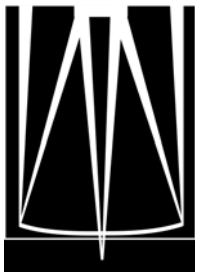

GEMINI
OBSERVATORY

Adaptive Optics Program

Altair/ISS Vibration Measurements

REV-AO-00100

Gemini Observatory
March 26, 2004

Revision Control

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Table of Contents

1. Introduction

This report summarizes vibration measurements made at the Altair/ISS interface to quantify the operational vibration levels experienced by Altair as a result of all nearby vibration sources, in particular, vibration generated by the NIRI closed-cycle coolers.

2. Test Setup

Test equipment

- 1 Siglab 20-42 spectrum analyzer
- 3 PCB Piezotronics 333B50 Accelerometers mounted in a tri-axial orientation to an aluminum block
- 1 PCB Piezotronics Model 483A IPC power supply

The tri-axial block of accelerometers was magnetically attached to the ISS face adjacent to each Altair truss interface point. Vibration levels were calculated as the average of 20 measurements for each of the three orthogonal axes. The bandwidth of the calculations was 2000 hz and the record length of each measurement was 8192 (frequency resolution 0.625 hz). Measurements were taken with the NIRI closed-cycle coolers on and off.

3. Results

The results are shown in figures 1 through 3 for the X-axis (horizontal, parallel to the ISS face), Y-axis (normal to the ISS face) and Z-axis (vertical, parallel to the ISS face). These plots show the measured acceleration spectral density in units of G^2/hz. Overall rms levels are given in the legend. Curves are shown for cases with NIRI on and NIRI off. Also plotted is the operational vibration requirement for instruments.

4. Conclusions

Operational vibration levels for Altair, even in the presence of the NIRI closed cycle coolers is very low. In fact, the measured levels are approximately 3 orders of magnitude below the design requirement for operational vibration as specified in the Gemini Environmental Requirements ICD (ref. ICD-G0013, rev. B).

