



George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

FPD-OI-FD21.3
April 26, 2001

ORGANIZATIONAL INSTRUCTION

Flight Projects Directorate Flight Systems Department Environmental Control and Life Support Systems Group Test Team FD21

Environmental Control and Life Support System (ECLSS) Facility

Revision B

APPROVAL

<u>NAME</u>	<u>TITLE</u>	<u>ORG</u>	<u>DATE</u>
<u>Original Signed by</u> _____	Lead, FD21 ECLSS Group	FD21	April 26, 2001
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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		7/30/99	Baseline version
Revision	Rev. A	8/7/00	Reformatted to Flight Projects Directorate standard template
Revision	Rev. B	5/1/01	Revise to add Appendix C Procedure Numbering System and correct section 8.0 quality records

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1. GENERAL INFORMATION

1.1 Scope

This document addresses the Development Test activities, Flight Test activities, and the work instructions followed by each in the operation of the Environmental Control and Life Support System (ECLSS) Facility. Unless specifically separated, these instructions apply to both Development and Flight test activities.

1.2 Purpose

This document establishes the work instructions that control ECLSS test operations and data delivery to the customer. It also establishes the training and certification requirements for test personnel, safety issues inherent in the facility operation, and the equipment and materials concerns necessary for the operation of the ECLSS test facility.

1.3 Applicability

The policies and work instructions outlined in this document shall apply to all NASA personnel, NASA contractor employees, non-NASA employees, and visitors who may be involved with the operations of the MSFC ECLSS test facilities, associated equipment and systems.

2. APPLICABLE DOCUMENTS

Revision levels of documents are not shown. The latest revision will be used unless otherwise required by contractual requirements or other regulations. In this case the letter revision of the document will be given.

FPD-OI-FD21.1	Management Process
FPD-OI-FD21.5	Quality Record Maintenance
MPG 1440.2	MSFC Records Management Program
MPG 8730.3	Control of Nonconforming Product
NPG 1441.1	Records Retention Schedules

3. ACRONYMS and DEFINITIONS

3.1 Acronyms

DR	Discrepancy Report
ECLSS	Environmental Control and Life Support System
FAP	Facility Activation Procedure

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FEDS	Functional Environmental Database System
FOP	Facility Operating Procedure
JSC	Johnson Space Center
KSAOC	Knowledge, Skills, Attributes and Other Characteristics
MIP	Mandatory Inspection Points
MSFC	Marshall Space Flight Center
NASA	National Aeronautics and Space Administration
NSTC	NASA Safety Training Center
OJT	On the Job Training
PACRATS	Payload and Components Realtime Automated Test System
PI	Principal Investigator
PPE	Personal Protective Equipment
RF	Radio Frequency
SOP	Standard Operating Procedures
TCP	Test and Checkout Procedure
TDR	Test Discrepancy Report
TPS	Test Preparation Sheet
TRR	Test Readiness Review

3.2 Definitions

Placard A procedure, available at the test console or test conduct location, used as a guide in the routine operation of a subsystem.

Team Leader Technical lead and consultant.

Test Conductor Designated person assigned to perform Integrated Systems Tests.

Test Engineer Designated person assigned to perform subsystem and component tests. The Test Engineer provides support to the Test Conductor.

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Test Procedure Any document which presents detailed steps for the performance of test operations, e.g., Test and Checkout Procedure (TCP), Test Preparation Sheet (TPS), etc.

4.0 INSTRUCTIONS

4.1 General Information

The following processes shall be followed to operate the facility and test any of the systems and subsystems of the ECLSS. Refer to Figures 1 and 2 for a top-level graphical depiction of the test planning and test operations processes.

4.2 Test Authorization

4.2.1 Test Operations Requirements

Requirements for test operations, determined by the customer, are sent to the facility. These requirements can be in the form of a Test Plan or request memorandum from the customer, a verbal test request from the customer, or via MSFC/JSC Technical Task Agreement. Verbal test requests will be accepted for minor changes to existing task agreements, written test requirements, and test request memorandums.

4.2.2 Requirements Review

The requirements are then reviewed by the designated test team at the ECLSS facility.

4.2.3 Questions or Comments

Any questions or comments that arise from the first or subsequent reviews of test requirements will be cycled between the customer and the test team until all issues have been resolved.

4.3 Test Procedures

The Team Leader will designate test personnel to develop a test procedure based on agreed upon requirements.

