporary directory.*

Verify: Once all files have been extracted, use "cmp" to verify that the archived files are the same as the archived experiment files currently saved on disk.

8.0 *Delete the temporary files from the system.*

5.3.6 Test Procedure 5

The purpose of this test procedure is to verify nominal operation of the Ingest, Special Comps, Distribution, Database, and Archive processes during extended AOS/LOS periods. Specific functions tested include:

- Creation of archive files during an AOS when a set amount of time has past (generation of an EOF condition).
- Output of files to TLM and IDFS tapes under these conditions.
- Output of entries to the database under these conditions.
- Deletion of archive files as the disk capacity is reached.
- Processing of the end of tape and transition to a new tape.

5.3.6.1 Input Data

Input data required for this test procedure includes the following:

- MDC - get the names/descriptions of the raw files from Dave Anderson.

5.3.6.2 Output Data

Output data generated by this test procedure includes the following:

- TLM real time and archive data files located in /TSS/Data/<stream>/.
- IDFS real time and archive data files located in /TSS/Data/<experiment/.
- Database files located in /TSS/Database/.

5.3.6.3 Detailed Procedures

1.0 *Execute the command "/TSS/Bin/Cleanup" to cleanup IPC resources, to delete log files, delete data files, delete database files, and create new blank databases.*

1.1 *Execute the command "/TSS/Bin/Manager" with the configuration file "shake.config".*

1.2   *On the Decommutation System, start all data streams.*

1.3   *Allow the data to run for the duration of the playback files.*

Verify: Verify that after approximately 1 hour, the current set of real time TLM and IDFS files are archived and a new set of files opened. The TLM files will include the following:

- /TSS/Data/SFMD/SFMD<GMT date>T
- /TSS/Data/SATL/SATLT<GMT date>T
- /TSS/Data/CASD/CASDT<GMT date>T
- /TSS/Data/SFMD/SFMDT
- /TSS/Data/SATL/SATLT
- /TSS/Data/CASD/CASDT

Verify the IDFS files. Refer to step 3 in test procedure 1 for a listing of the IDFS logical instruments:

- /TSS/Data/DCORE/
- /TSS/Data/DPLY/
- /TSS/Data/DRB/
- /TSS/Data/EMP/
- /TSS/Data/RETE/
- /TSS/Data/ROPE/
- /TSS/Data/SAHK/
- /TSS/Data/SCORE/
- /TSS/Data/SETS/
- /TSS/Data/SPREE/
- /TSS/Data/TEMAG/
- /TSS/Data/DCORE/

Verify that the Manager indicates that both tapes need new labels. Use the Manager to label the tapes as "Test Tape 1" and "Test Tape 2". Verify that after this point, the first set of files is output to each tape.

2.0   *Allow the data stream to continue until the end of all playback files is reached. At this point, use the Manager to indicate a normal LOS. Record the times of each such LOS.*

2.1   *On the Decommutation System, re-start all data streams. Continue this and the previous step until certain that each of the disks has been filled.*

2.2   *Allow the data stream to complete, at which time use the Manager to signal an LOS.*

2.3   *Execute the command "/TSS/Bin/Dbm".*

Verify: Use the database manager to verify that for each of the TLM streams, an entry was made for each archived file. The time durations for each file will be approximately 1 hour apart with the exception of the files terminated by the LOS signals. Record or obtain a hardcopy of the names of all files.

Use the database manager to obtain the same information for the IDFS files.

Using the information generated above, verify that all but the oldest archive files are currently present on disk. Verify for TLM and IDFS files.

3.0 *On the Decommutation System, re-start all data streams. When the data streams terminate, signal an LOS. Continue until the end of each tape is reached, at which time wait until the streams terminate and then signal a final LOS.*

Verify: During this time, verify that the oldest archive files are being deleted as necessary when new archive files are created (at LOS or EOF).

Verify that each tape is nearly full and that the manager is prompting for action for each tape (indicated by highlighting). Verify that both tapes have been rewound after sensing that they are full (will not fully hold the next archive file).

4.0 *Execute the command "/TSS/Bin/Dbm".*

Verify: Use the database manager to verify that for each of the TLM streams, an entry was made for each archived file. The time durations for each file will be approximately 1 hour apart with the exception of the files terminated by the LOS signals. Record or obtain a hardcopy of the names of all files.

Use the database manager to obtain the same information for the IDFS files.

