GRAVITY PROBE B

PROCEDURE FOR GYROSCOPE COMMISIONING

P0426 REV. -

PROCEDURE TO MEASURE READOUT LOOP RESISTANCE

19 October, 1998

Prepared by: Robert W. Brumley

Approvals:

Program Responsibility	Signature	Date
Robert Brumley Acting RE Gyroscope Verification		
Barry Muhlfelder SQUID RE		
P. Bayer Gyroscope Integration		
B. Taller GP-B Quality Assurance		
Sasha Buchman GP-B Hardware Manager		

NOTES:
Level of QA required during performance of this procedure:
___Stanford QA Representative
___Government QA Representative

Revision Record:

Rev	Rev Date	ECO #	Summary Description

Acronyms and Abbreviations:

Acronym / Abbreviation	**Meaning**

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A. SCOPE

This procedure describes a test to determine that the connection of the readout cable to the gyroscope thin film loop is unaltered when the gyroscope is cleaned. Basically, it consists of making a careful measurement of the resistance of the cable-loop combination before and after gyroscope cleaning.

B. REQUIREMENTS VERIFICATION

B.1. Requirements Cross Reference:

None

B.2. Expected Data for verification per requirement:

Verification that readout loop resistance does not change during gyroscope cleaning and assembly, coupled with direct experimental evidence that the readout loop was DC coupled prior to the cleaning, may constitute verification that the readout loop remains DC coupled after the cleaning procedure.

C. CONFIGURATION REQUIREMENTS

C.1. The gyroscope shall be fully assembled.

C.2. The measurement be done on a Class 10 clean bench; all standard cleanliness and handling precautions used in gyroscope cleaning apply here.

D. HARDWARE REQUIRED

D.1. Commercial test equipment

Manufacturer	Model	Serial Number	Calibr. Exp. Date
Keithley DMM with 4-wire resistance measurement	196	467891	7/99

D.2. Mechanical/Electrical Special test equipment

Description	Part No.	Rev. no.	Serial No.	Certification Date
Interface Cable Set	none	-	001	
Measurement Fixture	none	-	001	

Note: The measurement fixture was originally assembled to be the interface between the GTU-2 gyroscopes' readout cables and the old low-temperature acceptance probe. It contains a strain relief for the cable while making a reliable and reproducible connection.

D.3. Tools

None required.

D.4. Expendables

None required

E. SOFTWARE REQUIRED

No software is required for this procedure.

F. PROCEDURES REQUIRED

Procedure Name	Procedure No.

G. PERSONNEL REQUIREMENTS

This test to be conducted only by certified GSS personnel. Two persons from the following list must be present during the execution of the test:

- Paul Bayer
- Barry Muhlfelder
- Bruce Clarke
- David Hipkins
- Chris Gray
- Robert Brumley

H. SAFETY REQUIREMENTS

NOTE

This test is to be performed on a science-mission gyroscope. Great care

should be taken in handling so as to not damage or alter the state of the equipment.

I. GENERAL INSTRUCTIONS

I.1. Redlines can be initiated by a qualified person as noted in Section H*, QA approval is required.*

I.2. 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.

I.3. Qualified test personnel have the authority to exit/terminate this test or perform a retest.

J. REFERENCES AND APPLICABLE DOCUMENTS

(none specified)

K. EQUIPMENT PRETEST REQUIREMENTS

The following procedure is required to set up and calibrate the support equipment for this test.

K.1. DMM setup

K.1.1. Make sure DMM has been turned on for at least 30 minutes.

K.1.2. Press the "Ω" button in the FUNCTION area of the DDM.

K.1.3. Put the Ohmmeter on the 30 kΩ scale by pressing the down key until the decimal place is two places from the left. The meter should read "OV.ERFLOkΩ".

K.2. Cable Setup

K.2.1. Connect the Test Leads to the Readout Loop Measurement Fixture -- DO NOT CONNECT THE TEST LEADS TO THE DMM!

L. OPERATIONS

NOTE 1:

This resistance measurement is very dependent on temperature. Specifically, the current used by the DMM to measure the resistance and heat coupled from the operator's hands will both cause the pickup loop to heat up and alter the resistance. Therefore it is important to (1) minimize the length of the measurement, and (2) perform the before and after gyroscope cleaning measurements under conditions as similar as possible.

NOTE 2:

This procedure may be used to verify that the readout cable resistance has not changed during the cleaning procedure. Therefore there has been space left in the data table for two separate measurements of the cable resistance.

L.1. Note current temperature in the clean room and record in Table 1.

L.2. Being careful to not overly torque the cable or stress the gyroscope ←→readout cable connection, place the end of the readout cable into the readout loop measurement fixture.

L.3. Clamp down the measurement fixture cable strain relief

L.4. Insert ends of readout cable under lead spring clips (these are the same spring clip design used to connect the readout cable for the science mission).

L.5. Insert the free ends of the test lead cables into the DMM per Figure 1.

L.6. Quickly record measured resistance in Table 1. Include at least 0.1 ohms of accuracy. The readout loop may heat up during the measurement, changing its resistance. The initial reading on the DMM is the correct one.

L.7. Disconnect DMM from measurement cables

L.8. Remove the ends of the readout cable from underneath the spring clips

L.9. Unclamp the strain relief cover from the measurement fixture

L.10. Remove the readout cable from the measurement fixture

L.11. Procedure complete.

M. DATA TABLE

Table 1

Meas. #	Date	Time	Temperature	**Resistance** (Record to better than 1 Ohm)	Comments
1					
2					

Figure 1