



**W. W. Hansen Experimental Physics Laboratory**

**STANFORD UNIVERSITY  
STANFORD, CALIFORNIA 94305 - 4085**

**Gravity Probe B Relativity Mission**

**Probe-C Assembly/SMD Integration (& Test) Readiness Review Completion Certificate**

**GP-B P0483**

**May 11, 1999**

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**Prepared by: M.R. (Mark) Anderson      Date**  
**Systems Engineer**

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**Approved by: Mike Taber                      Date**  
**GP-B Payload Systems Test Manager**

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**Approved by: Dave Murray                  Date**  
**GP-B Cryogenic Test Engineer**

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**Approved by: John Janicki                  Date**  
**Safety**

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**Approved by: Dorrene Ross                 Date**  
**Quality Assurance**

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**Approved by: Bob Schultz                  Date**  
**Chief Systems Engineer**

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**Approved by: S. Buchman                  Date**  
**Hardware Manager**

## **Probe-C Assembly / SMD Integration (& Test) Readiness Review**

Date & Time: May 11, 1999, 1:00 to 3:00 P.M.

Location: GP-B conference room

### Purpose:

To ensure that the test article hardware, test facility, ground support personnel, and test procedures are ready for testing, data acquisition, reduction, evaluation, and control.

### Scope:

The Probe-C Assembly / SMD Integration Test Readiness Review (TRR) will encompass all activities associated with the insertion of the Probe-C Assembly into the Science Mission Dewar. This shall include probe insertion, lead bag temperature monitoring during probe insertion, Belleville pre-load measurement testing and refilling of the main tank.

### Agenda:

- See attachment A

### Review Team:

Sasha Buchman	Hardware Manager
Bob Schultz	Chief Systems Engineer
Mike Taber	GP-B Payload Systems Test Manager
Dave Murray	GP-B Cryogenic Test Engineer
Dorrene Ross	Quality Assurance
M.R. (Mark) Anderson	Systems Engineer
John Janicki	Safety

### TRR check list:

- Confirm that all specifications and interface control documents are approved and have proper traceability.
- Confirm that test procedures cover requirement verification matrix and have been approved.
- Confirm that the hardware configuration as tested vs. flight configuration is documented.
- Confirm that the test personnel have been trained adequately.
- Confirm that sufficient and detailed resources are allocated to the test effort and test equipment has been appropriately calibrated.
- Ensure the customer, witnessing agents, test personnel, quality assurance, and support personnel understand the objective of the test and the parameters that are critical for successful operation.

- Confirm that test support software is adequate, pertinent, and verified (validated for intended use).

**Attachments:**

- A. Agenda
- B. Hardware List
- C. Dewar Status (4 pages)
- D. Discrepancy Summary (3 pages)
- E. Probe-C Assembly Status
- F. Facility and GSE Status (2 pages)
- G. Safety Preparations – Hardware (2 pages)
- H. Test Operations Flow Diagrams
- I. Schedule and Manning Requirements
- J. Personnel (2 pages)
- K. QA and Safety – Operations (4 pages)
- L. Training
- M. Procedure Status (2 pages)
- N. Test Support Software Status
- O. Requirements Traceability Matrix
- P. Action Item Closure List

**A. Agenda**

**PROBE-C / SMD INTEGRATION AND TEST READINESS REVIEW (TRR)**

May 11, 1999      GP-B Conference Room

**Introduction (M. Taber)**

**Hardware (M. Taber)**

- **Hardware to be integrated**
- **Dewar Status / Probe Status**
- **Discrepancy Summary**
- **Facility and GSE Status**
- **Facility Safety**

**Operations and Personnel (D. Murray)**

- **Operations Flowcharts**
- **Schedule and Manning Requirements**
- **Personnel**
- **Quality Assurance and Safety**
- **Training**
- **Procedure Status**
- **Software Status**

**Requirements Traceability (M.R. Anderson)**

## B. Hardware List

### HARDWARE TO BE INTEGRATED

- **PROBE-C ASSEMBLY**
  - Probe-C + SIA
- **SCIENCE MISSION DEWAR**
  - As delivered from Lockheed + lead shield and retainer
- **HARDWARE KIT**
  - SMD top plate / Probe top hat o-ring seal (available)
  - 30 X 1/4-28 Ti bolts (available)
  - 30 X 1/4" BeCu bellevilles (available)
  - 30 X phBr flat washers (in procurement)

