ISS MEMO # 72-51

To: Distribution
From: J. Gilmore
Subject: Apollo 16, LM IMU Disposition
Date: March 22, 1972

MIT/DL considers that the IMU-39 gyro performance history and, more significantly, today's reported Y PIPA bias shifts represent a mission performance hazard and therefore it is recommended that:

1. a) IMU-39 and PTA be removed and replaced with IMU-33 and PTA

   b) IMU-28 not be considered a flight worthy back-up for IMU-33

   c) IMU-38 is more satisfactory unit (ADSRA Y has a level of instability however it doesn't appear to be a reliability problem) and that it be assigned as the Apollo 16 LM-IMU spare.

2. With regard to IMU-33 it is considered flight worthy, however only ISS base-line testing history is available. We therefore recommend the following:

   a) Conduct 2 performance tests as part of the retest procedure, preferably separated by all other testing to obtain the maximum possible operating time between tests.

   b) If results are stable between these two points and have reasonable correlation with prior IMU history we would consider that no further tests are required, although another performance test would be desirable to assure a confident compensation load selection.

   c) If the 2 tests do not yield stable data or correlation with the prior test data is poor, we recommend a 3rd performance test at a later date to assure system reliability and to enable confident compensation load selection.

3. The recommended preliminary IMU-33 compensation load based on a review of the available ISS test data is listed below. We recommend that a final update be made based on the forthcoming KSC G & N tests, if required.

Mission J2 - AS511 - LM-11 - G&N 615 - IMU 33

	Decimal Value	Octal Value
X PIPA Bias (cm/sec^2)	+ 1.84	04554
X Scale Factor (ppm)	- 890	61325
Y PIPA Bias (cm/sec^2)	1.60	04061
Y Scale Factor (ppm)	- 400	71344
Z PIPA Bias (cm/sec^2)	1.16	02760
Z Scale Factor (ppm)	- 470	70230
NBD X (meru)	- 0.3	77731
NBD Y (meru)	+ 0.6	00114
NBD Z (meru)	- 2.6	77264
ADSRA X (meru/g)	- 1	77745
ADSRA Y (meru/g)	- 4	77627
ADSRA Z (meru/g)	3	00116
ADIA X (meru/g)	13	00522
ADIA Y (meru/g)	- 3	77661
ADIA Z (meru/g)	14	00554

The above recommendations represent the coordinated review of in-house Draper Lab engineering. Items 1 and 2 have been coordinated with MIT/DL at KSC and MSC and discussed with J. Wachholz of Delco.

It is our understanding that NASA/KSC awaits recommendations from NASA/MSC.

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