Using the information generated above, verify that all but the oldest archive files are currently present on disk. Verify for TLM and experiment files.

Using the information generated above, use the "tar tvf /dev/rst0" command to verify that tape 1 contains a file for each entry in the database. Use the command "tar xvf /dev/rst1" to repeat for the second tape. Make a note of the database entries which are not present on the tape. This information will be used later to verify that all queued entries are properly output to the tapes.

5.0 *Use the Manager to select and label two new tapes. The same two tapes can be used.*

Verify: Verify that once the tapes are labeled, the queued archive files begin to be output to the tapes.

6.0 *Once all pending files have been output to the two tapes, exit from the Manager. Wait until all processes are killed and the screen is cleared.*

Verify: Using the command "tar tvf dev/rst0", verify that tape 1 contains all archive files not placed on the first TLM tape. Using the command "tar tvf /dev/rst1", verify that tape 2 contains all archive files not placed on the first experiment tape.

5.3.7 Test Procedure 6

The purpose of this test procedure is to verify operation of the Ingest, Special Comps, and Distribution processes when loss of data occurs. Specific functions tested include:

- Ability of the system to recover when the Level B LAN is disconnected, thereby causing loss of data.

5.3.7.1 Input Data

Input data required for this test procedure includes the following:

- MDC - get the names/descriptions of the raw files from Dave Anderson.

5.3.7.2 Output Data

Output data generated by this test procedure includes the following:

- N/A.

5.3.7.3 Detailed Procedures

1.0 *Execute the command "/TSS/Bin/Manager" with the configuration file "shake.config". Note that "Cleanup" is not executed because the data files generated by the previous test procedure will be needed in a later test.*

1.1 *On the Decommuration System, start all data streams.*

Verify: The Manager should be reporting normal ingest, processing, and distribution of data.

2.0 *Briefly disconnect the Level A LAN connection to the Data Handling System. Repeat this in an attempt to cause the Data Handling System to fail.*

Verify: MDC - The Manager will output status messages indicating loss of minor frames. The Manager will update parameters indicating loss of data.

3.0 *Exit from the Manager.*

Verify: The Manager should exit normally.

5.3.8 Test Procedure 7

This set of test procedures is designed to thoroughly test the interactive functions of the Manager process. These test procedures concentrate on the testing of functions which are not covered in other Data Handing System test procedures. These test procedures do not include exercise of other processes and then verification that the Manager properly reports parameters. This level of testing is performed in the test procedures corresponding to other processes.

This test procedure does not test in detail the implications of sending various signals to given processes (such as LOS, INIT, or KILL). This test procedure only verifies that Manager can successfully send these signals and that they do not cause the DHS to fail at the subsystem level.

5.3.8.1 Input Data

Input data required for this test procedure includes the following:

- MDC - get the names/descriptions of the raw files from Dave Anderson.

5.3.8.2 Output Data

None.

5.3.8.3 Detailed Steps

1.0 *Execute the command "/TSS/Bin/Manager" with the configuration file "shake.config". Note that "Cleanup" is not executed because the data files generated by the previous test procedure will be needed in a later test.*

Verify: The Manager will immediately display the primary menu and first page of information (which will not be updating). As the Manager is initializing, the "STATUS LOG" window will be updated with messages indicating that all processes are being initialized. The "ERROR LOG" window should not be updated with any messages.

Once the Manager process is fully initialized, it will begin updating various system parameters. The following parameters on the screen will be updated at 5 second intervals:

- GMT and MET times.
- CPU activity. Idle time should be approximately 99%.
- Disk operations will be 0.
- Directories are 0.0% full.
- Archive tapes are 0.0% full.
- No playback or RDS requests.
- The manager will indicate an LOS period and MUTE. The TAPE 1 and TAPE2 strings will not be highlighted.
- For the ingest layer, the SFMD, SATL, and CASD streams parameters will be 0.
- For the special comp layer, all experiment streams (11) will be 0. Sync will be "No".
- For the network distribution layer, all experiment streams (11) will be 0.
- The manager will report the presence of all workstations.

2.0 *The valid input characters at this time are "V", "P", "B", "D", "T", "L", "A", "Q", "^S", "^Q", "^Z", "^C", and "RETURN" (not case sensitive). Attempt to input all of the remaining unshifted, shifted, control, and meta characters. Attempt to input several function keys.*

Verify: All such characters will be ignored and the keyboard will be beeped.