### C. Dewar Status

## DEWAR STATUS (1)

- **SMD CONFIGURATION: DEVIATIONS FROM FLIGHT CONFIGURATION**
  - The SMD is installed in its transportation and test fixture
  - Double relief valves are installed in place of the fill line burst disk due to occasional pressure spiking during external fill operations
  - Burst disk will be substituted at appropriate times (thermal-vac, acoustic tests)
  - Use of burst disk for flight needs review since BD could possibly blow during GT refill on launch vehicle and is probably not replaceable once fairing is installed
  - Emergency vent line deflectors are installed over the four burst disk ports and an oxygen collection pan is installed on the floor below these.
  - Ion pump magnet is installed
  - The Airlock Support Plate is installed on the SMD during integration and subsequently removed
  - GSE cabling is connected between SMD and Electrical Module (P/N 5833812) and Data Acquisition System (P/N 5833811).
  - GSE cabling will be installed between Probe and Lab DAS to monitor key parameters (SDT temperatures, pressure) during Probe insertion

## DEWAR STATUS (2)

- **SMD CONFIGURATION: DEVIATIONS FROM FLIGHT CONFIGURATION (CONT'D)**
  - **Guard Tank vent is connected to the Gas Module (P/N 5833813) with a vacuum insulated line**
    - **GT vent extension plumbing will be permanently installed when available**
  - **Main Tank vent is connected to the Gas Module with a vacuum insulated line (P/N 5833806)**
    - **Ground MT vent line will be removed after final MT tophoff and conditioning at Vandenberg and replaced with a cap assembly**
  - **During insertion Well contains liquid helium; Well will be evacuated prior to completion of integration**
    - **Well pyrovalve not installed**
    - **Non-flight Well access operator and manifold will remain installed (on Probe) to allow Well to be repumped as necessary**
  - **The Vacuum shell pump out port at SV-6 may be connected to the Vacuum Module (P/N 5833816) via a 2-in valve operator and pumping line.**
  - **RAV-4A -4B Main Tank vent manifold not yet installed**

## DEWAR STATUS (3)

- **SMD CONFIGURATION: DEVIATIONS FROM FLIGHT CONFIGURATION (CONT'D)**
  - **Non-flight cap assembly is installed at fill bayonet (B1)**
  - **Dewar top plate heaters connected to GSE**
  - - **Will be disconnected prior to final FEE closure**



## DEWAR STATUS (4)

### PRE GTU-2 DEWAR DISCREPANCY SUMMARY:

Ref.	Description	Disposition	Status
LMMS / R17724	Superfluid Well Leak	use as is	Closed
LMMS / R13082	Axial Lok (#1 high running torque, not functional)	use remaining Axial Loks (see DR #76)	Closed
LMMS / R13236	Flow Meter (cal. Questionable)	<b>retest at Stanford</b> (not completed)	<b>Open</b>
LMMS / R13235	Top Plate to Vacuum Shell Water Trap	corrected with epoxy seal	Closed
LMMS / R13234	Vent Valve Icing	heaters installed to reduce problem	Closed
LMMS / R13061	Instrumentation (minor defects)	use as is	Closed
SU / 50	Tank vent valve (SV-9) spring rusted	replaced springs in SV-9, 13 with CRES	Closed
SU / 52	Leak into internal fill line through cold valve	Leak substantially reduced after cycling valve to well (RAV-5); see DR #186	Closed
SU / 58	Through leak in external fill valve (SV-13) after fill	use as is; re-torque valve after warm-up	Closed
SU / 60	Failure to remove SMD Lead Bag #3	discrepancy corrected	Closed
SU / 63	Deposition of aluminized mylar debris from 10" r baffle assembly at station 200 surface	debris completely removed; remaining stripped from baffle assembly	Closed
SU / 64	Pressure spiking in internal fill line during external rations; has potential to blow flight burst disk	continue use of relief valve; flight burst stalled only when necessary	Closed

