

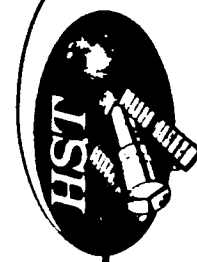
N87 - 22742

**VIBRATION ISOLATION FOR
LINE OF SIGHT PERFORMANCE IMPROVEMENT**

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LOCKHEED MISSILES & SPACE CO., INC.
SPACE SYSTEMS DIVISION
SUNNYVALE, CA 94086**

**Presented at the
Workshop on Structural Dynamics and Control Interaction of Flexible Structures
GEORGE C. MARSHALL SPACE FLIGHT CENTER**

22 - 24 APRIL 1986

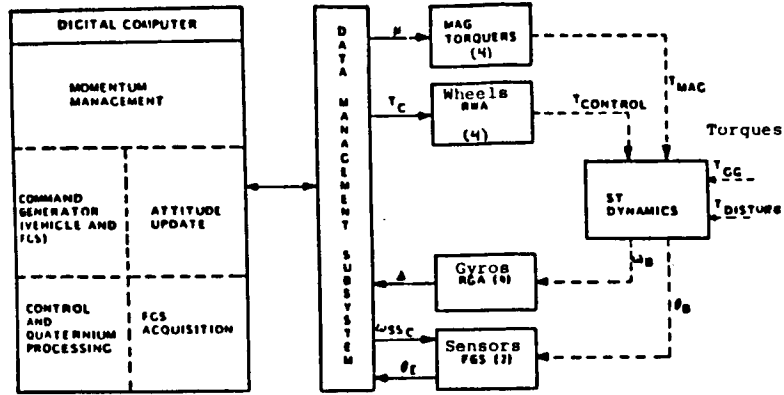


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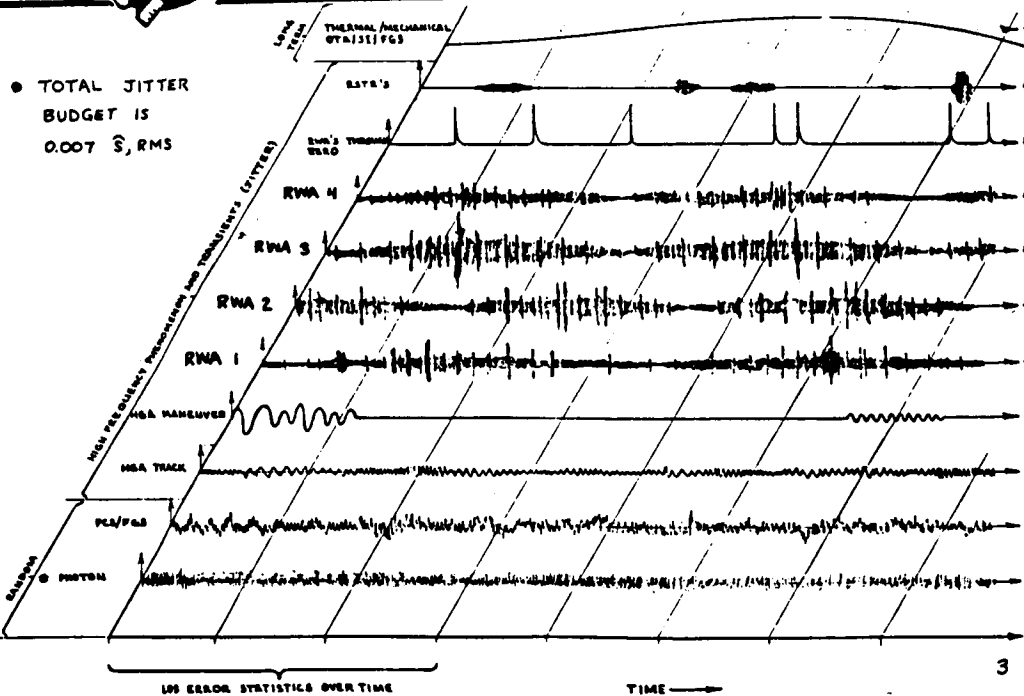
Pointing Control System Block Diagram