3.0 *Initiate data streams on the DCS. Change the DHS state from MUTE to ACTIVE.*

Verify: The DHS will begin processing ingested data. This step is performed to insure that certain displays are being updated properly.

4.0 *Select "V" and then RETURN.*

Verify: The "Main Menu" will change to "View Menu" and will offer the following selections:

- page 1
- page 2
- Statuslog
- Errorlog
- Os Shell
- Set Gmt
- Set Met
- Return

5.0 *Repeat Step 2 above in an attempt to enter an invalid character.*

Verify: All invalid characters will be ignored and the keyboard will be beeped.

6.0 *Select Return.*

Verify: The "Main Menu" will be re-displayed.

7.0 *Select Return. Select "1" and then RETURN.*

Verify: No visible action will occur.

8.0   *Select "2" and then RETURN.*

Verify: "Page 2" will be displayed. The second page will contain throughput information for the special comps and the network distribution processes. Because the current status is an LOS, all values will be 0.

9.0   *Select "S" and then RETURN.*

Verify: The list of status messages will be displayed. Each status message will include a time, the process sending the status message, and then the actual message. The highlighted area below the status messages will include the number "0" (which indicates the top message) and will list valid control characters used to traverse the list of status messages:

- ^B - page up.
- ^F - page down.
- ^V - line up.
- ^D - line down.

10.0   *Repeat Step 2 above in an attempt to enter an invalid characters.*

Verify: All invalid characters will be ignored and the keyboard will be beeped.

11.0   *Use the "^D" character several times to scroll the list down to the end.*

Verify: As each character is entered, the list scrolls and the number of the tope message is displayed. When the end of the list is displayed at the bottom of the window, entry of the "^D" character results in a keyboard beep and no scrolling occurs.

12.0   *Use the "^V" character several times to scroll the list up to the top.*

Verify: As each character is entered, the list scrolls and the number of the top message is displayed. When the top of the list is displayed at the top of the window, entry of the "^V" character results in a keyboard beep and no scrolling occurs.

13.0   *Use the "^F" character to page down to the bottom of the list.*

Verify: As each character is entered, the list pages down. The last entry on the current page becomes the first entry on the next page. The last page displayed consists of a single entry. Subsequent inputs result in a keyboard beep.

14.0   *Use the "^B" character to page up to the top of the list.*

Verify: As each character is entered, the list pages up. The list first entry on the current page becomes the last entry on the next page. The first page displayed will be a full page of entries. Subsequent inputs result in a keyboard beep.

15.0   *Select "E" and then RETURN.*

Verify: The list of errors will be displayed. There should not be any error messages displayed. If any errors are displayed, an explanation of each must be obtained.

As with status messages, the highlighted area below the error messages will include the number "0" (which indicates the top message) and will list valid control characters used to traverse the list of error messages:

- ^B - page up.
- ^F - page down.

-	^V - line up.
-	^D - line down.

16.0 *Repeat Step 2 above in an attempt to enter an invalid character.*

Verify: All invalid characters will be ignored and the keyboard will be beeped.

17.0 *Repeat the steps listed above to test the four control characters.*

Verify: If no error messages are present, no action will take place. If any error messages are present, the actions will be the same as described above.

18.0 *Select "O" and then RETURN. Make a note of the layout of the screen.*

Verify: The normal UNIX shell will be executed.

19.0 *Select "^D".*

Verify: The Manager screen will be re-displayed in the same state as when the "Os shell" function was selected.

20.0 *Select "G" and then RETURN.*

Verify: A popup window will be displayed to prompt for the GMT time.

21.0 *Select RETURN.*

Verify: The popup window will be removed.

22.0 *Enter the following invalid format GMT times and select RETURN:*

- "+", "-"

- ":", "::", ":::", "::::", ":::::"

  - Strings containing the proper format, but with out of range values for the GMT day, hour, minutes, and seconds.

  - Several completely erroneous strings containing odd combinations of numbers, alphanumeric strings, and symbols.

Verify: In all cases, the Manager will report "Improper time string entered - (Press any key)". When a key is presses, the prompt will return.

Verify that during display of this prompt, system parameters are still being updated correctly.

23.0 *Select "G" and then RETURN.*

Verify: a popup window will be displayed to prompt for the GMT time.