## D. Discrepancy Summary

### DICREPANCY SUMMARY (1)

- POST GTU-2 DEWAR DISCREPANCY SUMMARY:**

Ref.	Description	Disposition	Status
SU / 76	Excessive running torque on Axial Lok #2	Abandon Axial Loks; functionality assumed by BPS mechanisms added to Probe-C	Closed
SU / 83	Partial blockage of GT vent line during disconnect from GM in GTU-2	Blockage removed; leaking hardware located and removed (see #226)	Closed
SU / 85	Failure of RAV-2 microswitches to indicate closure	monitor for leakage; use as-is	Closed
SU / 105	Leak into internal fill line thru RAV-1 or RAV-5	see DR #186	Closed
SU / 126	Top plate water seal debond	Replace 2115 seal with blue death	Closed
SU / 186	RAV-5 leak (diagnosis possible because of Well evacuation during Probe-C fit check)	Very minor impact. Discontinue use of RAV-5 and assure future access to well pumpout port.	Closed
SU / 197	Excessive dc magnetic field in Well (1.6 $\mu$ gauss at gyro 4 position; S/B 0.1 $\mu$ gauss)	Determined to likely yield satisfactory trapped flux in gyro rotor ( $\leq 3 \mu$ gauss); Will be verified during payload test. Spec. revised by PCB 362.	Draft
SU / 214	Insufficient longitudinal magnetic ac attenuation by combined dewar shields (S/B $2 \times 10^{-11}$ , measured $4 \times 10^{-9}$ )	Spec. revised by PCB 362. Determined to likely meet overall attenuation req'ment of $2 \times 10^{-12}$ when combined with SIA shielding factors. Will be verified during payload test.	Draft
SU / 226	Blockage of GT vent line during disconnect of GM for leak check of GM	Blockage removed; eliminated root cause (bayonet interference) and verified absence of leaks by complete RGA leak check. GT diff. pressure gauge installed.	Closed

## DICREPANCY SUMMARY (2)

- **POST GTU-2 DEWAR DISCREPANCY SUMMARY (CONT'D):**

<b>Ref.</b>	<b>Description</b>	<b>Disposition</b>	<b>Status</b>
SU / 247	Blockage of Guard Tank vent line	Blockage removed; GT external vent plumbing rechecked for leaks: none found. Blockage presumed to be due to residual air left over from previous event (DR #226).	Ready for Review
SU / 248	O-ring fragment missing and presumed in Axial Lok tunnel #2 or #3	Axial Loks no longer used; fragment cannot escape AL region. Use as is.	Ready for Review

## DICREPANCY SUMMARY (3)

- DEWAR / PROBE-C INTERFACE DISCREPANCY SUMMARY**

<b>Ref.</b>	<b>Description</b>	<b>Disposition</b>	<b>Status</b>
SU / 144	Misclocking of Probe-C during Probe-C fitcheck	Integration GSE corrected; Probe-C misclocking acceptable. Final fitcheck insertion accomplished successful integration.	Closed
SU / 151	Inability to bolt down Probe-C during fitcheck	Modified final bolt-down procedure to maintain positive clocking control.	Closed
SU / 157	Shedding of aluminized kapton tape from probe into SMD Well	All aluminized kapton tape on Probe-C baffles will be removed prior to integration with SMD. Tape at bottom of Well magnetically acceptable	Closed
SU / 160	Leak at Probe-C tophat / SMD top plate seal	Cause of leak not known; possible contamination. Seal changed from C-seal to fluorosilicone o-ring	Closed

- WITH THE FUNCTIONAL REPLACEMENT OF THE AXIAL LOKS BY THE BPS SYSTEM, NO DISCREPANCY SIGNIFICANTLY DEGRADES THE FUNCTIONALITY OF THE SMD**

**E. Probe-C Assembly Status**

## **PROBE-C ASSEMBLY STATUS**

- **INTEGRATION OF PROBE-C WITH SIA IS IN PROGRESS**
- **Details of Probe-C Assembly (including discrepancies) will be covered In Probe-Assembly Acceptance Review**

## FACILITY AND GSE STATUS

- **GSE NEEDED FOR PROBE INSERTION HAS BEEN VERIFIED BY SUCCESSFUL FITCHECK OF PROBE-C IN THE SMD**
  - **Data Acquisition Systems (SMD, Lab DAS, and BPS)**
  - **Instrumentation cabling**
    - **Cable to Probe I6 is available (from Probe-C fit check)**
    - **Cables to I3 and I5 (to monitor QB SDTs) need to be fabricated**
  - **HEPA downflow booth**
  - **Probe Genie lifter**
  - **Assembly stand**
  - **Probe adjustment hardware (BPS, load stops, thermal shoes)**
  - **Airlock assembly**
  - **Probe alignment/centering/clocking adjustment and verification hardware**
  - **Probe/Airlock adapter hardware**
  - **Well cover assembly**
  - **Payload-server for archiving software and data**