Test Procedures (FAP, FOP, SOP, TCP, and TPS) shall be written by the responsible test engineer in response to test requirements, objectives, and specifications established by the Test Requirements Documentation or the customer's test request. The test procedure Quality coverage requirements will be specified in the project quality plan or the customer agreement/test request. Test procedures shall contain the level of detail to properly function the article under test and to clearly depict the implementation of the test requirements.

These procedures are prepared in accordance with following paragraphs.

4.3.1 FAP, FOP, SOP, and TCP Test Operation Procedures

4.3.1.1 Procedure Content and Preparation

Appendix A contains a suggested format for the procedure content; however, procedures are not limited to this example, but should be formatted and prepared to meet specific test requirements. An approval/signature sheet shall be prepared in accordance with 4.3.1.9, and placed behind the document revision record. Procedures that require quality acceptance shall provide spaces for inspection stamps and

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sign-off by Quality. MSFC Quality may insert Mandatory Inspection Points (MIPs) into the procedure as deemed necessary.

4.3.1.2 Procedure Numbering

The document numbering system shown in Appendix C shall be used when producing FAP, FOP, SOP, and TCP Test Operation Procedures. Procedures written before 7/1/99 will not follow this numbering system.

4.3.1.3 Procedure Cover

MSFC Form 454 will be used for the Procedure cover sheets.

4.3.1.4 Specification Values and Tolerances

Procedures shall identify and specify test or operational constraints, controls, specification values, and tolerances. Critical measurements shall be recorded and have the approved limits specified in the procedure.

4.3.1.5 Emergency Situations

Test procedures shall contain an emergency shutdown procedure and a list of emergency telephone numbers. The emergency shutdown procedure shall contain the steps required to perform a test shutdown in case of an emergency. Procedures shall contain instructions for safeguarding hardware and personnel. It is the test conductor's responsibility to determine when an emergency situation exists and to ensure that the emergency shutdown procedure is performed. The emergency shutdown procedure and emergency telephone numbers shall be located on the last page of the procedure.

4.3.1.6 Safety Critical Operations

The determination of the safety classification of a procedure is the responsibility of the originator of the procedure and the Group Lead/Team Lead. If there are any questions about the safety classification the Industrial Safety Office should be consulted. Typical examples of potential hazards include: high pressure, cryogen, chemicals, RF radiation, machine shop, and high voltage. Procedures will provide appropriate warning or caution notes preceding critical functions, and identify any steps which require lockout/tagout. The procedure will define operations or sequences that require participation by Industrial Safety Office or Environmental Health personnel.

4.3.1.7 Preliminary Procedures

Preliminary copies of the procedures should be prepared as early in the project cycle as possible. Ideally, the procedure should be issued two weeks before the final issue for review by those personnel directly involved in the procedure or directly concerned with the test. Situations may arise that require a shorter response.

4.3.1.8 Final Procedure Issue

Upon completion of the review, the procedure will be prepared in final form for approval. After final signature approval, the current date will be entered on the cover page and in the Revision Record. The original signed copy will be filed and maintained by the test facility.

4.3.1.9 FAP, FOP, SOP, and TCP Approval

The responsibility for reviewing or approving test operational procedures is dependent upon the type of test program and type of procedure. Approvals shall be obtained prior to implementation of procedures. Table 1 reflects the minimum approval requirements for initial procedure issuance and revisions. The

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Systems Test Engineer and the Project Engineer are responsible for resolving any conflicts in the review/approval process. The Project Engineer shall have the authority to sign for the Design or Analysis Engineer.

TABLE 1: SOP, FAP, FOP, and TCP Approval

All Test Programs	SOP	FAP	FOP	TCP
Test Engineer	Prepare	Prepare	Prepare	Prepare
Systems Test Engineer	Prepare/ Approve	Prepare/ Approve	Prepare/ Approve	Prepare/ Approve
Team Leader	Approve	Approve	Approve	Approve
Design Engineer				(1)
Analysis Engineer				(2)
Marshall Lead Representative				(3)
PCH Engineer	(4)	(4)	(4)	(4)
Quality Assurance	(5)	(5)	(5)	(5)
Industrial Safety	(6)	(6)	(6)	(6)

Notes:

- (1) Approval of the Design Engineer is required for in-house projects.
- (2) Approval of the Analysis Engineer is required for environmental tests of in-house projects.
- (3) Marshall Lead Representative approval is required for Customer Supplied Product hardware.
- (4) Program Critical Hardware (PCH) Engineer approval is required for PCH handling procedures whenever the move/handling is being performed by the PCH Engineer.
- (5) Quality Assurance approval is required for quality sensitive tests.
- (6) Industrial Safety approval is required for safety critical tests.