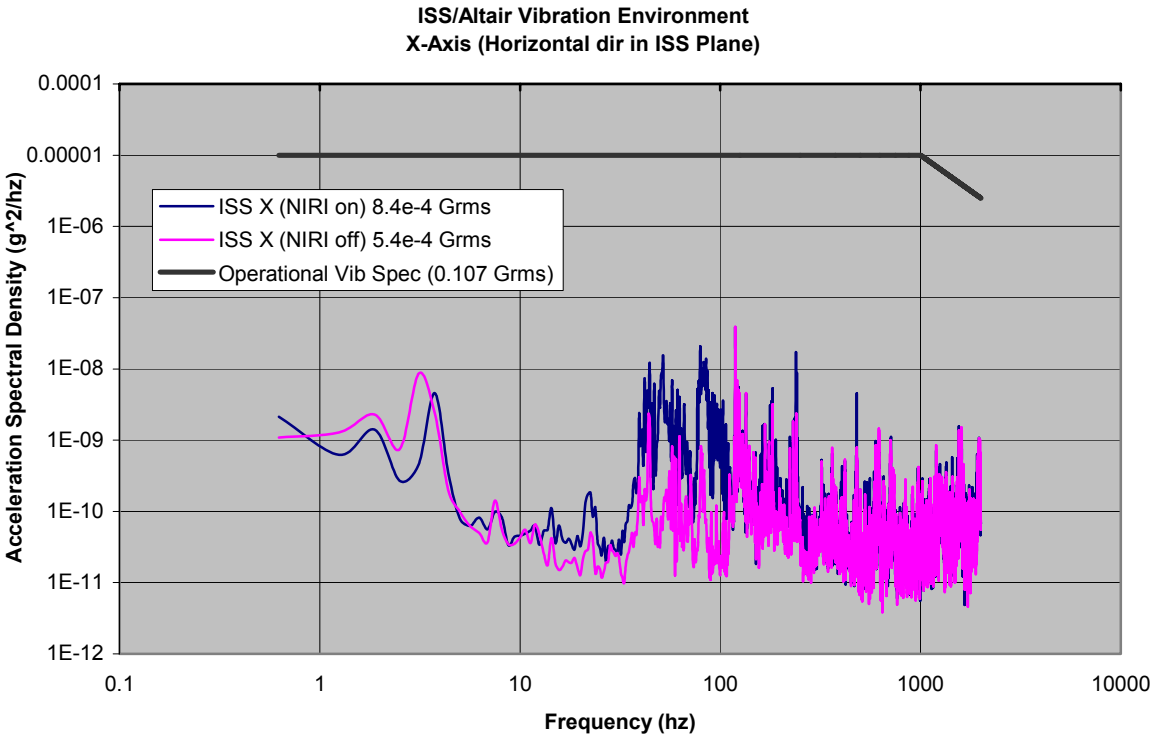

Figure (1) X-Axis Vibration Environment

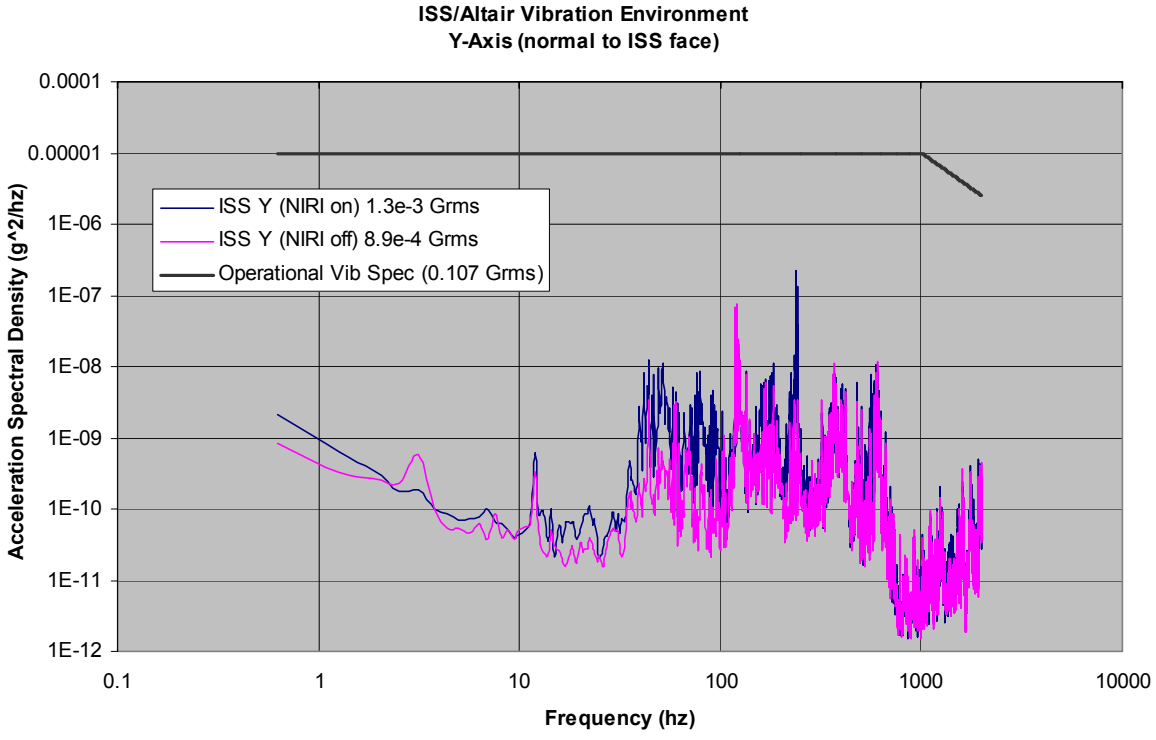

Figure (2) Y-Axis Vibration Environment

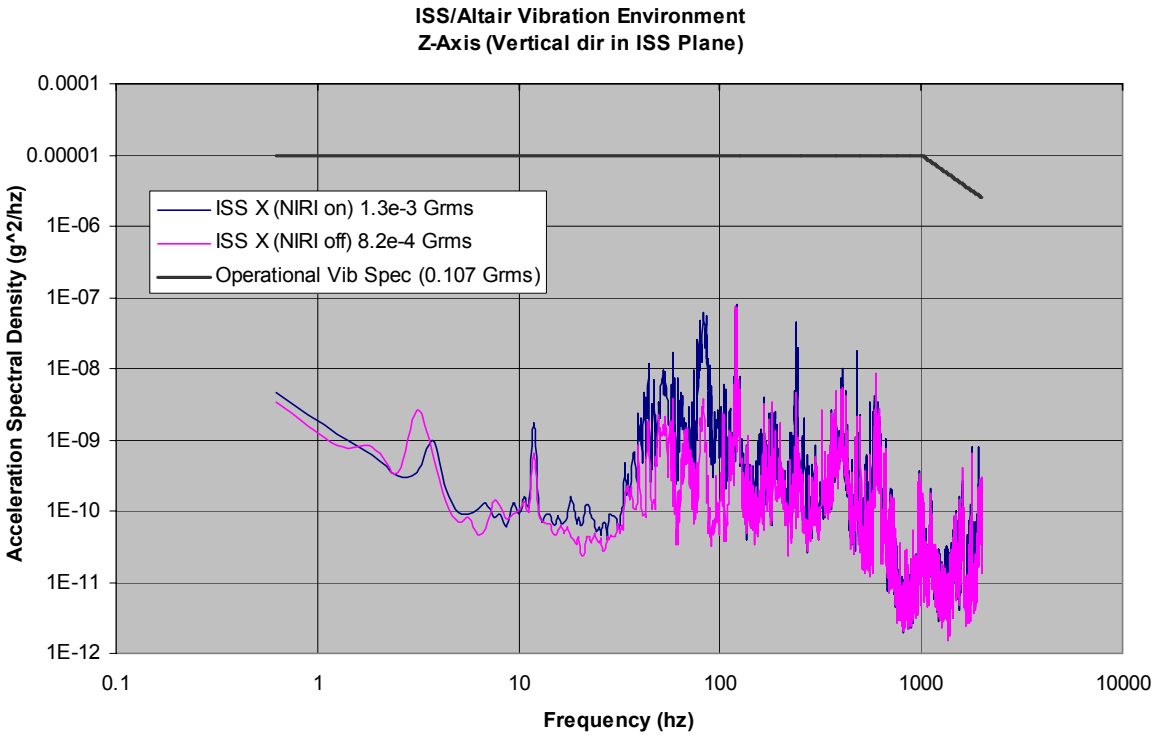

Figure (3) Z-Axis Vibration Environment