24.0 *Select several valid GMT times and select RETURN.*

Verify: The prompt will be removed and the GMT time will be updated.

25.0 *Select "M" and then RETURN.*

Verify: A popup window will be displayed to prompt for the MET time.

26.0 *Select RETURN.*

Verify: The popup window will be removed.

27.0 *Enter the following invalid format MET times and select RETURN:*

- "+", "-"

- ":", "::", ":::", "::::", ":::::"

- Strings containing the proper format, but with out of range values for the MET day, hour, minutes, and seconds.
- Several completely erroneous strings containing odd combinations of numbers, alphanumeric strings, and symbols.

Verify: In all cases, the Manager will report "Improper time string entered - (Press any key)". When a key is presses, the prompt will return.

Verify that during display of this prompt, system parameters are still being updated correctly.

28.0 *Select "M" and then RETURN.*

Verify: a popup window will be displayed to prompt for the MET time.

29.0 *Select several valid MET times and select RETURN.*

Verify: The prompt will be removed and the MET time will be updated.

30.0 *Select "R" and then RETURN.*

Verify: The main menu will be re-displayed.

31.0 *Select "P" and then RETURN.*

Verify: The "Main Menu" will change to "Processes Menu" and will over the following selections:

- Init
- Los
- Nice
- Quit
- Kill
- reStart
- Update
- Return •

The list of processes will be displayed. The highlighted area below the processes will include the number "0" (which indicates the top process) and will list valid control characters used to traverse the list of processes:

- ^B - page up.
- ^F - page down.
- ^V - line up.
- ^D - line down.

The main processes heading will include the fields PROCID, PID, CPU, MEM, NICE, USER, SYS, and FILE. Following the heading will be sections for Ingest, Special Computation, Network Distribution, Database Server, Archive Server, Playback Server, and Ping Server (some are on the following pages). The PROCID and FILE labels of the processes displayed include:

- in.SFMD   ingest
- in.SATL   ingest
- in.CASD   ingest
- sp.SETS   sets

-	sp.SPREE	spree	
-	sp.DCORE	dcore	
-	sp.DPLY	dply	
-	sp.EMP	emp	
-	sp.SAHK	sahk	
-	sp.ROPE	rope	
-	sp.TEMAG	temag	(next page)
-	sp.DRB	drb	
-	sp.SCORE	score	
-	sp.CAS	cas	
-	nd.SETS	netdist	
-	nd.SPREE	netdist	
-	nd.DCORE	netdist	
-	nd.DPLY	netdist	
-	nd.EMP	netdist	
-	nd.SAHK	netdist	
-	nd.ROPE	netdist	
-	nd.TEMAG	netdist	
-	nd.DRB	netdist	(next page)
-	nd.SCORE	netdist	
-	nd.CAS	netdist	
-	DBS_IN	DBS	
-	DBS_SC	DBS	
-	AS_IN	AS	
-	AS_SC	AS	
-	PlayBack	PBS	
-	RDS	RDS	(next page)
-	pi.LEVELC	pinger	
-	hb.LEVELC	heart	

The PID, CPU, MEM, NICE and USER fields will vary depending on the amount of activity performed by the process.

32.0 *Repeat Step 2 above in an attempt to enter an invalid characters.*

Verify: All invalid characters will be ignored and the keyboard will be beeped.

33.0 *Use the "^D" character several times to scroll the list down to the end.*

Verify: As each character is entered, the list scrolls and the number of the top message is displayed. When the end of the list is displayed at the bottom of the window, entry of the "^D" character results in a keyboard beep and no scrolling occurs.

34.0 *Use the "^V" character several times to scroll the list up to the top.*

Verify: As each character is entered, the list scrolls and the number of the top message is displayed. When the top of the list is displayed at the top of the window, entry of the "^V" character results in a keyboard beep and no scrolling occurs.

35.0 *Use the "^F" character to page down to the bottom of the list.*

Verify: As each character is entered, the list pages down. The last entry on the current page becomes the first entry on the next page. The last page displayed consists of a single entry. Subsequent inputs result in a keyboard beep.

36.0 *Use the "^B" character to page up to the top of the list.*

Verify: As each character is entered, the list pages up. The list first entry on the current page becomes the last entry on the next page. The first page displayed will be a full page of entries. Subsequent inputs result in a keyboard beep.

37.0 *Select "I" and then RETURN.*

Verify: A prompt will appear requesting the PROCID.

