Appendix C

DIRBE Cold Mission Events Log

Table C.0-1 is a log of events that affected the *DIRBE* from *COBE* launch through exhaustion of the cryogen.

Table C.0-1: Abridged on–orbit events log

Date		Time[a] (yy:ddd:hh:mm:ss)	Event
1989	November 18	89:322:14:34:04	*COBE* launch
	November 19	89:323:14:11	*DIRBE* Power–on and configure
	November 21	89:325:11:18	Dewar cover ejection (roll 4°)
	November 21	89:325:14:30	Begin science telemetry format
	November 22	89:326:05:32	ACS Gyro B failure
	November 22	89:326:07:22	ACS Gyro B cross–strapped out
	November 23	89:327:11:18–11:36	New ACS control mode; pitch–back 5–7°
	November 23	89:327:14:10–17:55	*DIRBE* preliminary optimization
	November 24	89:328:00:00	Initiate *DIRBE* nominal operations
	November 25	89:329:14:10	Spin Rate 0.4 rpm
	November 26	89:330:14:24	Spin Rate 0.6 rpm
	November 26	89:330:20:12–20:15	Band 8 heater real-time test
	November 27	89:331:11:29	Spin Rate 0.8 rpm
	November 27	89:331:12:54–23:52	*DIRBE* onboard deglitcher on
	November 28	89:332:21:00	Start of *DIRBE* optimization tests
	November 29	89:333:06:06	End of *DIRBE* optimization tests
	November 29	89:333:08:48	Interlocked–IRS linearity test (DIR567, TA086 equivalent)
	November 29	89:333:10:42	IRS *vs.* sky linearity test
	November 30	89:334:21:00–23:59	*FIRAS* MTM hits in Van Allen Belts (VABs)
	December 1	89:335	*FIRAS* MTM hits in VABs all day
	December 1	89:335:04:33:40	Analog gain calibration test
	December 2	89:336:00:00	Band 8 overbias level raised to 168 DN
	December 3	89:337:17;16	First Moon crossing predicted
	December 9	89:343:00:00	Start commanding *FIRAS* MTM to position mode during SAA crossings
	December 10	89:344:23:03–23:32	*DIRBE* shutter left closed (loss of lock during real–time IRS cal)
	December 11	89:345:00:00–23:59	100 s duration IRS boost and band 8 overbias during anneal (one day only)
	December 11	89:345:01:04	New *DIRBE* operating parameters loaded and start of new IRS calibration runs
	December 12	89:346	First off–nominal pointing test (roll to 2 and 8°)
	December 13	89:347:17:48	Momentum wheel speed reduced by 0.5%
	December 17	89:351:00:00	Resume 100 s duration of IRS boost and band 8 overbias during annealing
	December 17	89:351:22:51	Start of second off–nominal pointing test (roll to 8°)
	December 18	89:352	First command triggering with new SAA contours
	December 18	89:352:00:00–17:46	Second off–nominal pointing test (roll to 8 and 2°)
	December 19	89:353	IRS boost at 3200 DN during anneal
	December 19	89:353:11:30	Roll to 8° for *FIRAS* XCAL motion
	December 19	89:353:11:48	*FIRAS* XCAL moved into horn (at roll 8°)
	December 20	89:354	No band 8 overbiasing during anneal
	December 20	89:354:09:55–11:20	Periodic IRS runs after hard SAA
	December 21	89:355	Resume nominal annealing recipe (IRS boost 2800 DN, band 8 overbiasing 168 DN)
	December 21	89:355:15:47	*FIRAS* XCAL removed from horn (at roll 8°)
	December 27	89:361:06:16:28	Analog gain calibration test
	December 27	89:361:14:40	Re–run differential linearity test
	December 27	89:361:22:42	Re–run IRS vs. sky linearity test

