W. W. Hansen Experimental Physics Laboratory
STANFORD UNIVERSITY
STANFORD, CALIFORNIA 94305-4085

Gravity Probe B Relativity Mission

G.S.S. Aft Control Unit Abbreviated Functional Test

GP-B Procedure
P0692 Rev –
September 21, 2000

Prepared by: Ron Zilm   Date
RE, Mission Operations

Approved by: William Bencze   Date
RE, Gyroscope Suspension System (GSS) Group

Approved by: Dorrene Ross   Date
GP-B Quality Assurance

S/N:

Table of Contents:

1.0 Revision History

Rev Level	Comments/notes	Date	Revised By
-	First release of this test procedure	21-Sep-00	R. Zilm

2.0 Scope:

This procedure provides the details for the subsystem-level software functional tests of the GSS Aft Computer Unit subsystem (ACU).

This test plan has been written to certify flight or "flight-like" GSS Aft Unit Assemblies. The test is automated to a large degree and requires minimal intervention from an operator.

Data recorded during this test are recorded to a single data file; each test of a board will use its own copy of this procedure, and will be identified by serial number in the upper right corner.

3.0 Reference Documents

3.1.   GSS Gold System Hardware and Software Configuration Standard, P0663

3.2.   Board-level test software operational procedure, P0670

3.3.   Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies, and Equipment, MIL-STD-1686

3.4.   G.S.S. Test Set Bring Up, P0691

3.5.   Lockheed Command and Telemetry Handbook Section SCSE 16.9.2.5

4.0 Test Facilities

HEPL Room 127, Stanford University and various others.

5.0 QA Provisions:

5.1.   This procedure shall be conducted on a formal basis to its latest approved and released version. The QA Program Engineer (D. Ross) and the ONR representative (E. Ingraham) shall be notified 24 hours prior to he start of this procedure. QA may monitor the execution of all or part of this procedure should they elect to do so.

Date/time:_____   Date/time:_____
GP-B QA (D. Ross)   ONR (E. Ingraham)

5.2.   Upon completion of this procedure, the GSS manager and the GP-B QA manager shall certify her/his concurrence that the procedure was performed and accomplished in accordance with the prescribed instructions by signing and dating his approval at the end of this procedure.

6.0 Test Personnel

This test procedure is to be conducted only by the following personnel:

6.1.   William Bencze

6.2.   Scott Smader

6.3.   Joe Kilner

6.4.   Ron Zilm

7.0 General Instructions

7.1.   Redlines can be initiated by the test personnel listed in Section 6.0 and must be approved by QA.

7.2.   Test operators shall read this procedure in its entirety and resolve any apparent ambiguities prior to beginning this test.

7.3.   Any nonconformance or test anomaly should be reported by a Discrepancy Report. Refer to the Quality Plan, P0108, for guidance. Do not alter or break test configuration if a test failure occurs; notify quality assurance.

7.4.   Only the following persons have the authority to exit/terminate this test or perform a retest: Test operators listed in Section 6.0 and GP-B QA.

7.5.   All software used in this procedure shall be released and under configuration control prior to the start of this procedure.

7.6.   Items to be typed are in **Bold**. Hit the "*Return*" key after every line of typed commands.

8.0 Test Software Required (Fill in current version)

	Name and Description	Version Number
8.1.	OASIS-CC*	
8.2.	MSS 3.2.0s GSS Test Set Software*	
8.3.	Ground RealTime Software*	
8.4.	SUN Solaris Operating System*	
8.5.	testrts - program to test for G.S.S. presence and location on the spacecraft bus(1553).	
8.6.	probe_10hz - program to test availability of 10 hz clock from GSE.	
8.7.	GSS System software (GSW)	
8.8.	Gssloader.csh - The shell script to load GSS software into SRAM memory on gss flight processor via 1553 bus. Runs on SUN Solaris OS(see above #9).	
8.9.	Gss1553ramload - The executable that loads the GSS software into SRAM memory on gss flight processor via 1553 bus. This executable is launched by the gssloader shell script and receives its setup values via rtloader_setup data file.	
8.10.	Rtloader_setup - Is a data file containing necessary setup information to configure gss1553ramload.	
8.11.	gss_start.prc - Cstol to configure test set for test.	
8.12.	aft_ga.prc - Cstol to checkout aft box.	
8.13.	Perl Script Interpreter: ActiveState's ActivePerl or equivalent. Used to run report-extraction scripts on data output files.	
8.14.	Datax.pl - Perl Script to strip commanding and telemetry information from test output report.	