38.0 *Enter RETURN.*

Verify: The prompt will be removed.

39.0 *Enter "I" and then RETURN.*

Verify: A prompt will appear requesting the PROCID.

40.0 *Verify that the control functions used to scroll still work properly. Enter a PROCID which is invalid.*

Verify: The message "PROCID <proc id> not found (Press any key)" is displayed.

41.0 *Press any key.*

Verify: The prompt will be removed.

42.0 *Repeat the above listed steps for "L", "N", "Q", "K", and "S".*

Verify: All functions will behave in the same manner as described above.

43.0 *For each of the "I", "L", "N", "K", and "S" functions, specify a valid PROCID. When the "y/n" prompt appears, select "X". Repeat, but select "N". Repeat, but select only RETURN.*

Verify: In all cases, the verification prompt is removed with no action being taken for the process.

44.0 *Select "I" and then RETURN. Enter "in.SFMD" and then select "Y" to verify the prompt. Repeat for each available process.*

Verify: Each process will be initialized.

45.0 *Select "L" and then RETURN. Enter "in.SFMD" and then select "Y" to verify the prompt. Repeat for each available process.*

Verify: An LOS indication will be sent to each process.

46.0 *Select "N" and then RETURN. Enter "in.SFMD" and then select "Y" to verify the prompt. When the prompt for the value is displayed, enter the following invalid values:*

- RETURN.

- Several invalid alphanumeric strings.
- -1.
- 20.

Verify: For the first two cases, the keyboard will beep and no action will take place. For the second two cases, the nice value will be updated to the lower or upper limit ("0" or "19"). The updated nice value will be reflected in the display.

47.0 *Select "N" and then RETURN. Enter "in.SFMD" and then select "Y" to verify the prompt. Enter a valid nice value and select RETURN. Repeat for each available process.*

Verify: The process will be updated with the new nice value. The display will indicate the new value.

48.0 *Select "Q" and then RETURN. Enter "in.SFMD" and then select "Y" to verify the prompt. Repeat for each available process.*

Verify: In each case, the process will be terminated. The display will be updated with "-1" values to indicate that the process is not active.

49.0 *Select "K" and then RETURN. Enter "in.SFMD" and then select "Y" to verify the prompt. Repeat for each available process.*

Verify: In each case, the message "<process> is not alive (Press any key)" will be displayed.

50.0 *Select "S" and then RETURN. Enter "in.SFMD" and then select "Y" to verify the prompt. Repeat for each available process.*

Verify: In each case, the process will be restarted. The display will be updated with the new PID and parameters.

51.0 *Select "K" and then RETURN. Enter "in.SFMD" and then select "Y" to verify the prompt. Repeat for each available process.*

Verify: In each case, the process will be killed. The display will be updated with "-1" values to indicate that the process is not alive.

52.0 *Select "S" and then RETURN. Enter "in.SFMD" and then select "Y" to verify the prompt. Repeat for each available process.*

Verify: In each case, the process will be restarted. The display will be updated with the new PID and parameters.

53.0 *Select "U" several times followed by RETURNs.*

Verify: The display will be updated.

54.0 *Select "R" and then return.*

Verify: The Main Menu will be redistilled.

55.0 *Select "B" and then RETURN.*

Verify: The "Main Menu" will change to "Buffers Menu" and will offer the following selections:

- Segment.
- Buffer.

- Mode.
- Update.
- Return.

The display will be updated to list the following shared memory segments:

SFMD	SATL	CASD	SETS	SPREE
DCORE	DPLY	SAHK	EMP	ROPE
RETE	TEMAG	DRB	SCORE	CAS

56.0 *Repeat Step 2 above in an attempt to enter an invalid character.*

Verify: All invalid characters will be ignored and the keyboard will be beeped.

57.0 *Select "U" and then RETURN.*

Verify: The message "Unable to attach segment (null) (Press any key)" will be displayed.

58.0 *Select "S" and then RETURN.*

Verify: The prompt "Enter the segment name:" will be displayed.

59.0 *Enter several invalid segment names, including NULL.*

Verify: In each case, the message "Segment not found (Press any key)" is displayed.

60.0 *For each of the listed shared memory segments, select "S" and then the segment.*

Verify: In each case, the display will be updated to list the circular buffers in the segment. For the TLM segments, the buffers will be as follows:

- SFMD SFMDT.
- SATL SATLT.
- CASD CASDT.