1989	December 28	89:362:03:27	Re–run detector optimization with nominal biases and heaters
	December 29	89:363:03:22	Band 7 bias changed to .2V (67 DN) by real–time command
	December 30	89:364:01:56:20	Band 7 bias reset to .24V (81 DN)
1990	January 1	90:001:00:00	Install final annealing recipe: IRS boost for 100 s, no band 8 overbiasing
	January 10	90:010:17:16	*FIRAS* MTM hit at SAA entrance (see §3.5.3.1)
	January 12	90:012:22:19	*FIRAS* MTM hit at SAA entrance (see §3.5.3.1)
	January 13	90:013:18:57	*FIRAS* MTM hit at SAA entrance (see §3.5.3.1)
	January 14	90:014:22:18	*FIRAS* MTM hit at SAA entrance (see §3.5.3.1)
	January 15	90:015:22:18	*FIRAS* MTM hit at SAA entrance (see §3.5.3.1)
	January 16	90:016:20:14–21:43	Backup X–axis gyro used by ACS
	January 17	90:017:15:31–16:03	Test of ACS eclipse mode (engineering telemetry format)
	January 17	90:017:17:50	Momentum wheel speed increased by 0.5%
	January 18	90:018:14:15–16:09	Start of *FIRAS* calibration; roll 8° for XCAL insertion
	January 20	90:020:01:41–02:41	End of *FIRAS* calibration; roll 8° for XCAL stow
	January 22	90:018:34–18:50	Test of ACS eclipse mode (engineering telemetry format)
	January 24	90:024:∼17:00	Test of ACS eclipse mode (engineering telemetry format)
	January 25	90:025:00:01:32	Analog gain calibration test
	January 26	90:026:18:27–18:45	Solar eclipse by the Moon; roll excursion to 3°.5
	January 26	90:026:20:26–20:44	Solar eclipse by the Moon; roll excursion to 11°
	February 15	90:046	Jupiter enters *DIRBE* swath
	February 16	90:047:14:00	Start of *FIRAS* calibration; roll 8° for XCAL insertion
	February 18	90:049:01:42	End of *FIRAS* calibration; roll 8° for XCAL stow
	February 26	90:055:07:40:12	Analog gain calibration test
	March 4	90:063	Uranus enters *DIRBE* swath
	March 6	90:065:15:37–15:57	Real–time command procedure test
	March 7	90:066:15:37–15:57	Real–time command procedure test
	March 9	90:068	Neptune enters *DIRBE* swath
	March 15	90:074:22:08–22:22	*FIRAS* XCAL test
	March 16	90:075:14:38–14:58	*FIRAS* MTM Relay Test
	March 16	90:075:16:45–17:05	*FIRAS* MTM Relay Test
	March 18	90:077:09:41	Start of *FIRAS* calibration; roll 8° for XCAL insertion
	March 19	90:078	Saturn enters *DIRBE* swath
	March 20	90:079:16:44	End of *FIRAS* calibration: roll 8° for XCAL stow
	March 21	90:080	*FIRAS* initiates MTM power–off at every SAA entrance as normal operation
	March 26	90:085:14:00–22:00	Roll test at 1.5°
	March 27	90:086:14:00–20:38	Roll test at 1.0°
	March 28	90:087:08:59:40	Analog gain calibration test
	March 28	90:087:14:55–15:15	*FIRAS* MTM relay test
	March 28	90:087:16:30–16:50	*FIRAS* MTM relay test
	April 17	90:107	Start of *FIRAS* calibration; roll 8° for XCAL insertion
	April 20	90:110	Last *DIRBE* observations of Jupiter at 4.5° roll
	April 20	90:110	End of *FIRAS* calibration; roll 8° for XCAL stow
	April 20	90:110:20:28	Spacecraft roll commanded to 1°.75; actual roll 2°