## FACILITY AND GSE STATUS (2)

- **FACILITY STATUS**
  - **Unchanged since GTU-2 and Probe-C fit check**

## SAFETY PREPARATIONS (1)

- **LIFTING SAFETY**
  - **Equipment upgrade and inspection (as required by Cal OSHA)**
    - **Quarterly inspections by Morris Material Handling**
    - **Load tested to 125% capacity by Morris Material Handling every four years or after significant modification or repair**
  - **Adherence to safe lifting practices**
    - **Checkout & inspection must be performed within previous seven days**
    - **Hard hats used during lifting operations & with personnel overhead**
    - **No loads lifted over personnel**
    - **No loose objects on lifted loads**
    - **Avoidance of pinch-point hazards**
    - **Lifting equipment conservatively rated and inspected before use**



## SAFETY PREPARATIONS (2)

- **CRYOGENICS OPERATIONS SAFETY**

- **Safe plumbing design (rupture disks or relief valves on captured volumes)**
- **GHe vented to outside through low-pressure relief valves (pressure regulator in case of airlock)**
- **Emergency SMD vent safety issues**
  - **Loss of vacuum could cause rupture of main tank burst disk and a substantial vent of cold He gas into the lab with potential for O<sub>2</sub> depletion**
    - > Facility O<sub>2</sub> monitor is in continuous use with alarm threshold set at 19.5%
    - > Personnel will be instructed to safely exit the lab in the event of an emergency vent
    - > An Emergency Escape Breathing Apparatus (EEBA) will be available for anyone working on the upper scaffold platform who may need extra time to egress
    - > Any persons working on the upper scaffold platform will be EEBA-qualified
  - **Cryogenic hazard**

90° elbow deflectors have been installed on external burst disks to prevent the exposure of personnel to cold gas flow and to prevent accidental damage to the BD diaphragms

H. Test Operations Flow Diagrams

TEST FLOW CHART  
FOR  
PREPARATION FOR PROBE/AIRLOCK INTEGRATION GP-B P0133

TM 78  
Load Probe onto  
Genie Lift

TM 05  
Install  
Probe Flange

TM 79  
Prepare  
Assembly Stand

TM 80  
Install Probe to  
Piston

TM 36  
Leak Check and  
Backfill Probe

TM 86  
Install Cables/  
Balance  
Probe/Piston

TM 34  
BPS/Thermal  
Shoe Setting

TM 230  
Thermal Shoe  
Alignment

End of Preparation for Integration  
Proceed to  
Airlock/Dewar Integration GP-B P0134