Notes:

* These items are provided by LMMS/Stanford System Administrator and are kept current in the red software revision logs that travel with the G.S.S. test sets.

Version numbers for all GSS products will be provided by the test director to fill in the blanks, along with the products on a storage medium (CD or floppy or tape).

9.0 Device Under Test (DUT):

Record the serial number of the Device Undergoing Test, or DUT.

GSS Aft Control Unit (ACU) PN: 26224-101	SN:	

Test Operator:	Name:	

Start of test:	Date:	

10.0. System Functional Tests Description:

Note: Tests run in this section are run with the hardware in "flight" configuration. The tests will be run using our "flight-like", OASIS-CC based, Test Set SUN Workstation (hereafter referred to as "Test Set"). This system simulates the ground station and the Spacecraft Mission Computer to provide a realistic simulation of the mission environment. This simulation provides for commanding, scripting, data display and data recording for the GSS subsystem.

This test sequence is a scripted sequence of commands that launches software commands which reside in the memory systems of the GSS payload processor onboard the Aft unit of our GSS under test. The input and output data can be viewed using screen displays. Data is selected and processed to obtain a useful report. This report is recorded to a file on the Test Set. A paper copy shall be attached to this test procedure upon completion.

S/N:

10.1. Summary of testing activity

	Test Name	Relevant Test Case	Telemetry Output Mnemonic	Success Criteria
10..1	Diagnostic Monitor Test	Pre-Test Confidence	CSTOL massaged Output to Message File	Completion Status = Pass (PY_cmdCompStat1)
10.1.2	Clock Phase Setup/Diagnostic	Pre-Test Configuration	CSTOL massaged Output to Message File	CSTOL reports success/fail of test sequence
10.1.3.1	Monitor Ranges Check - 1	Pre-Test Establish good known baseline values	CSTOL massaged Output to Message File	record hi/low values from RY_diagMon#4, RY_diagMon#5,RY_diagMon#6,RY_diagMon#7, RY_diagMon#8
10.1.3.2	Monitor Ranges Check - 2	Pre-Test Establish good known baseline values	CSTOL massaged Output to Message File	As above
10.1.3.3	Monitor Ranges Check - 3	Pre-Test Establish good known baseline values	CSTOL massaged Output to Message File	As above
10.1.3.4	Monitor Ranges Check - 4	Pre-Test Establish good known baseline values	CSTOL massaged Output to Message File	As above
10.1.4	ACS 16 f0 AB Detection	Aft Clock Support	RY_diagMon041	Diagmon #4 = 0x0003
10.1.5	ACS 10 Hz SRE input detect	Aft Clock Support	PY_cmdCompStat1	Completion Status = Pass
10.1.6	ACS 16f0 is functional	Aft Clock Support	PY_cmdCompStat1	Completion Status = Pass
10.1.7	ACS PLL control effort is in range	Aft Clock Support	PY_cmdCompStat1	Completion Status = Pass
10.1.8	ACS SRE Clock off	Aft Clock Support	PY_cmdCompStat1	Completion Status = Pass
10.1.9	AMT monitors in range	Aft Monitor and Timing	PY_cmdCompStat1	Completion Status = Pass
10.1.10	AMT Register Tests	Aft Monitor and Timing	Diagmon packed flags	Correct Mask Value
10.1.11	AMT Interrupts Off Test	Aft Monitor and Timing	PY_cmdCompStat1	Completion Status = Pass
10.1.12	AMT Alternate 10 Hz Presence Test	Aft Monitor and Timing	PY_cmdCompStat1	Completion Status = Pass
10.1.13	AMT Tri-State Logic Test	Aft Monitor and Timing	PY_cmdCompStat1	Completion Status = Pass
10.1.14	AMT Interrupt Periodicity Test	Aft Monitor and Timing	PY_cmdCompStat1	Completion Status = Pass
10.1.15	AMT Interrupt Delay Test	Aft Monitor and Timing	PY_cmdCompStat1	Completion Status = Pass
10.1.16	AMT Alternate 10 Hz Error Count Test	Aft Monitor and Timing	PY_cmdCompStat1	Completion Status = Pass
10.1.17	Burst Bit Error Rate Test	Aft Comm Link	PY_cmdCompStat1	Completion Status = Pass
10.1.18	ADDA Hardware Triggers Test	Aft Comm Link	RY_diagMon031	Diagmon #3 = 0x0003
10.1.19	Forward Mode Register Diagnostic	Aft Comm Link	PY_cmdCompStat1	Completion Status = Pass Note: Tests GFAB