2



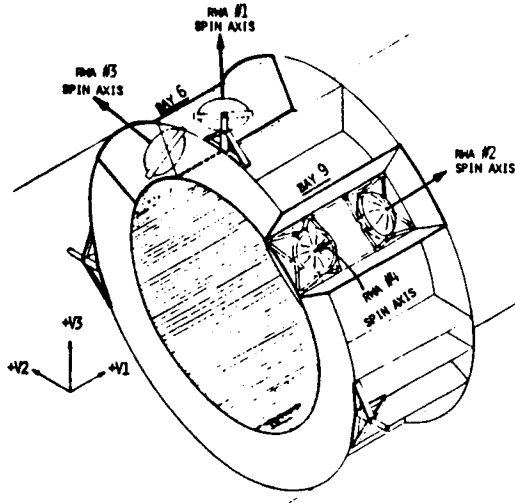
Jitter Error Model



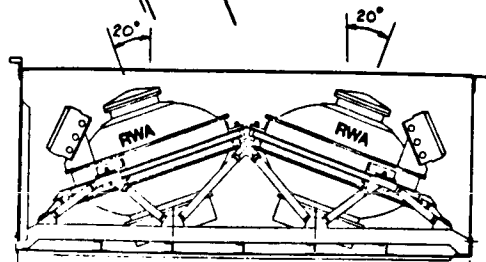
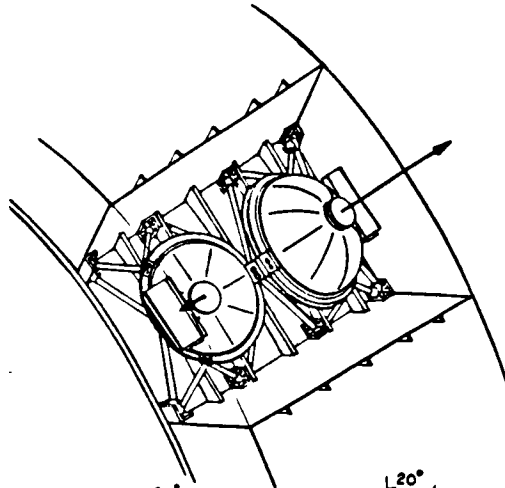
3



RWA UNIT / EQUIPMENT SECTION BAY DETAILS

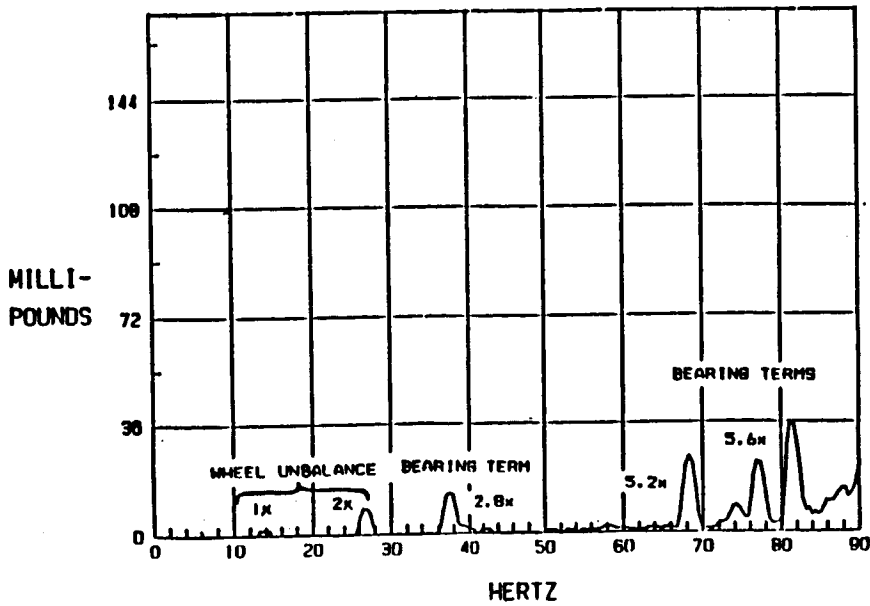


OVERVIEW : 53M EQ. SECT.