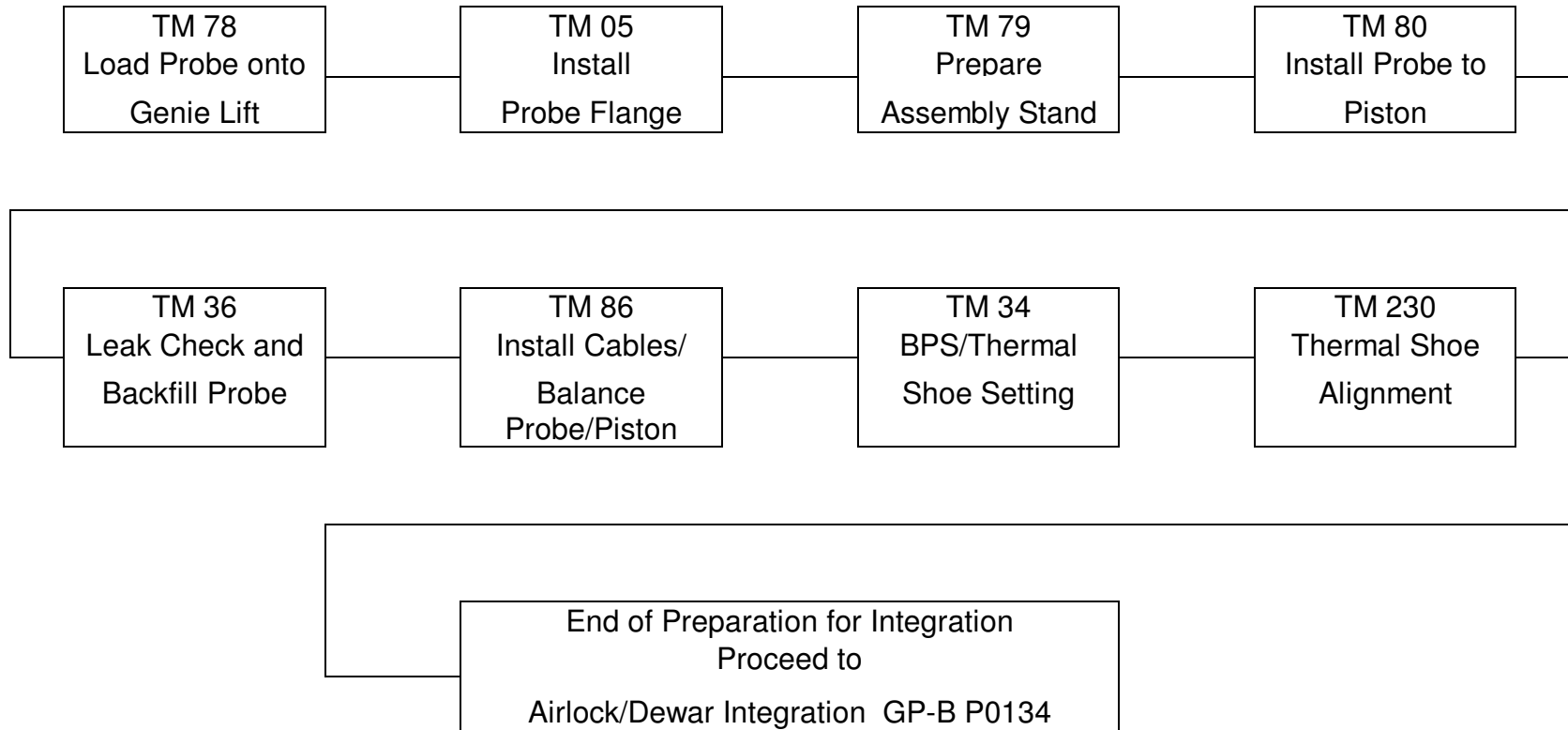


Fig. 1 TEST FLOW CHART  
FOR  
AIRLOCK/DEWAR INTEGRATION - GP-B P0134

TM 87  
Integrate Piston/Pr  
with Airlock

TM 81  
Install A/L  
Support Plate

TM54  
Install Glove Box  
Platform

TM 67  
Remove  
Baffles (Case 3)