10.2.   Pre-test:

Prepare 1 formatted IBM floppy double-sided, high density for the end of the test. This is to collect the output of the test for documentation purposes. Label the disk with the information: GSS AFT Unit Test MMDDYY <Operator Name> <test location> Note also the purpose of the test. Note any other pertinent information in an additional log, to be attached to printout of test data for records.

10.3.   Perform the following:

10.3.1. Right-click on an unused portion of the desktop.
10.3.2. Left Double-click on the *file manager* option.
10.3.3. Left Double-click on the folder icon in the upper, left-hand portion of the file manager window. There will be a */* underneath to indicate root directory.
10.3.4. Scroll to the bottom of the window using the page-down key.
10.3.5. Left Double-click on *usr6*
10.3.6. Left Double-click on *lab*
10.3.7. Left Double-click on *messages*
10.3.8. Look for files that look like *foo*.event_messages* (Where * represents arbitrarily chosen alphanumeric characters.). Delete any that are present.
10.3.9. Left Double-click on bar icon, to close window.

10.4.   Bring up the test set per p0691.

At the close of p0691 you shall see a menu of choices. Type: **aft**
This will select the aft test for unit #1.

10.5.   Guidelines for operating the aft abbreviated functional test procedure as follows:

There will be instructions in the "U Procedures" window, follow them.
The CSTOL procedure contains instructions and output logging.

There will be warnings that a command is hazardous, when these warnings are obtained:
        Left Click on *Yes*
This will dismiss the warning screen and continue the test.

The test will notify you of pass/fail, if PASS the DUT has passed.
Estimated test duration: 30 minutes

Note PASS/ FAIL condtition here:	

11.0   Completion of procedure:

11.1.   Shut down OASIS-CC(Test Environment):

Click on the *QUIT* button in OASIS.
When the OASIS windows close, double left-click on the *StopLab* icon

11.2.   Retrieve the test data file and place it on a floppy.

11.2.1.   Right-click on an unused portion of the desktop.
Left Double-click on the *file manager* option
Left Double-click on the folder icon in the upper, left-hand portion of the file manager window. There will be a / underneath to indicate root directory.

11.2.2.   Scroll to the bottom of the window using the down-arrow key.
Left Double-click on *usr6*
Left Double-click on *lab*
Left Double-click on *messages*

11.2.3.   Look for files that look like *f00*.event_messages* (Where * represents arbitrarily chosen alphanumeric characters). There should only be one.
Left click on the name and rename it to the form: aftgssMMDDYY.txt (where M=month, D=day and Y=year).

11.2.4.   Insert Blank, Formatted IBM floppy into test-set floppy drive.
Left click file menu. Left click on *Open Floppy*.
Left click and hold renamed file's icon (in file manager window) to drag file to floppy window.
Left click *file* in floppy drive window. Left click *eject floppy*.
Arrange for generation of report.

11.2.5.   Copy data file aftgssMMDDYY.txt from floppy to perl_script directory on gss41-pc.
Type copy a:\aftgss*.txt c:\windows\desktop\perl_script*.*
Type perl c:\windows\desktop\perl_script\datax.pl
Type name of file when prompted.
Type optatgDDMMYY.txt for name of output file when prompted.
Type 1320 for Low line number
Type 1740 for High line number.

11.2.6. Print opt/aftgss files.

Review printout for correctness.

Staple opt to top of aftgss and and attach to DUT documentation package.

11.2.7. I certify that I performed this procedure in whole.

Test Engineer		Date	

This is to certify that the information obtained under this test procedure is as represented and the documentation is completed and correct.

GSS Representative		Date	
Quality Assurance		Date	