4.3.1.10 Procedure Revisions

Approval of revisions will be coordinated with the organizations that approved the initial issuance. Revision copies will be distributed to all test team members prior to the start of the test or operation covered by the procedure.

4.3.2 Test Preparation Sheet (TPS)

A TPS (MSFC Form 248) is required to perform configuration changes and may be used to perform tests, authorize the performance of a procedure, or other work not covered by another approved procedure or Discrepancy Record (TDR/DR). In general, a TPS should only be used for simple operations and should not be used in lieu of formal procedures for complex operations. For complex operations, a TPS may be used in lieu of a formal TCP for extenuating circumstances such as if there is insufficient time to prepare and approve a TCP. However, in this circumstance the approval for the TPS shall be the same as required for the TCP it is replacing. For example, a TPS written to perform a vibration test would require the approval of the Team Leader, Design Engineer, and Analysis Engineer in addition to the normal required approvals for a TPS. The TPS form shall be filled out in accordance with Appendix B. A master log of assigned numbers and short titles will be established and maintained for each test program and/or facility in order to prevent duplication. A TPS file shall be maintained for each active project/facility by the appropriate Systems Test Engineer/Test Facility Manager.

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4.3.2.1 TPS Attachments

TPS attachments can be used with all original TPS's. Attachments shall become an internal part of a TPS and will be handled in the same manner as a TPS continuation Sheet. The original TPS shall contain the detailed steps for implementing an attachment. The attachments will be referenced in the TPS and contain the TPS number.

4.3.2.2 TPS Numbering

The document numbering system shown in Appendix C shall be used.

4.3.2.3 Specification Values and Tolerances

TPS's shall identify and specify test or operational constraints, controls, specification values, and tolerances. Critical measurements shall be recorded and have the approved limits specified in the TPS.

4.3.2.4 Safety Critical Operations

TPS's shall contain instructions for safeguarding hardware and personnel, implementation of evacuation plans, and equipment protection procedures. TPS's will provide appropriate warning or caution notes preceding critical functions, and identify any steps which require lockout/tagout. The TPS will define operations or sequences that require participation by Safety Office or Environmental Health personnel.

4.3.2.5 TPS Approval

The responsibility for reviewing or approving test preparation sheets is dependent upon the type of test program and type of TPS. Approvals shall be obtained prior to implementation of TPS's. Table 2 reflects the minimum approval requirements.

TABLE 2: TPS Approval

All Test Programs	TPS
Test Engineer	Prepare
Systems Test Engineer	Prepare/Approve
Team Leader	Approve
Marshall Lead Representative	(1)
Quality Assurance	(2)
Industrial Safety	(3)

Notes:

- (1) Marshall Lead Representative approval is required for Customer Supplied Product hardware.
- (2) Quality Assurance Approval is required for quality sensitive tests.
- (3) Industrial Safety approval is required for safety critical tests.

4.3.3 Customer Review of Draft Test Procedure

The customer will review the draft test procedure. Any questions and comments are cycled between the customer and the test team until all issues have been resolved. Approved original TCP's are kept as Quality Records in the *ECLSS Group Test Team* File Cabinet labeled Current TCP's.

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4.3.4 Determine if Test Contains Hazardous Operations

The Team Leader will determine if the test contains possible hazardous operations. If so, a safety review, coordinated with appropriate personnel will be conducted. All safety issues will be resolved before test operations begin.

4.3.5 Perform Integrated Systems Testing

Integrated systems testing may be performed in accordance with a TCP. The TCP may initiate and control the test sequence through reference to sub-system placards. Subsystem testing may be performed with a TCP or TPS. These documents may be used as Placards.

4.3.6 Record Required Measurements

Facility personnel will record all required measurements and events in the appropriate logbooks. These include, but may not be limited to the Test Engineer's Logbook and the Test Conductor's Logbook.

4.3.7 Collect Required Samples

Facility personnel will collect any required samples.

4.4 Test Readiness Review

A Test Readiness Review (TRR) is performed for integrated tests by the test team and other required personnel to determine facility readiness. *The Test Conductor will conduct the TRR.* No TRR is required for sub-system tests.

4.5 Test Anomalies

4.5.1 Record Anomalous Events

The test conductor or test facility personnel will record any anomalous event in the appropriate logbook.

4.5.2 Record Flight Hardware Anomalies

Flight hardware test anomalies are recorded as a Test Discrepancy Report (TDR) and become part of the test record of the TCP. The TDR is then dispositioned according to MPG 8730.3, Control of Nonconforming Product. Once anomalies are resolved the data is then transferred to the MSFC Quality Assurance Records Center QS10.

