JAXA/SLB/TechNote/MODA/010.3

JAXA Solar-B Project Office

Solar-B Command Planning and Interface Issues for ISACS-PLN

Appendix 3
Orbit, Pointing & Doppler Shift Compensation

Rev. 0.5: 2005 Apr 13

Revision History

	Date	Authors (Affiliation)	Issue
Rev. 0.0	2005 Feb 08	H. Hara (NAOJ/NINS)	All new; not completed
Rev. 0.4	2005 Apr 5	H. Hara (NAOJ/NINS)	Correction & addition
Rev. 0.5	2005 Apr 13	K. Matsuzaki (ISAS/JAXA)	Initial Release

Applicable Documents

JAXA/SLB/TechNote/MODA/010	Solar-B Command Planning and Interface for ISACS-PLN

Appendix 3-1: Attitude Control Command for re-pointing (TBD)

Format: **not known at all at present.**

Input to Solar-B AOCS unit:

There are four tracking parameters for one tracking curve. Four tracking curves can be set in AOCS.

S/C TI clock (4bytes), rotation rate (4bytes)

Heliocentric longitude (4bytes) and latitude (4bytes)

Command preparation:

AOCS ground support software can create re-pointing commands. The output file format is not known.

Note: Multiple OGs will be allocated for this action.

Appendix 3-2: Re-pointing plan file (TBD)

A file summarizing a re-pointing of spacecraft and selection of tracking curves is made in a process creating a re-pointing command for the Solar-B attitude control system.

Format: ASCII characters

Users : Chief planner and chief observers.

Name of file: re-point_YYYYMMDDhhmmPassID;

YYYYMMDDhhmm is the date and time for the first upload of the re-pointing command.

PassID is the uplink pass ID to upload AOCS memory map for re-pointing.

File : re-point_20061011180502

```
/*                    Date        Time      Tracking   Offset-X   Offset-Y */
/*                                (UT)      Curve No.  (deg)      (deg)    */
Latest re-pointing    2006/10/11 12 12:00     1          0.0        0.0   /* Information of initial position */
AOCS Mem-Upload       2006/10/11 18:05:00                                  /* Memory upload to update pointing data*/
Re-point Start        2006 10/11 20:00:00     2          0.0        0.0
Re-point Start        2006/10/11 21:59:30     0          0.0        0.0   /* Sun-center observation */
Re-point Start        2006/10/11 22:09:50     2          0.0        0.0
Re-point Start        2006/10/12 04:59:30     0          -0.53      0.0   /* East-limb observation */
Re-point Start        2006/10/12 05:09:30     2          0.0        0.0
/* End of re-pointing and tracking schedule */

/* AOCS Tracking Parameters before the memory upload */
Fm: 2006/10/11 12:12:00
To: 2006/10/11 18:05:00
/*          Track No.  Start of Tracking        Helio-long.  Helio-lat.  Rot. Rate   */
/*                     Date        Time(UT)     (degree)     (degree)    (deg/sec)   */
Track       1          2006/10/09 10:22:11     10.2         -0.5        0.000167.
Track       2          2006/10/08 11:32:10     12.5         -13.7       0.000160
Track       3          2006/10/07 13:10:20     33.8         -22.5       0.000158
Track       4          2006/10/10 18:05:00     -40.3        20.0        0.000154

/* New AOCS Tracking Parameters after the memory upload*/
Fm: 2006/10/11 18:05:00
To: 2006/10/26 18:05:00
/*          Track No.  Start of Tracking        Helio-long.  Helio-lat.  Rot. Rate   */
/*                     Date        Time(UT)     (degree)     (degree)    (deg/sec)   */
Track       1          2006/10/09 10:22:11     10.2         -0.5        0.000167.
Track       2          2006/10/11 12:00:53     -70.5        -13.7       0.000160
Track       3          2006/10/07 13:10:20     33.8         -22.5       0.000158
Track       4          2006/10/10 12:35:20     43.3         20.0        0.000152
/* End of Tracking Curve Information */
```

Tracking curve: Five tracking curves (TC) are defined in the Solar-B attitude control system (AOCS). One of tracking curves is set in AOCS during observations. TC 0 implies that the Solar-B spacecraft is looking at a fixed position on the solar surface. By setting two offset parameters (offset-X, offset-Y), a fixed-pointing observation can be performed at any position on the solar surface. On the other hand, when TC n (n = 1, 2, 3, or 4) is selected, the spacecraft tracks a differential rotation curve whose parameters are set in AOCS. (offset-X, offset-Y) shall be (0,0) when the tracking of a differential rotation curve is selected. Parameters of TC are start date and time of tracking, heliocentric longitude and latitude in degree, and the speed of rotation rate in degree per second. "FM" and "TO" in the AOCS tracking parameters define the time range in which the tracking parameters are used.

"Latest re-pointing" is defined by the TC that runs just before the next memory upload for re-pointing. The same information is shown as "Re-point Start" in the re-pointing file of the previous upload.

The future tracking position at a time can easily be calculated from the AOCS tracking parameters.

Appendix 3-3: Doppler shift compensation for SOT Operation (TBD)

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Reference document: JAXA Solar-B SOT Progress Report section 3.4.