TM 57  
Ice Inspection  
and Removal

TM 83  
Install  
Well Cover

TM 40  
Install  
Glove Box

TM41  
Remove  
Glove Box

TM55  
Remove Glove  
Box Platform

TM 88  
Install Airlock/Pr  
onto Dewar

End Airlock/Dewar  
Integration P0134  
Go to SU/GP-B



Indicates TM  
Called from  
within previous

TEST FLOW CHART  
FOR  
PROBE INSERTION INTO SMD - P0135

TM 90  
Align and Center  
Probe

TM 91  
Purge Airlock  
with Helium Gas

TM92  
Insert Probe  
into Dewar

SU P210  
Internal Well  
Fill

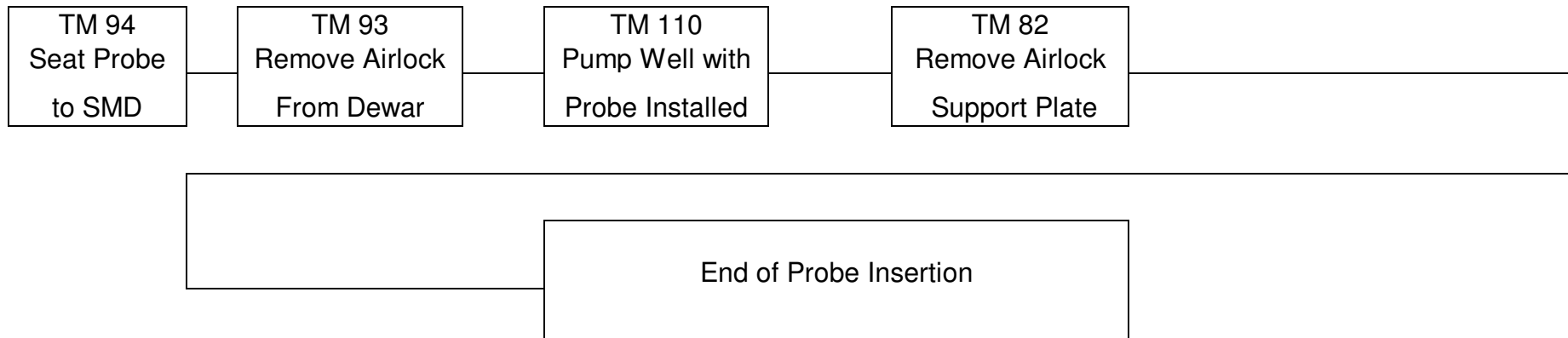
End of Probe Insertion



Indicates TM called from within preceding non-shaded TM

TEST FLOW CHART  
FOR  
PROBE-B INSERTION INTO DEWAR - P0140

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I. Schedule and Manning Requirements

## INSERTION SCHEDULE AND MANNING (PRELIMINARY)

	Monday	Tuesday Day	Tuesday Night	Wednesday Day	Wednesday Night	Thursday Day	Friday Day
TASKS	>Mate Probe/ Piston w Airlock >Final Instr. C/O	>Prep Dewar - Remove Baffles - Ice Inspect - Install Well Cover with deployable baffles >Airlock onto Dewar >Align & Center Probe >Begin Purge	>Continue Purge of Airlock	>Probe Insertion up to entry to neck tube	>Maintain Well level under Moderate boil- off conditions	>Complete Insertion using intermediate seal-off flange  >Establish Well Vent	>Remove I/M flange and seat Probe to Dewar  >Remove Airlock from Dewar
PER- SONNEL	Taber Murray Frank Thrasher Welsh	Taber Murray Frank Thrasher Welsh RSE	No staffing required	Taber Murray Frank Thrasher Welsh RSE	Read Tech	Taber Murray Thrasher Welsh RSE	Taber Murray Thrasher Welsh Shaul
BACKUP	Warren Tech	Warren Tech	Read Tech	Warren Tech	Tech	Frank Tech	Frank Tech

Preliminary activities:

- Ready-to-Integrate review
- Verify all Kits up-to-date
- Meeting with workers

## PERSONNEL – 1

The Personnel requirements for the performance of the two Probe insertion procedures, P0134, Airlock/Dewar Integration and P0135, Probe Insertion into Dewar are:

Testing requires a Test Director and crew of from 1 to 3 Cryogenic Test Engineer (CTE) and one Responsible Safety Engineer (RSE).

The one exception to this manning scheme is the Task Module 92 in P0135, Lower Probe into Dewar, for which the required manning is Test Director and three CTE's and the Safety Engineer.

The Safety Engineer attendance for this Task Module 92 is required: his attendance at other portions of the procedures is at his discretion.

RSE WILL COVER ALL TASKS WHICH ENTAIL LIFTING OR MOVING FLIGHT HARDWARE - PREVIOUSLY WAS FOR CRANE OPS ONLY

The test director is the designated signer for the **witnessed by** signoffs located at the end of each procedure/task module. The CTE who performs the operation is to sign the **completed by** signoff.

THE QA WILL BE NOTIFIED PRIOR TO START OF EACH TASK MODULE AND WILL SIGN-OFF EACH OF THESE COMPLETIONS

## PERSONNEL - 2

At present (May, 1999) the personnel who qualify for the above categories are:

Test Director:

Mike Taber                      Stanford University

Dave Murray                      Navastro

Cryogenic Test Engineer:

Tom Walsh                      Lockheed

Dave Frank                      Lockheed

Dean Read                      Lockheed

Bill Thrasher                      Lockheed

Chuck Warren                      Stanford University

Mike Taber                      Stanford University

Dave Murray                      Navastro

Paul Ayres                      Lockheed

Don Harshman                      Lockheed

Responsible Safety Engineer:

John Janicki

Quality Assurance:

Russ Leese

Dorrene Ross



## SAFETY PROVISIONS - 1

### GENIE OPERATIONS

**Work at the top of the Airlock after it has been integrated with the SMD requires the use of Genie personnel lifts. The following steps shall be used whenever the Genie lifts are employed.**

**Before raising the Genie ensure the four outriggers have been installed and locked and the leveling jacks have been adjusted to firmly touch the floor and the base is level.**

