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To: XIS Team
From: Mark Bautz
Subject: Summary of XIS team meeting at MIT, 28 June 2001

Following are brief summaries of each topic discussed at our meeting last week. A list of action items and the agenda follow.

Summary

Charge injection

We decided to delay a decision on implementing charge injection. We will attempt to specify risks by examining failure modes, and we will attempt to demonstrate in the lab that charge injection can be used to measure CTI. We will ask Lincoln to design and fabricate masks so that we can implement charge injection if we choose to do so. A final decision is required before CCD production begins, at the beginning of 2002, but we will aim to make our decision by the end of the summer.

Thinning

We decided NOT to thin the XIS detectors. Although charged particle tracks in the thick XIS2 CCDs will occupy approximately twice as much detector area as they did in ASCA detectors, (9% vs 4%), we do NOT expect a higher background due to direct charged-particle interactions in the detector. Dotani-san showed that in ASCA dark earth data the unrejected X-ray background was not spatially correlated with particle track (grade 7) events. Thus we do NOT expect the thicker XIS2 substrate to lead to higher background. Also, Dotani-san showed that we have sufficient telemetry capacity to accomodate the large particle tracks in the XIS-2 CCDs. We will apply a nominal ($\sim$ 15V) bias to the back-junction on XIS-2 CCDs, just as we did on XIS-1.

Dotani-san's analysis was confined to the 2.5-6 keV band. He will repeat the analysis in a low-energy band (0.5-1.3 keV, say.)

Dotani-san speculated that the unrejected background on ASCA was due to bremmstrahlung in the materials near the detector. This suggests that it is worthwhile to review the materials closest to the detector on XIS2.

It should be noted that any background component induced by Compton scattering within the detector *will* increase linearly with the effective thickness of the detector (i.e., by about a factor of 2.2 for XIS-2 compared with ASCA.)

Calibration Source

The XIS2 calibration source is identical to that on XIS1. About 100 pixels in one corner of each CCD will be illuminated. This source will not provide detailed information on radiation-induced CTI.

AE FPGA HK bug

Hayashida-san showed the details of the bug and stated that, since its cause is not really understood, the existing patch in the DE software that deals with the bug is not guaranteed to work. Rick Foster explained that there are risks in changing the FPGA, and said we would not be able to decide whether to change the ACTEL before mid-2002. Thus the EM DE testing in Japan in April 2002 must be done with the existing EM AE now in Japan, without change to the FPGA.

Focal plane redesign
We will review the CCD substrate, CCD mounting, flexprint and TEC designs for XIS2. Redesign work will begin this year, and will be complete by September, 2002.

Schedule
The Japanese team presented a schedule requiring that the FM AE and sensor bases be delivered to Japan in June 2003 for a first integration test. This schedule is not compatible with the current MIT production schedule, which calls for delivery in September 2003. We discussed various alternatives for closing this gap, but reached no solution. Ideas discussed include 1) refurbishing the EM AE now in Japan to "flight-like" status for use in the 1st interface test, 2) delivering some of the FM hardware by June and the rest later and 3) performing qualification testing (thermal and vibration) after the first interface test 4) revising the master spacecraft schedule. There are problems with all of these approaches.

Action Items

1. MIT: Determine if there are spare HK channels for charge injection DAC values. (8/1)
2. ISAS (Dotani): Repeat background analysis for the 0.5-1.3 keV range. (8/1)
3. Osaka: Consider feasiblility of revising cal. source to illuminate all CCD columns. (9/1)
4. MIT: Investigate feasibility and consequences of altering AE gain by 20(9/1)
5. MIT: Provide additional information about charge injection, including i) assessment of failure modes and ii) feasibility of using charge injection to measure CTI. (8/15)
6. ISAS/MIT: Identify ways to address delivery schedule gap. (12/31)

Agenda

1. Charge injection

Introduction/Motivation	Bautz
Value of Charge Injection	Kissel/Bautz
CCD Design changes	Prigozhin
XIS AE Design Changes	Boughan
XIS DE Changes	Tsuru
Scheudule impact	Foster
Discussion	

2. CCD Thinning/Etching

Overview & Motivation	Bautz
Thinning/etching options	Gregory
CCD Production Schedule/Risk Impact	Gregory
Particle background on ASCA SIS	Dotani
Discussion	

3. Onboard Calibration source — Tsunemi

4. XIS AE FPGA Bug:

Impact of bug on DE	Hayashida
Impact of bug fix on AE schedule	Foster

5. FPA structure — Foster

6. Schedule Issues

Astro-E XIS Schedule Overview	Tsunemi
Baseline MIT Schedule Review	Foster
Other	