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FILE RE

SUMMARY OF NORDEN GYRO PACKAGE PERFORMANCE

S/N I

6/17/63 1.0 Received.
Package tested at P.E. to eliminate possibility of damage in shipment.

1.1 Test Consisted of:
Simple test conducted due to certified test report from Norden, and lack of adequate test bed at P.E.

7/18/63 1.1.1 Measure a D.C. voltage from the pkg proportional to earth rate, a rough check of gyro scale factor.

8/1/63 1.1.2 Measure some D.C. voltage from each axis in presence of an unknown rate input.
Check polarity of voltage vs compatability with IC stab. system.

1.1.3 Roll Gyro output measured continuously for 2 hours. Wide band noise present approx. 60mv. P-P.

10/18/63 2.0 Initial Attempt to operate stab. system.

2.1. Found gyro pitch and yaw axes inoperative.

10/25/63 2.2 Norden discovers burned out pick off flex leads.

2.3 Investigation conducted.
Norden contends package mishandled by P.E. personnel. Contention denied by P.E. Copy of report summarizing P.E. use of gyro submitted to Norden showing their contention untenable; cause of failure still unknown.

2.4 Gyros repaired at P.E. expense

3/10/64 3.0 Repaired Unit returned to P.E.

3/18/64 4.0 Gyro turned on to investigate noise problem in view of noise output of S/N 2.

4.1 After 1 hour warm up time pitch and yaw gyros exhibit same noise voltages as S/N 2 pitch and yaw axes 70mv P-P @ 3cps.

5.0 Test conducted in P.E. conference room in front of Norden personnel. Norden personnel suggest excessive noise due to actual inputs from conference room floor.

5.1 Same test conducted at Norden. Gyro mounted on seismic pier. Noise output the same as P.E.

5.2 Norden agrees problem is real and serious.
P.E. requests immediate investigation of problem and presentation of method of investigation before proceeding. Norden agrees to provide same. To date P.E. has received no information regarding the above agreement.

5.3 Est. completion of repair 4-28-64
A. Est. Delivery may be meaningless in light of 5.2 above.
B. Will delay conclusive stab. testing on "D" by 3 weeks.
C. Means no spare (for "C") available in interim.

Present Location: Norden Corporation

S/N II

7/19/63 1.0 Received

1.1 Preliminary test conducted as on S/N I. Package appeared to be acceptable.

10/19/63 2.0 Package installed in IC system to replace inoperative S/N I package.

3.0 Stabilization tests on aeroflex flight simulator table conducted.

3.1 Platform rates well within specification (35 arc sec/sec) for all disturbances applied by aeroflex table (ref report to R.C. Rabish from T.W. Miller dated 11/14/63.

3.2 2-3cps @300mv P-P output from pitch gyro noted. Not known whether actual platform motion or gyro noise. Investigation postponed due to inoperative attitude sensor.

3.3 Gyro outputs measured at later date noise not present. (We now know due to insufficient warm up.)

3/16/64 3.4 IC system installed on aeroflex table for final preshipment test.

3.4.1 Stabilization initially operative (under static conditions).

3.4.2 Increasing 3cps signal from pitch gyro noted. Signal determined to be generated from gyro package itself. Signal capable of reinforcement when IC platform drives at 3cps.

3/19/64 3.4.3 Decide to remove gyro pkg and replace with S/N3 gyro package.

Present Location: Installed In "D" System

S/N III

3/18/64 1.0 S/N III undergoing final Q.C. Test
3/20/64 at Norden.

1.1 Noise measurement made and was 30MV P-P @3cps on the pitch and yaw axes; 30MV P-P wide band on the roll axis.

1.2 Decision made to obtain S/N3 package for "C" system. Norden agrees to "loan" P.E. S/N 3 package while they investigate problem.

1.3 Although the "best" gyro package seen by P.E. to date has the following drawbacks.

1.3.1 Noise output is low but is at a single, coherent frequency on the pitch and yaw axes.

1.3.2 The gyro bandwidth is only 6 cps wide thereby forcing P.E. to reduce its torquer gain and therfore its torque stabilization capability. Under maximum disturbance torques expected the minimum stabilization rate would be approx. 70 - 100 arc sec/sec.

Present Location: Installed in "C" system.

S/N IV

4/25/64 1.0 Estimated Delivery to P.E.

Pertinent P.E. Performance Specifications are:

3.1.1 GYRO SYSTEM SENSITIVITY - 5 ± .5 millivolts d.c. per degree per hour.

3.1.3 FREQUENCY RESPONSE OF GYRO SYSTEM - This system shall have the capability of sensing sinusoidal rates up to 15 cps with not greater than 90° degrees (lag) and 3 db. attenuation at 15 cps.

3.1.6 SYSTEM NOISE (PEAK-PEAK) - 12 arc-sec/sec maximum with 15 cps bandwidth.

3.1.15 PERFORMANCE DURING VIBRATION - All the performance requirements of section 3.1 must be accomplished while being vibrated at 0.4g maximum from 0 to 500 cps.

PREP. BY RJC
4/2/64

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