ST RWA INDUCED VIBRATION TEST

810 RPM WHEEL SPEED



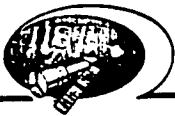
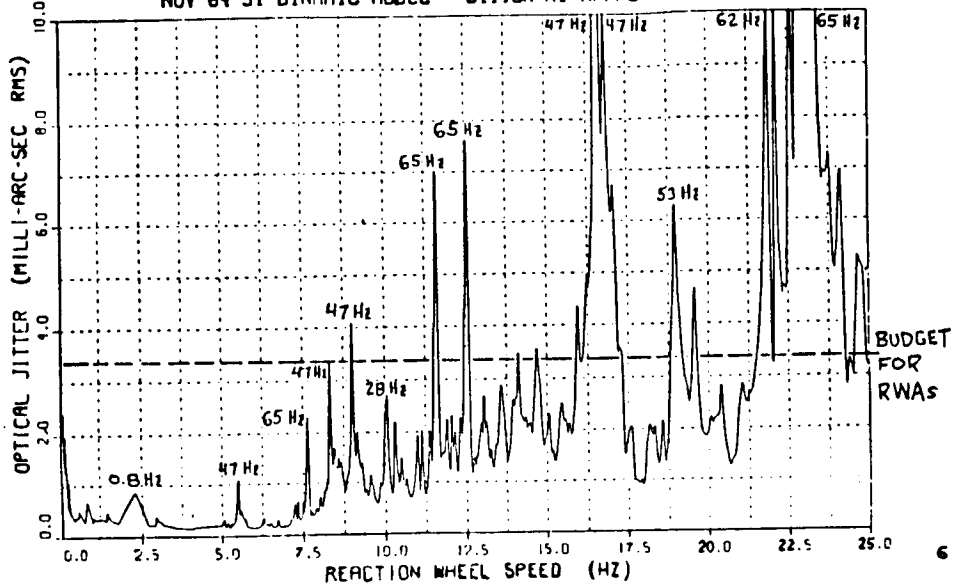
MODE, AXIAL

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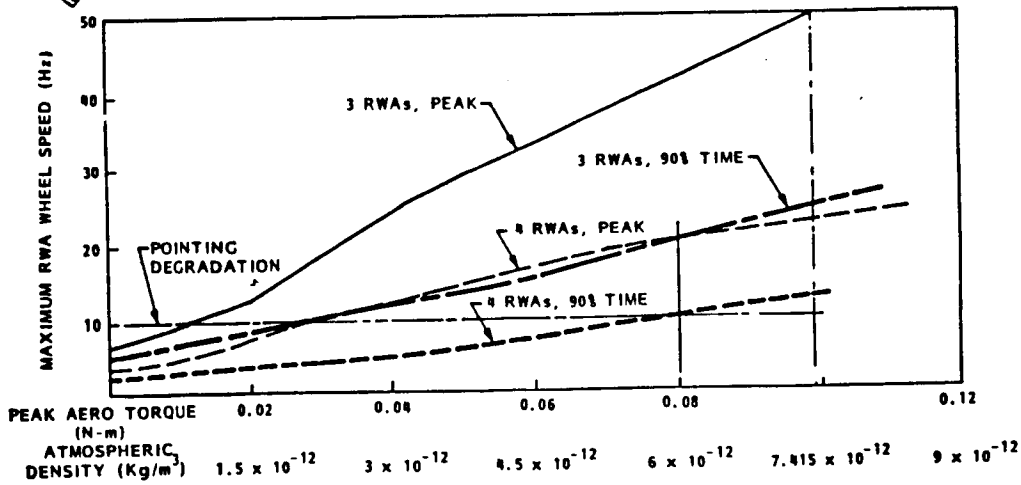