4.5.3 Notify Customer or PI of Anomalies

The customer or Principal Investigator (PI) will be notified of any anomaly. A solution will be discussed and agreed upon between the PI and the test conductor/facility personnel.

4.5.4 Resume Test

Once the agreed upon solution has been implemented, the test will be resumed and *normal* operations will proceed only when the solution to the anomaly has been shown to be successful.

4.6 Shift Change Operations

The Test Conductor and Test Engineers will handle shift transitions. All relevant test information will be passed between shift personnel at this time.

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4.7 Test Reports

4.7.1 Collect/Catalogue Sensor and Sample Data

All sensor and sample data will be collected and catalogued by facility personnel. Sample analysis data is put into the Functional Environmental Database System (FEDS). This database is shared with the customer. Records of all data will be maintained per FPD-OI-FD21.5.

4.7.2 Obtain Real-Time Data

Real-time data from sensors can be obtained during testing via the Payload And Components Realtime Automated Test System (PACRATS).

5.0 NOTES

The Environmental Control and Life Support System test facility performs the subsystems, systems, and integrated systems research and development test activities for the International Space Station (ISS) ECLSS. The technical product of development test activities is the test data that is made available to the customer in hard copy (logbook, procedure, etc.) and electronic form (sensor data, analytical results, etc). The technical record documenting flight hardware test activities is the test procedure, which is maintained as a quality record. Sensor data and analytical results from flight hardware test activities are transmitted electronically to the customer in the same manner as data from development tests.

6.0 SAFETY PRECAUTIONS and WARNING NOTES

6.1 Gas Monitors

All confined spaces are equipped with Oxygen (O₂), Carbon Dioxide (CO₂) and Carbon Monoxide (CO) monitors set at safe limits. These monitors are to be calibrated in place by the appropriate facility personnel. All *Test Team* personnel will be familiar with the operation of these sensors and their alarms.

6.2 Use of Ladders

Precautions for Lifting and Handling will be taken for accessing high positions, including shelves and cabinets. Appropriate ladders will be used when working above shoulder level. Height of the ladder will be such that the work can be performed between waist to shoulder height while standing on the ladder. Ladders will be used in accordance with manufacturer's recommendations and NASA safety requirements.

6.3 Welding and Machine Shop Operations

Precautions for Welding and Machine Shop Operations will be taken to prevent rings, loose jewelry, and exceptionally loose clothing from being worn while operating machine shop tools. Rings will not be worn while welding. All personnel will wear safety glasses while in the machine shop.

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6.4 Electrical Repair

Qualified electricians will perform all repairs and modifications to electrical power devices. *Rings will not be worn while trouble shooting, making modifications and repairs in electrical panels.* Equipment must be locked-out and/or tagged-out in accordance with Control of Hazardous Energy (Lockout/Tagout) Procedure for the ECLSS facility prior to modification and repair.

6.5 Forklift or Overhead Crane Operations

Precautions for Heavy Lifting will be observed when using a forklift or overhead crane. The personnel authorized for heavy lifting operations shall be certified by NASA and are identified by their signature in the MSFC Safety Certification Records. Only personnel certified for the use of heavy lifting equipment shall be in the vicinity of the lifting area.

7.0 APPENDICES, DATA, REPORTS, and FORMS

Appendix A Test Operations Procedures Format (FAP, FOP, SOP, TCP)

Appendix B Test Preparation Sheets

Appendix C Identification Number Format

8.0 QUALITY RECORDS

The table below contains a listing of all ECLSS Test Team Quality Records. These Quality Records will be maintained in accordance with FPD-OI-FD21.5.

Record Title	Description of Record	Authority	Retention	Notes
Test Team Master List	Contains a list of the ECLSS quality records, their locations, their revision, and their custodians.	This OI.	As defined in NPG 1441.1 Records Retention Schedules.	Located in a file cabinet in Room 111A of Bldg. 4755.
Calibration Data	Contains the instrument type, discrete calibration number, calibration due date, project or test used on, and test dates.		As defined in the Test Team Master List.	Storage location Calibration Data Base.