For the remaining (experiment) segments, refer to Test Procedure 2, step 3 for a listing of the logical instruments. The names of each buffer correspond to the logical instrument names.

61.0 *Select "B" and then RETURN.*

Verify: The prompt "Enter the buffer name:" is displayed.

62.0 *Enter several invalid buffer names, including NULL.*

Verify: In each case, the message "Buffer <buffer> not found (Press any key)" is displayed.

63.0 *For each of the shared memory segments and the buffers contained, use the "B" function to display the records in the buffer.*

Verify: In each case, the display will be updated to list in order the records (if any) within the buffer.

64.0 *Select "M" and then RETURN.*

Verify: The prompt "Enter the dump mode (hex or packet):" will be displayed.

65.0 *Select several invalid strings (not "hex" or "packet") including NULL.*

Verify: In each case the message "Mode <mode> not found (Press any key)" is displayed.

66.0   *Select "M" and then RETURN. Select "hex" and then RETURN. Select "U" and then RETURN.*

Verify: The display mode changes. The display will list lines of 16 bytes in hex. The number of lines is dependent on the buffer.

The highlighted area below the processes will include the number "0" (which indicates the top line) and will list valid control characters used to traverse the list of processes:

- ^B - page up.
- ^F - page down.
- ^V - line up.
- ^D - line down.

67.0   *Use the "^D" character several times to scroll the list down to the end.*

Verify: As each character is entered, the list scrolls and the number of the top line is displayed. When the end of the list is displayed at the bottom of the window, entry of the "^D" character results in a keyboard beep and no scrolling occurs.

68.0   *Use the "^V" character several times to scroll the list up to the top.*

Verify: As each character is entered, the list scrolls and the number of the top line is displayed. When the top of the list is displayed at the top of the window, entry of the "^V" character results in a keyboard beep and no scrolling occurs.

69.0   *Use the "^F" character to page down to the bottom of the list.*

Verify: As each character is entered, the list pages down. The last entry on the current page becomes the first entry on the next page. The last page displayed consists of a single entry. Subsequent inputs result in a keyboard beep.

70.0   *Use the "^B" character to page up to the top of the list.*

Verify: As each character is entered, the list pages up. The list first entry on the current page becomes the last entry on the next page. The first page displayed will be a full page of entries. Subsequent inputs result in a keyboard beep.

71.0   *Re-display the buffer for any other segment. The data in the segment will be displayed in hex.*

72.0   *Select "M" and select RETURN. Select "packet" and then RETURN. select "U" and then RETURN.*

Verify: The display format is restored to packet mode.

73.0   *Select "R" and then RETURN.*

Verify: The main menu will be re-displayed.

74.0   *Select "D" and then RETURN.*

Verify: The "Main Menu" will change to "Directory Menu" and will offer the following selections:

- Low water.
- Hi water.
- Update

- Return.

The highlighted area below the processes will include the number "0" (which indicates the top line) and will list valid control characters used to traverse the list of processes:

- ^B - page up.
- ^F - page down.
- ^V - line up.
- ^D - line down.

The display area will be updated to display for each TLM and IDFS directory, the percent full, the number of kilobytes, and the low/high marks used to determine when archived files are deleted. The directories in order are:

- /TSS/Data/SFMD
- /TSS/Data/SATL
- /TSS/Data/CASD
- /TSS/Data/EMP
- /TSS/Data/DPLY
- /TSS/Data/SETS
- /TSS/Data/SPREE
- /TSS/Data/DCORE
- /TSS/Data/DRB
- /TSS/Data/RETE
- /TSS/Data/ROPE
- /TSS/Data/SAHK
- /TSS/Data/SCORE
- /TSS/Data/TEMAG
- /TSS/Data/CAS

75.0 *Repeat Step 2 above in an attempt to enter an invalid character.*

Verify: All invalid characters will be ignored and the keyboard will be beeped.

76.0 *Use the "^D" character several times to scroll the list down to the end.*

Verify: As each character is entered, the list scrolls and the number of the top line is displayed. When the end of the list is displayed at the bottom of the window, entry of the "^D" character results in a keyboard beep and no scrolling occurs.

77.0 *Use the "^V" character several times to scroll the list up to the top.*

Verify: As each character is entered, the list scrolls and the number of the top line is displayed. When the top of the list is displayed at the top of the window, entry of the "^V" character results in a keyboard beep and no scrolling occurs.