**Do not adjust outriggers or reposition the machine while the platform is raised.**

**No work shall be performed by leaning out over the Genie rails.**

**No personnel safety harnesses/restraints are required.**

## SAFETY PROVISIONS - 2

### CRANE OPERATIONS

CRANE WILL BE UNDERGO TEST RUN THE FIRST TIME IT IS USED IN ANY GIVEN WEEL

THIS OPERATION IS CALLED OUT AT EACH CRANE USAGE POINT IN PROCEDURES

ALL LIFTING CONFIGURATIONS AND LIFTING HARDWARE AND HARDWARE PART NUMBERS ARE EXPLICITLY CALLED OUT IN THE PROCEDURE STEP

M. TABER AND CHRIS GRAY ARE LICENSED TO OPERATE THE OVERHEAD CRANE AND PERFORM ALL CRANE OPERATIONS

## SAFETY PROVISIONS - 3

### **LIQUID HELIUM DUMP**

**Certain failure modes of the SMD can lead to a rapid dump of liquid/gaseous helium into the room. The following precautions will minimize possibly injury to personnel.**

**NON-FLIGHT DIVERTERS (90-deg elbows) are attached to the outboard flange of the two Main Tank and two Vacuum Enclosure burst disk assemblies. These diverters are positioned to direct the potential helium flow to the floor (or other designated safe dump area).**

**DRIP PANS are placed under the diverters to prevent liquid oxygen collection on the floor.**

## SAFETY PROVISIONS - 4

### IN THE CASE OF A FAST HELIUM DUMP

The oxygen concentration may be lowered below a safe level (19.5%). In this case an oxygen concentration sensor mounted on the west wall will sound an alarm. All personnel shall immediately exit the FIST Operations room.

### ALSO

Only two persons are to work at the top of the Airlock at a time.

One of the two Genie lifts will be left at the top of the scaffolding at all times and used only if a need for rapid exiting of person el working top side. This would be the occasion if a fast liquid helium dump whether or not the oxygen concentration alarm has started or not.

Those working at the top of the Airlock shall each have ready access to an EEBA (Emergency Evacuation Breathing Apparatus) to be used for evacuating the room in case of a sudden dump of the helium cryogen and resultant depletion in oxygen concentration in the room.

Those working at the top of the Airlock shall have been certified trained to use an EEBA and been medically OK'd to use an EEBA.

## L. Training

### TRAINING - 1

At the start of this procedure and before any test procedures have been initiated an operations review meeting will be held with all personnel in attendance who have been assigned or who could be assigned (on a replacement basis) responsibilities. This meeting will cover the following:

- 1) Day-by-day schedule of insertion operations by Task Module.
- 2) Manning assignments for all shifts.
- 3) Crane main breaker switch location and operation
- 4) Review the ground rules for Genie personnel lift operations per Paragraph 3.3
- 5) Review the ground rules for operations at top of Airlock, use of EEBA's, etc.
- 6) Open discussion to cover all suggestions/concerns of test
- 7) Exit procedures in case of Dewar emergency vent

## M. Procedure Status

# PROBE-C / SMD INTEGRATION PROCEDURES

Document	Revision Date	Author	Title	Written	In Database	Approval Status
P-0133A		Dave Murray	Prep for Probe-C / Airlock Integration	✓	✓	Complete
P-0134C		Dave Murray	Airlock / SMD Integration	✓	✓	Complete
P-0135C		Dave Murray	Probe-C Insertion into Dewar (SMD)	✓	✓	Complete
P-0140A		Dave Murray	Prepare for Probe Tests	✓	✓	Complete
P-0141		Dave Murray	FIST Emergency Procedures	✓	✓	Complete
P-0210D		Dave Murray	Internal Well Transfer	✓	✓	Complete
P-0207C		Dave Murray	Main Tank Fill NBP Helium	✓	✓	Complete

Present procedures have incorporated modifications for use of BPS and Well Cover with deployable baffles.

## PROCEDURE STATUS – 2

### From P 0135 **Probe Insertion into SMD** (*typical procedure format...*)

#### Operations

.1 Test Director for this Procedure is: \_\_ .

Starting Date & Time: \_ .

.2 Verify that the Critical Operations Review meeting of Para. 4.3 has been completed and that all applicable personnel have attended or been briefed of the results.

.3 VERIFY RESPONSIBLE SAEFTY AND QUALITY ENGINEERS HAVE BEEN NOTIFIED AT:

TIME/DATE \_\_\_\_\_

.4 Verify Completion of procedure P0134 Airlock/Dewar Integration

.5 Verify that a 500 liter supply of liquid helium is on hand.