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Discrepancy Reports	Used to record and document any anomalies which occurred.		As defined in the Test Team Master List.	Upon resolution of anomaly the data is transferred to QS10
Facility Activation Procedures	Procedures used to document all activities and equipment needed to activate the facility.		As defined in the Test Team Master List.	Storage location defined in the Test Team Master List. Maintained by the test facility or by the appropriate contractor.
Facility Operating Procedures	Procedures used to document all activities and equipment needed to operate the facility.		As defined in the Test Team Master List.	Storage location defined in the Test Team Master List. Maintained by the test facility or by the appropriate contractor.
Logbooks	Used by facility personnel to record all required measurements and events.		As defined in the Test Team Master List.	Storage location defined in the Test Team Master List.
On the Job Training Records	Contains records of the machine shop training received and the proficiency of employees hired or transferred in after 9/1/1997.		As defined in the Test Team Master List.	Maintained by the Team Lead.
Sample Analysis Data	Consists of all sensor and sample data.	FPD-OI-FD21.5	As defined in the Test Team Master List.	Maintained by the customer of the Design Team in FEDS.
Standard Operating Procedures	Procedures used to document all activities and equipment needed for the normal operation of the facility.		As defined in the Test Team Master List.	Storage location defined in the Test Team Master List. Maintained by the test facility or by the appropriate contractor.

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Test and Checkout Procedures	Procedures used to document all activities and equipment needed to perform testing and checkout of the facility.		As defined in the Test Team Master List.	Storage location defined in the Test Team Master List. Maintained by the test facility or by the appropriate contractor.
Test Data			As defined in the Test Team Master List.	Maintained by the Systems Test Group (SD43) in PACRATS .
Test Discrepancy Reports	Used to record and flight hardware test anomalies.	MPG 8730.3, Control of Nonconforming Product.	As defined in the Test Team Master List.	Upon resolution of anomaly the data is transferred to QS10.
Test Preparation Sheets	Required to perform configuration changes or other work not covered by another approved procedure or Discrepancy Record.		As defined in the Test Team Master List.	Storage location defined in the Test Team Master List. For Flight Hardware QS10

9.0 TOOLS, EQUIPMENT, and MATERIALS

9.1 Equipment Calibration

All Category 1 and 2 equipment and instrumentation used to obtain acceptance parameter data is calibrated by the MSFC Calibration Laboratory. All category 4 & 5 equipment is calibrated in house.

All acceptance data collection instrumentation utilized on a test is recorded in the ECLSS calibration database. This database documents the instrument type, discrete calibration number (assigned by the MSFC Calibration Facility), calibration due date, project or test used on, and dates.

9.2 Calibration Recall

Upon the receipt of an out of calibration instrument notification from the MSFC calibration Laboratory, the ECLSS Equipment Calibration Manager shall determine using the ECLSS calibration data base all tests in which the faulty instrument was used. He will then contact the appropriate customers by memo or e-mail and inform them of the possibility of erroneous data, relative to their work request. Any follow-up actions will be in response to the customer's request. Out of Calibration Disposition Tags will be recorded in the Calibration database. All software that is used to collect data during testing of systems or sub-systems will be verified functioning properly and accurately by steps in the test procedure for the system or sub-system.

9.3 Chemistry Lab Testing

ECLSS has an in-house Chemistry Laboratory whose function is to provide analysis of processed test material. All analyses will be conducted per ECLSS Test Team procedures. Appropriate Personal Protective Equipment (PPE) shall be worn during all chemical testing. The PPE will be defined in the

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Procedures. The results of this analysis are made available to the Customer. These analysis results are not used as verification for Acceptance Testing of Flight Hardware. Chemistry Lab requirements for Flight Hardware Acceptance Test verification are sent to a certified laboratory to provide this service.

10.0 PERSONNEL QUALIFICATION, TRAINING, and CERTIFICATION

All employees will be trained in accordance with FPD-OI-21.1 as applicable.

All required Test Team personnel should be certified for the handling of Program Critical Hardware (PCH), PCH handling via crane operation, and non-PCH handling via crane operation. This certification will be conducted per NASA Safety Training Center (NSTC) Course 205.

The only On the Job Training (OJT) required at the ECLSS facility is the machine shop equipment. This is only required of employees hired or transferred after September 1, 1997. Machine Shop personnel must be skilled at blue print reading, math, and have mechanical work experience to effectively learn the operation of the machine shop equipment. The trainee is taught the basic concepts of welding, sawing, clamping, cutting, grinding, drilling, sanding, milling, rotation speeds of cutting tools, and equipment safety. The technician or engineer will be classified as trained on a machine when the trainee has demonstrated the ability to perform a particular operation on a machine. The technician or engineer will learn how to operate each machine and the sequence of events required to complete an operation successfully and safely. The Test team Leader will make evaluation of the trainee's performance. OJT status will be recorded in the ECLSS *Group Test Team* training records.