HARDMOUNTED RWA INDUCED JITTER: 1005

NOV 84 ST DYNAMIC MODEL - JITTER AT WF/PC (F/30)



RWA WHEEL SPEED / AERO TORQUE SENSITIVITY RESULTS—V2 POP



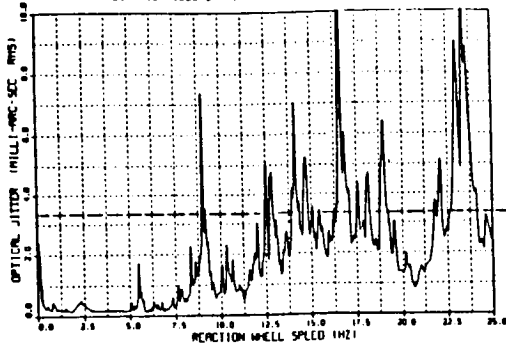
SOLAR ACTIVITY	ALTITUDE (Km)					
LOW	535	480	455	430	410	405
HIGH	750	655	605	570	535	525

NOMINAL HST ALTITUDE IS 580 KM

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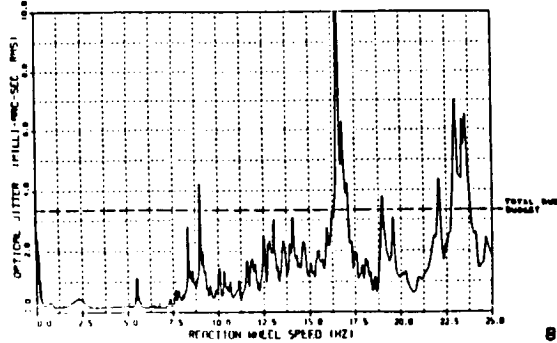
NOISY WHEEL

MARIMOUNTED R.W.A. 1002 INDUCED JITTER
AT THE O.T.A. FOCAL PLANE
DYNAMIC MODEL OF NOV. 1984 I.V. DATA OF 2/85



QUIET WHEEL

MARIMOUNTED R.W.A. 1004 INDUCED JITTER
AT THE O.T.A. FOCAL PLANE
DYNAMIC MODEL OF NOV. 1984 I.V. DATA OF 11/84



- ANALYSIS SHOWS RWAs WILL EXCEED THEIR JITTER BUDGETS



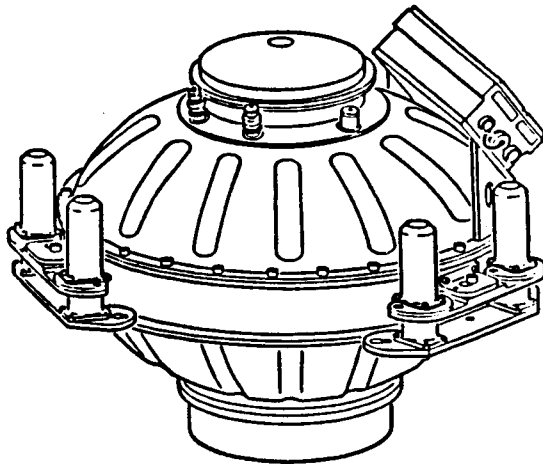
RWA ISOLATOR SPEC REQUIREMENTS

PARAMETER	REQUIREMENT
● AXIAL STIFFNESS	900-1100 LB/IN
● LATERAL STIFFNESS	1380-1870 LB/IN
● AXIAL DAMPING	.300-.060 (Q = 3 TO 20)
● LATERAL DAMPING	.170 - .025 (Q = 3 TO 20)
● MEET DYNAMIC PROPERTIES WITH STATIC 1G LOAD ON 3 UNITS	37.0 LB AXIAL 102.0 LB RADIAL
● ENVIRONMENT	TEMP: -20 F TO +120 F PRESSURE: 810 TO 10 ⁻¹³ TORR ACCEL.: 9.2 g's FOR 1.5 MIN. RANDOM VIB: 6.18 g (rms) OVERALL
● LIFE	UNIT: 2 YEARS GROUND 5 YEARS ORBITAL
● WEIGHT	DAMPING ELEMENT: 7 YEARS 4.0 LBS MAX PER ISOLATOR