78.0 *Use the "^F" character to page down to the bottom of the list.*

Verify: As each character is entered, the list pages down. The last entry on the current page becomes the first entry on the next page. The last page displayed consists of a single entry. Subsequent inputs result in a keyboard beep.

79.0   *Use the "^B" character to page up to the top of the list.*

Verify: As each character is entered, the list pages up. The list first entry on the current page becomes the last entry on the next page. The first page displayed will be a full page of entries. Subsequent inputs result in a keyboard beep.

80.0   *Select "L" and then RETURN. Enter several invalid directory names including NULL. Repeat this step for the "H" function (high water mark).*

Verify: In each case, the message "Directory <directory> not found (Press any key)" is displayed. For the NULL entry, only a keyboard beep will sound.

81.0   *Select "L" and then RETURN. Enter "/TSS/Data/SFMD".*

Verify: The prompt "Enter the new level in kilobytes" will be displayed.

82.0   *Enter some very small and very large values (values which are larger than the disk size).*

Verify: MDC - this is valid now.

83.0   *Use the "L" function to set the low water mark on several of the listed directories.*

Verify: The new low water mark will be updated on the display.

84.0   *Select "H" and then RETURN. Enter "/TSS/Data/SFMD".*

Verify: The prompt "Enter the new level in kbytes" will be displayed.

85.0   *Enter some very small and very large values (values which are larger than the disk size).*

Verify: MDC - this is valid now.

86.0   *Use the "H" function to set the high water mark on several of the listed directories.*

Verify: The new high water mark will be updated on the display.

87.0   *On any of the available directories, attempt to set a low water mark which is greater than the high water mark.*

Verify: MDC - this is valid now.

88.0   *Select "U" and then RETURN several times.*

Verify: The Display is updated.

89.0   *Select "R" and then RETURN.*

Verify: The main menu is re-displayed.

90.0   *Select "T" and then RETURN.*

Verify: The "Main Menu" will change to "Tapes Menu" and will offer the following selections:

- New tape.
- Go tape.
- End tape.
- Update.
- Return.

The display will be updated to include information for each of the two tape drives. For each tape, the current tape label (blank), the current number of kbytes used on the tape (0 and 0.0%), the number of tapes written (0), and a pending service request indicator will be presented.

91.0 *Repeat Step 2 above in an attempt to enter an invalid character.*

Verify: All invalid characters will be ignored and the keyboard will be beeped.

92.0 *Select "N" and then RETURN.*

Verify: The prompt "Enter the Drive number:" will be displayed.

93.0 *Enter several invalid tape drive numbers, including "0", "3", alphanumeric values, and NULL.*

Verify: In each case, the request will be ignored and will cause the prompt to be removed.

94.0 *Select "N" and then RETURN. Select "1" and then RETURN.*

Verify: The prompt "New Tape of Drive 1? (y/n):" will be displayed.

95.0 *Select "X" and then return. Repeat with "N" and NULL.*

Verify: In each case, the prompt is removed with no action taking place.

96.0 *Select "N" and then RETURN. Select "1" and then RETURN. Select "Y" and then RETURN.*

Verify: The prompt "Place a new tape in the drive, then enter the new tape label (<32 char.)" will be displayed.

97.0 *Select RETURN.*

Verify: The keyboard will beep and the prompt will be removed. No changes will be made to the display.

98.0 *Select "N" and then RETURN. Select "1" and then RETURN. Select "Y" and then RETURN.*

99.0 *Select a long string which is larger than 32 characters.*

Verify: The keyboard will beep and the prompt will be removed. No changes will be made to the display.

100.0 *Select "N" and then RETURN. Select "1" and then RETURN. Select "Y" and then RETURN. Enter the string "test tape 1" and then select RETURN.*

Verify: The display will be updated with the new tape label.

101.0 *Repeat the above several steps for tape 2.*

Verify: The same results will occur, will the display for tape 2 being updated for the final step.

102.0 *Select "G" and then RETURN.*

Verify: The prompt "Enter the Drive number:" will be displayed.

103.0 *Enter several invalid tape drive numbers, including "0", "3", alphanumeric values, and NULL.*

Verify: In each case, the request will be ignored and will cause the prompt to be removed.