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11.0 FLOW DIAGRAM

The following charts graphically depict the processes described in Section 4.0.

FIGURE 1: Test Planning Process

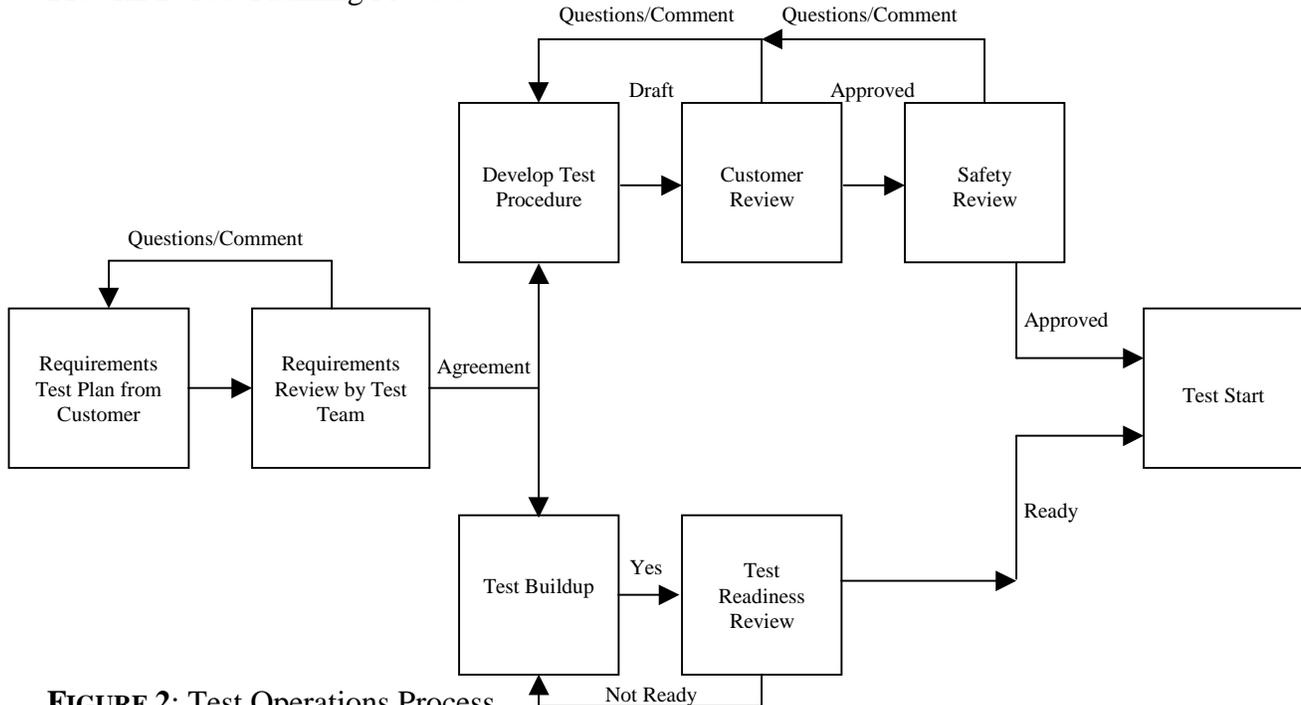
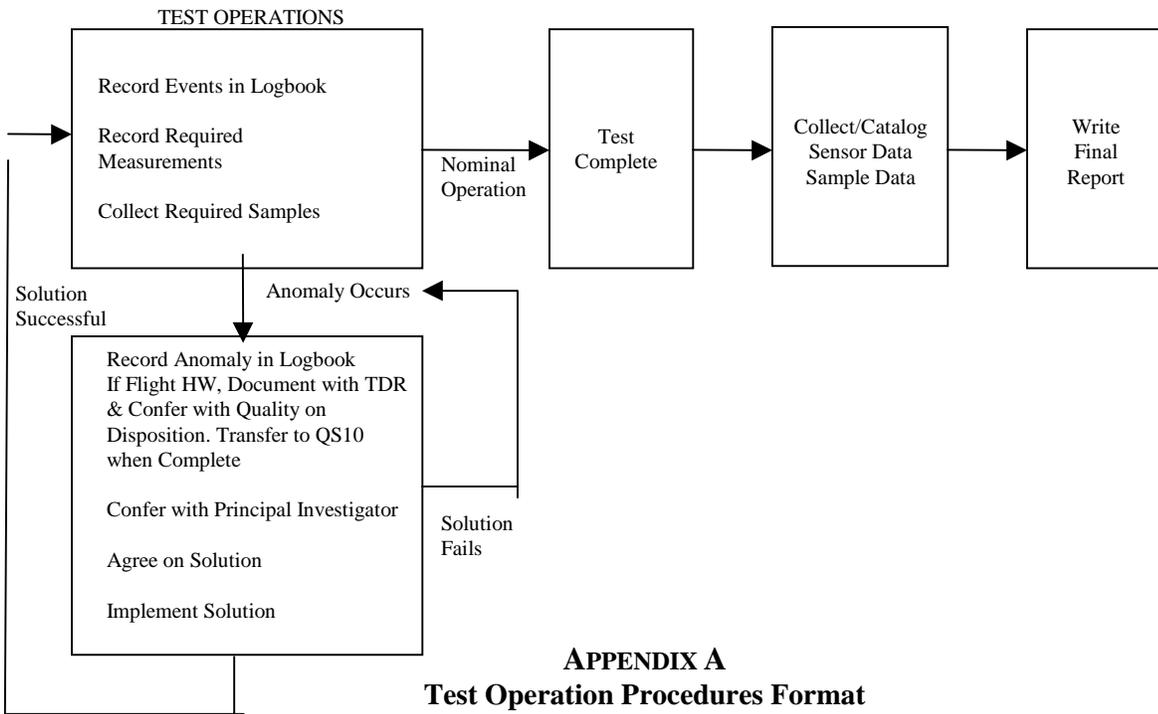