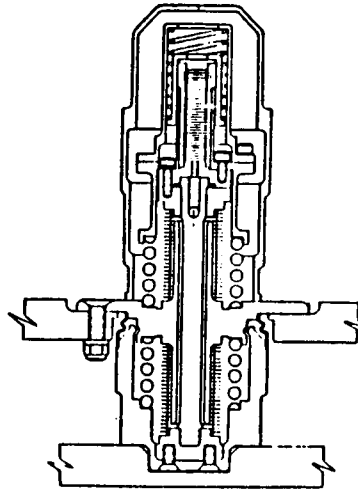


VIBRATION ISOLATION SYSTEM ON AN RWA

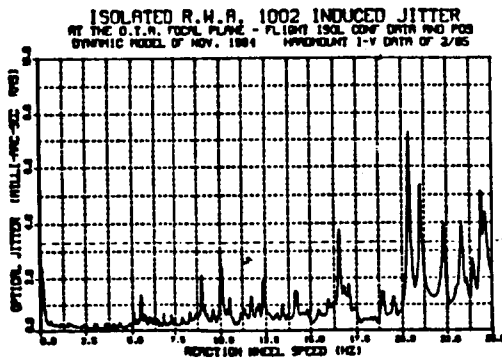
REACTION WHEEL ASSEMBLY WITH 3 ISOLATOR UNITS



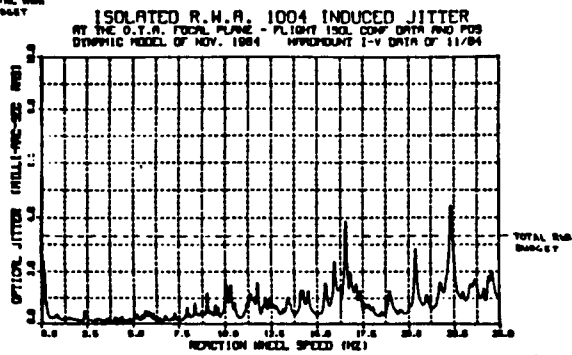
DAMPER SUBASSEMBLY CUT-AWAY



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- ANALYSIS SHOWS THAT ISOLATED RWAs WILL MOSTLY REMAIN WITHIN THEIR JITTER BUDGETS

