



ASTRO-H

INSTRUMENT CALIBRATION REPORT INSTRUMENT MAP ASTH-ALL-CALDB-INSTMAP

Version 0.1

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ISAS/ GSFC

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DOCUMENT TITLE : Instrument Map			
ISSUE	DATE	PAGES AFFECTED	DESCRIPTION
Version 0.1	March 2016	All	First Release

Introduction

1.1 Purpose

A Hitomi instrument map is one of the files used in the derivation of an exposure map. It is combined with a map of bad and flickering pixels, a telescope vignetting function and other calibration files defining the instrument quantum efficiency, contamination and filter transmission. The exposure map is then used to generate an instrument response matrix. The instrument map is also used to derive a flat field image.

1.2 Scientific Impact

A Hitomi instrument map defines the field of view of a single Hitomi detector. It includes one or more FITS images, each in a particular coordinate system, along with keywords defining the relevant coordinate systems. The six Hitomi instrument map files (one each for SXI, SXS, HXI1, HXI2, SGD1, SGD2) define the mapping of the physical extent of a detector into a standard Hitomi coordinate system. These maps change when the measurement of the alignment between the instruments and spacecraft changes.

2 Release CALDB 20160310

Filename	Valid data	Release data	CALDB Vrs	Comments
ah_hx1_instmap_20140101v001.fits	2014-01-01	20160310	001	
ah_hx2_instmap_20140101v001.fits	2014-01-01	20160310	001	
ah_sg1_instmap_20140101v001.fits	2014-01-01	20160310	001	
ah_sg2_instmap_20140101v001.fits	2014-01-01	20160310	001	
ah_sxi_instmap_20140101v001.fits	2014-01-01	20160310	001	
ah_sxs_instmap_20140101v001.fits	2014-01-01	20160310	001	

2.1 Data Description

The data are derived from ground-based co-alignment measurements of the Hitomi telescopes.

2.2 Data Analysis

The alignment measurements were processed to derive the relative orientation (tilt) of each instrument mirror axis relative to a common axis and the relative differences between the instrument detector centers and the common axis. These quantities were then combined with the instrument coordinate system definitions to calculate offsets between instrument-specific (DET) coordinates and mission-common (FOC) coordinates. The locations of the instrument optical

axes are also calculated. This alignment information is stored in the instrument Telescope Definition (TelDef) file.

2.3 Results

The instrument maps are derived in the following way. First a FITS image is created in an instrument-specific coordinate system. The alignment data in the TelDef file for the given instrument is used to generate a transformation matrix for the FTOOLS (heasoft v6.18) program *imagertrans*, which converts the FITS image into the common FOC system. The tool *fitheadit* is used to write to the instrument map header keywords that are needed for the generation of the exposure map.

2.4 Comparison with previous releases

This is the first release of these data products.