FIGURE 2: Test Operations Process



APPENDIX A Test Operation Procedures Format

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(FAP, FOP, SOP, and TCP)

A.1 Procedure Format Example

Covers

All Procedures will utilize MSFC Form 454 as the cover.

Revision Record

Approvals

The Approval Sheet shall contain the procedure title, number, and revision letter if applicable. Spaces shall be provided for each required signature with names, titles, and organization identified.

1.0 INTRODUCTION

1.1 Purpose

State the specific purpose/objective of the procedure.

1.2 Scope

Define the scope of the procedure and its applicability.

1.3 System Description

Define the system under test in general terms.

1.4 General

Define the responsibility for coordination and enforcement of the document activities.

2.0 APPLICABLE DOCUMENTS

List only the number, title, and dates of documents and drawings which are specifically applicable to the activities covered by the procedural document.

3.0 SAFETY

List the safety procedures and policies applicable to the test being conducted. Refer to all emergency operations. List all specific safety requirements, hazards, applicable emergency telephone numbers, and hazard control if the test represents a safety critical operation.

4.0 ACTIVATION PREPARATIONS

List the required functions to be completed prior to test initiation, such as other tests or operations completed, identification of measuring programs, test equipment available and operating, material available, required sequence of events necessary to conduct of the test. A space shall be provided to "check-off" of each item on the list.

5.0 PROCEDURE

Define the step-by-step sequence/actions required to perform the test or operation (see Safety above). Each step in the procedure sequence will be provided with space to "check-off". Caution and Warning Notes will be conspicuously inserted within the procedure prior to any functional steps which may directly cause damage or injury (if improperly performed). Procedure content should

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include equipment lists, set up figures, calibration requirements, with space provided to record equipment serial number and calibration date.

6.0 EMERGENCY ACTIONS

Procedures shall describe critical actions and responsibilities to be taken during emergency situations.

7.0 POST TEST VERIFICATION

Upon completion of the test or operation, the procedure shall specify all processes required to shutdown the test and operational systems. A post-test verification statement or sheet will be completed for each test. The following are examples of post-test verification statements.

"The [facility/test] [Procedure Title, Procedure Number] has been successfully performed and all related problems/anomalies have been resolved."

"The undersigned hereby certify that the [system/subsystem] is activated

(Name/Organization)
Systems Test Engineer

(Name/Organization)
(Quality Organization) [if required]

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APPENDIX B Test Preparation Sheets (TPS)

B.1 TPS Preparation

The TPS will be prepared so that all copies are legible and the white original is reproducible. Either the multi-sheet paper form or the electronic version is acceptable. Complete the TPS as follows.

<u>Block</u>	<u>Entry Explanation</u>
1	Check Type A, if configuration change. If Type A is checked, include “update documentation step” prior to last item. Check Type B, if non-configuration change (work authorization or test operation).
2	TPS number from the TPS Log.
3	Not Used
4	Not Used
5	Internal tracking identifier code(s).
6	TPS Modification sheet alpha letter to be assigned.
7	Page Number (1 of X).
8	Concise, descriptive short title for TPS.
9	Safety - Check YES if hazardous operation requiring safety review. This should also include if Lockout/Tagout procedures are required.
10	Limited Life - Indicate if equipment to be operated has a requirement for Time and Cycle record.
11	Experiment/Model Number - Enter experiment name.
12	Enter date TPS was prepared.
13	Enter date TPS needs to be completed.
14	Specify requirement for weighing parts.
15	Identify all drawings, procedures, documents (including revision level) affected by TPS.