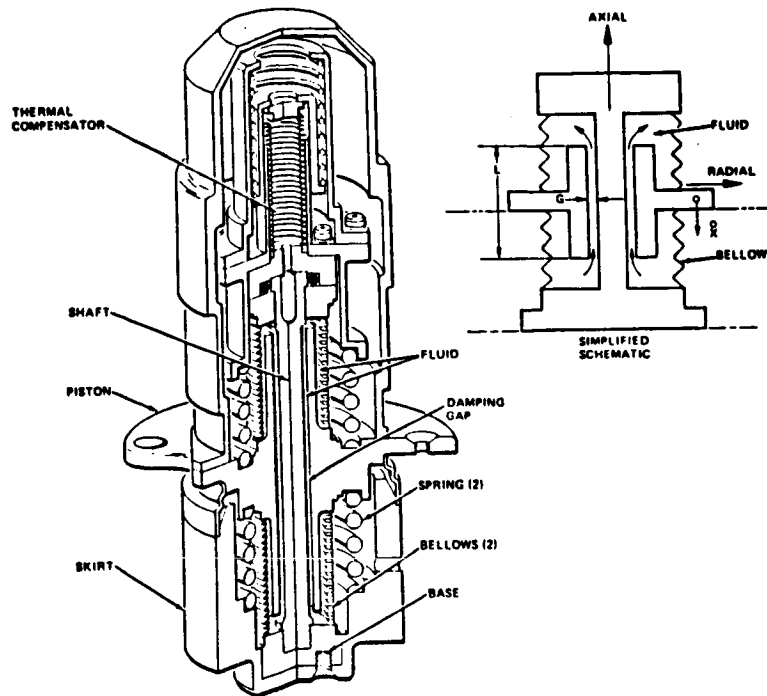


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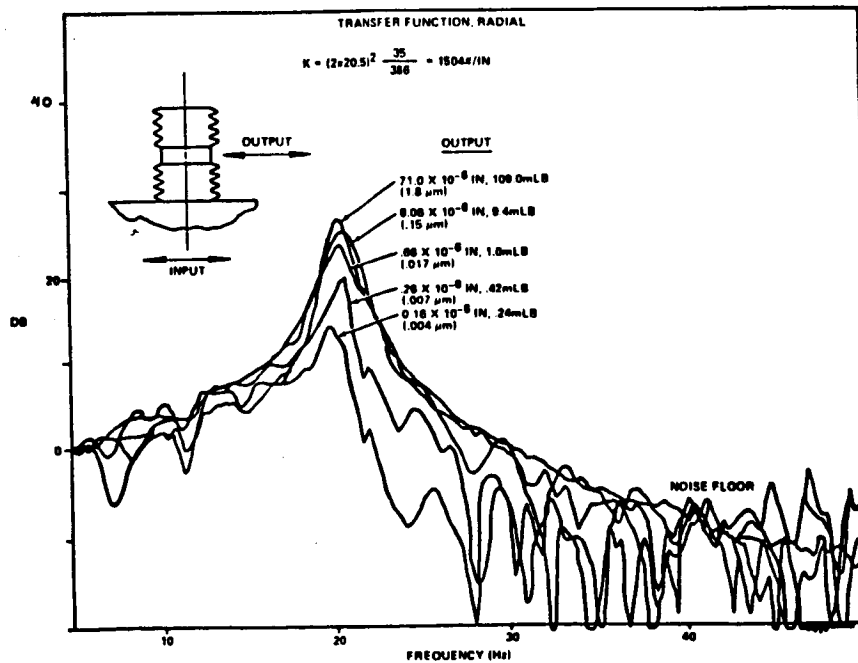
Unit Isolator



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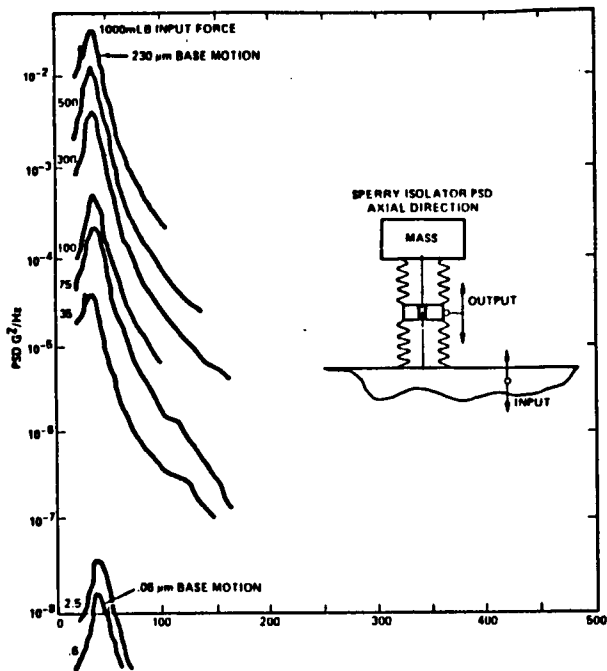
Radial Displacement Transfer Function



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Axial Displacement Power Spectral Density



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