104.0 *Select "G" and then RETURN. Select "1" and then RETURN.*

Verify: The prompt "Continue on Drive 1? (y/n)" is displayed.

105.0 *Select "X" and then return. Repeat with "N" and NULL.*

Verify: In each case, the prompt is removed with no action taking place.

106.0 *Select "N" and then RETURN. Select "1" and then RETURN. Select "Y" and then RETURN.*

Verify: The request completes successfully. No action is visible because no tape is present.

107.0 *Repeat the above several steps for tape 2.*

Verify: The same results will occur.

108.0 *Select "E" and then RETURN.*

Verify: The prompt "Enter the Drive number:" will be displayed.

109.0 *Enter several invalid tape drive numbers, including "0", "3", alphanumeric values, and NULL.*

Verify: In each case, the request will be ignored and will cause the prompt to be removed.

110.0 *Select "E" and then RETURN. Select "1" and then RETURN.*

Verify: The prompt "End tape on Drive 1? (y/n):" will be displayed.

111.0 *Select "X" and then return. Repeat with "N" and NULL.*

Verify: In each case, the prompt is removed with no action taking place.

112.0 *Select "E" and then RETURN. Select "1" and then RETURN. Select "Y" and then RETURN.*

Verify: The request completes successfully. No action is visible because no tape is present.

113.0 *Repeat the above several steps for tape 2.*

Verify: The same results will occur.

114.0 *Select "U" and then RETURN several times.*

Verify: The display will be updated.

115.0 *Select "R" and then RETURN.*

Verify: The main menu will be re-displayed.

116.0 *Select "L" and then RETURN.*

Verify: The prompt "Initiate LOS condition?" will be displayed.

117.0 *Select "X" and then return. Repeat with "N" and NULL.*

Verify: In each case, the prompt is removed with no action taking place.

118.0 *Select "L" and then RETURN. Select "Y" and then RETURN.*

Verify: The AOS state is changed to LOS. The parameters for ingest and special comps processing will decrease to 0. The LOS will cause the "TAPE 1" and "TAPE 2" strings to be highlighted.

119.0 *Select "A" and then RETURN.*

Verify: The prompt "Set the output mode to ACTIVE? (y/n)" will be displayed.

120.0 *Select "X" and then return. Repeat with "N" and NULL.*

Verify: In each case, the prompt is removed with no action taking place.

121.0 *Select "A" and then RETURN. Select "Y" and then RETURN.*

Verify: The MUTE state will be changed to ACTIVE and will be highlighted.

122.0 *Select "Q" and then RETURN.*

Verify: The prompt "Really quit? (y/n)" will be displayed.

123.0 *Select "Q" and then RETURN. Select "Y" and then RETURN.*

Verify: The status window will be updated as processes are removed. As processes terminate, they will be removed from the main display. Once cleanup is complete, the screen will be cleared.

5.3.9 Test Procedure 8

The purpose of this test procedure is to verify operation of the redelivery function. The basic test approach is to begin an AOS period with the DHS in MUTE mode. After a short period of time, the DHS will be switched to ACTIVE. At this time the DHS will begin (continue) to send IDFS data records for which no header was transmitted. This will generate redelivery requests for IDFS headers. Specific functions tested include:

- Response to redelivery requests by the DHS.

- Ability to process many redelivery requests for several workstations.

5.3.9.1 Input Data

Input data required for this test procedure includes the following:

- MDC - get the names/descriptions of the raw files from Dave Anderson.

5.3.9.2 Output Data

Output data generated by this test procedure includes the following:

- N/A.

5.3.10 Detailed Procedures

1.0 *Execute the command "/TSS/Bin/Manager" with the configuration file "shake.config".*

1.1 *On 1 workstation, set up a configuration file to cause the "listener" process to access data for all experiments. Execute the command "/we/tss_1/bin/listener" with the configuration file. Verify that only 1 workstation is actively reading data from the Level C LAN.*

1.2 *On the Decommutation System, start all data streams.*

Verify: The Manager is in the MUTE state when the AOS begins.

2.0 *Allow the AOS to continue for approximately 1 minute. At this time, use the Manager to change the state from MUTE to ACTIVE.*

Verify: The Manager will begin sending IDFS records to the Level C LAN (indicated by activity for the nework distribution processes). Because IDFS headers were not sent for the data, a redelivery request will occur for each IDFS experiment (XX total).Allow the data to run for the duration of the playback files.