**CHECK THE MASTER LIST
VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE**

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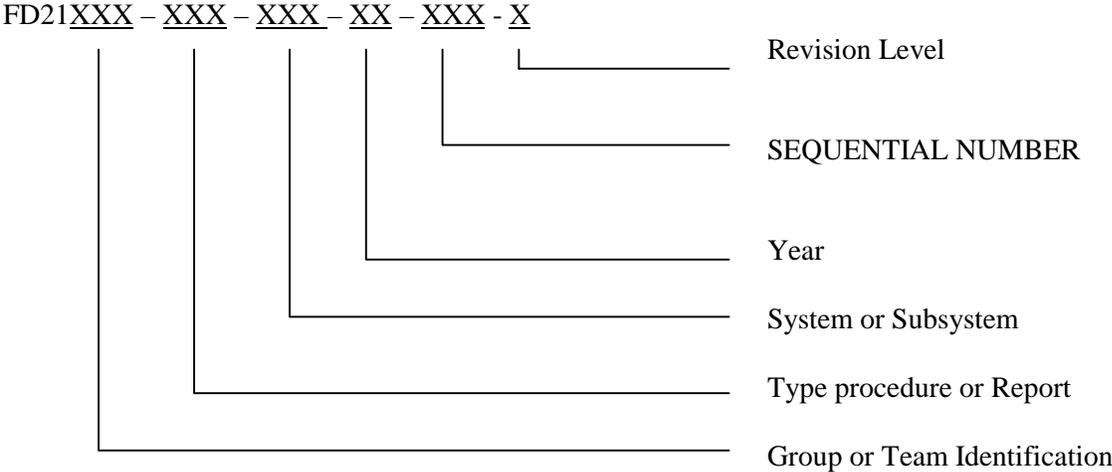
- 16 Material - check YES if change to required material or design that requires concurrence of material engineer or stress engineer. Add the word Stress after Material (Material/Stress) and circle material or stress or both as appropriate.
- 17 Enter originating organization code/name.
- 18 System affected by TPS.
- 19 A concise narrative description of reason why work is required. Identify any constraints to testing. Example: Installation of modified power module-Ref. CCBD NO. Constraints to integrated test sequence No. 20/21 Description of work to be performed, list sequentially. Instructions to be sufficiently detailed to be thoroughly understood by engineering, performing technicians, and inspection personnel. For a Type A TPS, the next-to-last step shall denote the required documentation changes.
- 22 Performing technician annotates by initialing after completion of each step.
- 23 Stamped and dated by Contractor Quality (when Contractor performed).
- 24 NASA Quality stamps and dates.
- 25 List any special instruction, warnings, or constraints. Lockout/Tagout requirements should be identified in this block. TPS's which are Non-Quality Sensitive should be designated as such in this block.
- 26 Name of person preparing TPS.
- 27 Telephone number of person preparing TPS.
- 28 For Non-Quality Sensitive TPS, final acceptance is required by the Test Conductor. For Quality Sensitive TPS, final acceptance is required by Quality Assurance.
- 29 Date of final acceptance.
- 30/31 Approvals required (see Section 4.3.2.5).

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APPENDIX C

IDENTIFICATION NUMBER FORMAT



Group or Team Identification

Design Team	DES
Development Team	DEV
ECLSS Group	GRP
Test Team	TST
Systems Team	SYS

Type Procedure or Report

Facility Activation Procedure	FAP
Facility Operating Procedure	FOP
Report	RPT
Standard Operating Procedure	SOP
Test and Checkout Procedure	TCP
Test Preparation Sheets	TPS

System or Subsystem

Carbon Dioxide Removal Assembly	CDR
Internal Thermal Control System	ITC
Major Constituent Analyzer	MCA

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Oxygen Generator Assembly	OGA
Portable Fan Assembly	PFA
Temperature Humidity Control	THC
Trace Containment Control System	TCC
Urine Processor Assembly	UPA
Urine Processor Flight Experiment	UPE
Volatile Removal Assembly	VRA
Water Processor	WPA

Year

Two year designation 99

Sequential Number

Sequential Record Number 001

Revision Level

BASELINE

Revisions

BLANK

A, B, C, etc.

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