.6 Perform, in sequence, the following Task Modules:

#### **Task Modules for Probe Insertion**

<b>Para.</b>	<b>Task Module</b>	<b>Op No.</b>	<b>Started</b>	<b>Completed</b>
5.3.1	Task Module 90: Align & Center Probe			
5.3.2	Task Module 91: Purge Airlock for Insertion			
5.3.3	P-0210 Internal Well Fill (continuous)			
5.3.4	Task Module 92: Lower Probe into Dewar			
5.3.5	Task Module 93: Remove Airlock from Dewar w/o Probe			

## DATA ACQUISITION AND SOFTWARE

DEWAR DAS WILL BE USED TO MONITOR DEWAR TEMPERATURES, PRESSURES, LIQUID LEVELS AND HELIUM EXHAUST FLOW

FACILITY DAS WILL BE USED TO MONITOR COOLDOWN OF PROBE AND POSITION OF CRITICAL PROBE COMPONENTS

- THIS IS SAME DAS AS USED FOR GTU2
- REWIRE CABLES TO ADAPT TO PBS INSTRUMENTATION

BPS DAS WILL PROCESS LOAD CELL DATA FOR INPUT TO FACILITY DAS SOFTWARE FOR EACH DAS UNITS IS:

SIMILAR OR IDENTICAL TO THAT USED PREVIOUSLY IN PROBE-C FITCHECK

THE VERSION USED FOR FLIGHT PAYLOAD INTEGRATION WILL BE ARCHIVED IN A LOCKED READ ONLY FILE



O. Probe-C Assembly / SMD Integration - Verification Matrix

## PROBE-C / SMD SPECIFICATION PLSE-12 PART #3

PLSE-12 Section Number	Title	Requirement Text and <i>Comment</i>	Verif. Method	Verification Plan	REE
3.7.4.1	Mechanical Interface	The dimensional interface between the probe and dewar is described by LMMS drawing 5833117.	I	SMD Acceptance Test Procedure, Vol. 2, ICD Verification, 5835036	M. Taber
3.7.4.4.3	Probe to Dewar ICD	The probe shall be capable of experiencing the temperatures during a cold insertion into the dewar, estimated to be as shown in figure 3.7.4-1 (See OLE tab.) <i>OLE tab is a drawing.</i>	T	P-0135	M. Taber
3.7.3.2.5	Probe Specification	The probe shall be designed to be inserted and removed from the dewar while the dewar is at or above 4.2 K and the dewar well is filled with liquid helium at a pressure of $\geq 101$ kPa (14.7 psia). It shall not be necessary to pre-cool the probe prior to integration.	T	P-0135	M. Taber
3.7.5.5.7	Dewar Specification	The temperature of the lead bag never rises above 6.5 K at any time after the final lead bag has been cooled below that temperature.	N/A		



**P. Action Item Closure Status**

Action Item	Assignee	ECD	Status
1) Obtain clarification of the drawing that Dean Read is releasing and the include revisions. Call out part number and include in review package.	M.R. Anderson	5/18/99	Closed
2) Review the fill line burst disk safety and provide recommendations to avoid potential problems associated with occasional pressure spiking during external fill operations.	Dean Read	Not required for signoff	Need by 6/11/9
3) Add status (closed or open) to discrepancy report status summary chart.	M.R. Anderson	5/18/99	Closed
4) Discuss open DRs with ONR to determine if authorized to proceed.	B. Taller / D. Ross	5/11/99	Closed
5) Provide list of items requiring calibration and verify they have been calibrated.	M.R. Anderson	5/21/99	Closed
6) Verify if connector savers for I3 and I5 are available.	M.R. Anderson	5/18/99	Closed
7) Perform visual inspection of all lifting hardware.	J. Janicki	5/14/99	Closed
8) Update the Test Flow Chart by removing TM93.	M.R. Anderson	5/14/99	Closed
9) Incorporate red-lines from the review into the package.	M.R. Anderson	5/14/99	Closed
10. Release integration procedures prior to sign-off of the TRR package	M.R. Anderson & Team	5/14/99	Closed
11. If necessary, pass PCB to change method of verification from PLSE-12 3.7.4.1 & 3.7.5.5.7.	M.R. Anderson	5/21/99	Closed

All the action items need to be closed before the testing.