1990	April 24	90:114	Last *DIRBE* observations of Jupiter at 2° roll
	April 28	90:118	Mars enters *DIRBE* swath
	April 30	90:120:13:56	Start of JFET–off test; bands 1 – 6 (1.25 – 25 μm) commanded off
	May 1	90:121:01:05	JFET–off test; 60 μm band (7) commanded off
	May 2	90:122:00:58	JFET–off test; 100 μm band (8) commanded off
	May 4	90:124	Uranus exits *DIRBE* swath
	May 5	90:125:08:20:43	Analog gain calibration test
	May 6	90:126:01:17–12:30	End of JFET–off test; all bands commanded on
	May 7	90:127	Earth limb over sunshade at 2° roll
	May 10	90:130	Neptune exits *DIRBE* swath
	May 12–14	90:132–134	*DIRBE* observes Comet Austin
	May 15	90:135:08:30	Spacecraft roll angle commanded to 4° (Sun angle 94°)
	May 15	90:135:08:40	Start of *FIRAS* calibration; roll 8° for XCAL insertion
	May 17	90:137	Start of eclipse season; first penumbra
	May 17	90:137:02:27:48	Shutter–closed CBM mode IRS cal (standard prime source cal)
	May 17	90:137:10:15:08	Start of eclipse season; first loss of Sun presence
	May 18	90:138:21:26	End of *FIRAS* calibration; roll 8° for XCAL stow
	May 19	90:139:∼00:00	Spacecraft roll angle commanded to 3° (Sun angle 93°)
	May 21	90:141	Saturn exits *DIRBE* swath
	May 24–25	90:144–145	*DIRBE* observes Comet Austin
	May 29	90:149:∼17:00	Spacecraft roll angle commanded to 2° (Sun angle 92°)
	June 9	90:160:00:00	Start of roll toggling at Earth limb; roll to 1° during limb passages
	June 11	90:162:13:28–15:12	One orbit of engineering mode telemetry for dewar and ACS analysis
	June 29	90:180	*DIRBE* operations includes 2–source CAL at each NVAB exit
	June 29	90:180:13:42	Start of *FIRAS* calibration; roll 8° for XCAL insertion
	June 30	90:181:13:38	End of *FIRAS* calibration; roll 8° for XCAL stow
	July 2	90:183:20:16:34	ACS pitch–back angle changed from 6° to 3°
	July 7	90:188	Primary and backup IRS sources interchanged (from this day on)
	July 9	90:190:01:48–02:11	Eclipse–mode voltage/current test
	July 10	90:191	First day of band 1B test; power–off 2 minutes every orbit
	July 11	90:192	Second day of band 1B test; power–off 2 minutes every orbit
	July 12	90:193	Third day of band 1B test; power–off 2 minutes every orbit
	July 12	90:193:∼18:00	*FIRAS* Sky Horn temperature reduced from 6 to 4° K
	July 13	90:194	Fourth day of band 1B test; toggle power on/off every other orbit
	July 14	90:195	Spacecraft roll angle changed to 2.25, 1.25 during earth limb
	July 14	90:195	Fifth day of band 1B test; toggle power on/off every other orbit
	July 15	90:196	Sixth day of band 1B test; power–off 2 orbits per day
	July 16	90:197	Last day of band 1B test; power–off 2 orbits per day
	July 22	90:203:02:00–04:04	Eclipse of Sun by Moon; roll angle changed to 6°
	July 23	90:204:03:20–04:00	Interlocked IRS linearity test (DIR567, TA086 equivalent)
	July 25	90:206:01:32	Last ACS eclipse mode event
	July 26	90:207:11:00	Start of *FIRAS* Sky Horn Test
	July 27	90:208:06:00	End of *FIRAS* Sky Horn Test

1990	August 2	90:214:14:34	Start of *FIRAS* calibration; roll 8° for XCAL insertion
	August 8	90:220:05:10	End of *FIRAS* calibration; roll 8° for XCAL stow
	August 9	90:221:00:00	Start of *FIRAS* XCAL temp controller test
	August 10	90:222:17:12	End of *FIRAS* XCAL temp controller test
	August 11	90:223:03:20	IRS *vs.* sky linearity test (DIR668; fixed IRS with slow shutter flutter)
	August 12	90:224:16:08	IRS *vs.* sky linearity test (DIR667; IRS ramps with shutter flutter)
	August 13	90:225, once/3 orbits	Absolute differential linearity test (DIR669; IRS A and B fixed levels)
	August 14	90:226, once/3 orbits	Absolute differential linearity test (DIR669; IRS A and B fixed levels)
	August 15	90:227:12:43	JFET–off test; bands 1 through 6 powered off
	August 15	90:227:13:52	Start of first *FIRAS* MiniCAL
	August 16	90:228:01:33	JFET–off test; 60 μm band (7) powered off
	August 17	90:229:01:29	JFET–off test; 100 μm band (8) powered off
	August 21	90:233:01:40–11:11	End of JFET–off test; all channels powered on
	August 25	90:237	Uranus enters *DIRBE* swath
	August 29	90:241:21:58	Band 1B powered off in real–time (after start of Moon passage)
	August 30	90:242	Temporary IRS cal RTSs used (to reload standard RTSs)
	August 31	90:243	Standard IRS cal RTSs reloaded
	August 31	90:243	Neptune enters *DIRBE* swath
	September 1	90:244:21:49	Band 1B powered on in real–time (after end of Moon passage)
	September 1	90:244:22:00–23:05	Engineering telemetry format (dewar and ACS analysis)
	September 5	90:248, once/3 orbits	Absolute differential linearity test (DIR670; IRS A and B fixed levels)
	September 6	90:249, once/3 orbits	Absolute differential linearity test (DIR670; IRS A and B fixed levels)
	September 7	90:250, 3 times	Absolute differential linearity test (DIR669; IRS A and B fixed levels)
	September 7	90:250	Saturn enters *DIRBE* swath
	September 7	90:250:15:42	Start of *FIRAS* calibration; roll to 8° for XCAL insertion
	September 10	90:253:00:32	Band 1B powered off by real–time command after start of Moon passage
	September 10	90:253:22:39	End of *FIRAS* calibration; roll to 8° for XCAL stow
	September 15	90:258:07:45	Band 1B powered on by real–time command after end of Moon passage
	September 21	90:264:09:37	Dewar helium depleted
	September 21	90:264:09:51	Dewar over–temperature circuit tripped; *FIRAS* power disconnected

[a] Greenwich Mean Time (GMT).