Clouds and the Earth's Radiant Energy System (CERES)

Data Management System

Operator's Manual

Geolocate and Calibrate Earth Radiances
(Subsystem 1.0)

CER1.0P2, CER1.0P3, CER1.1P8, CER1.2P1, CER1.4P1, and CER1.4P2, CER1.4P3

Release 6
Version 8

Denise L. Cooper, J. Ashley Alford & Brian Magill

Science Systems and Applications Incorporated (SSAI)
One Enterprise Parkway, Suite 200
Hampton, VA 23666

NASA Langley Research Center
Climate Science Branch
Science Directorate
21 Langley Boulevard
Hampton, VA 23681-2199

SW Delivered to CM: March 2016
Document Date: March 2016

Document Revision Record

The Document Revision Record contains information pertaining to approved document changes. The table lists the date the Software Configuration Change Request (SCCR) was approved, the Release and Version Number, the SCCR number, a short description of the revision, and the revised sections. The document authors are listed on the cover. The Head of the CERES Data Management Team approves or disapproves the requested changes based on recommendations of the Configuration Control Board.

Document Revision Record

SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
06/21/01	R4V1	272	• Modified release and version number.	All
			• Changed "Terra" to "Aqua" for PGEs CER1.1P5 and CER1.1P6.	Secs. 6.0 & 7.0
			• Changed "FM1" and "FM2" to "FM3" and "FM4" for PGE CER1.1P5.	Sec. 6.0
			• Updated format to comply with standards.	All
11/07/01	R4V2	306	• Modified PGE CER1.1P3 to only process when at least 90 Mb of Level-0 data is available.	Sec. 4.3.1a
			• Updated format to comply with standards.	All
01/22/02	R4V3	319	• Added new PGE CER1.3P1.	Sec. 8.0, App. C
			• Updated format to comply with standards.	All
03/21/02	R4V4	324	• Added preliminary draft information for CER1.3P2.	Sec. 9.0
			• Changed script names to include PGE Name.	Secs. 1.4, 1.5, 2.4, 2.5, 3.4, 4.4, 5.4, 6.4, & 7.4
			• Added new file_cleanup script and instructions.	Secs. 1.4.5, 2.4.5, 3.4.5, 4.4.5, 5.4.5, 6.4.5, 7.4.5, & 8.4.5
			• Updated expected output tables.	Secs. 1.6, 2.6, 3.6, 4.6, 5.6, 6.6, 7.6, & 8.6
			• Added new exit code for CER1.2P1 to indicate no usable data to write to Pre-ES8.	Sec. 3.5.2
			• Changed primary contact information.	Sec. 8.0
			• Fixed error in filenames for CER1.3P1, CC code is CC1_3, not CC1.	Secs. 8.4.1 & 8.5.3
			• Updated format to comply with standards.	All

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04/11/02 (Cont'd)	R4V5	336	• Updated information for CER1.3P2 to create final version.	Sec. 9.0
			• Added information for CER1.3P2.	App. C & D
			• Added Special Case Considerations.	Sec. 8.4.4
			• Fixed error in input filename.	Secs. 8.3.1 & 8.3.2
			• Fixed environment script name.	Secs. 8.2.2 & 8.4
			• Updated format to comply with standards.	All
06/06/02	R4V6	355	• Updated Destination for Expected Output File Listing.	Tables 1-6, 2-5, 3-6, 4-6, 5-5, 6-6, 7-5, 8-6, & 9-6
			• Added PGE CER1.3P3.	Sec. 10.0
			• Added new CER1.3P3 info to Appendix C.	App. C.12
			• Updated CER1.3P3 in Appendix D.	App. D, D-1
			• Updated format to comply with standards.	All
07/03/02	R4V7	370	• Added new filenaming conventions for Terra and Aqua ephemeris and attitude data files. Existing files will not be renamed, so both filenaming conventions are listed in this document.	Secs. 3.3.2, 4.3.2, 4.3.3, 6.3.2, 6.3.3, 10.3.2, & 10.3.3
			• Updated format to comply with standards.	All
03/24/04	R4V8	514	• Added a new Input Dataset Name section.	Sec. 10.3.4
			• Edited filename.	Secs. 10.4.3 & 10.4.5
			• Changed /CERESHOME to $CERESHOME.	All
			• Updated format to comply with standards.	All
08/20/04	R4V9	552	• Updated Contacts.	Secs. 1.1.1, 2.1.1, 4.1.1, 5.1.1, 6.1.1, 7.1.1, 8.1.1, & 10.1.1
			• Updated to include new options for the ASCII Input File generator.	Secs. 1.2.1, 2.2.1, 4.2.1, 5.2.1, 6.2.1, 7.2.1, & 10.2.1

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08/20/04 (Cont'd)	R4V9	552	• Took out old filenaming convention for Aqua ephemeris and attitude data files. Removed alternate dataset for Terra Attitude; no longer being received. Fixed filenames for Count Conversion data files. • Updated format to comply with standards.	Secs. 3.3.2, 4.3.3, 6.3.2, 6.3.3, 10.3.2, 10.3.3, & 10.3.4 All
01/26/05	R4V10	573	• Added new environment variables set in INSTRUMENT_env_PROD.csh and ENVinstrument-env.csh. • Updated format to comply with standards.	Secs. 1.2.2, 2.2.2, 3.2.2, 4.2.2, 5.2.2, 6.2.2, & 7.2.2 All
06/22/05	R4V11	589	• Updated to include new flags to turn off radiance QC checks. Needed to process data on Aqua-FM4 after the SW anomaly which began 3/30/05. • Added special instructions for creating the ASCII input file for Aqua-FM4 after the SW anomaly, which began on 3/30/05. • Updated format to comply with standards.	Secs. 1.2.1, 2.2.1, 4.2.1, 5.2.1, 6.2.1, & 7.2.1 6.4.1 All
11/18/05	R4V12	599	• Updated BDS file sizes due to addition of new Solar and Lunar Angle Additions per Requirement #1-5. • CER_BQCIES ... expected output file was changed from "m" to "o." • Updated format to comply with standards.	Secs. 1.6, 2.6, 4.6, 5.6, 6.6, 7.6, 8.6, & 10.6 Table 10-6 All
04/14/06	R4V13	621	• Updated Table 10-4 to include start and stop parameters. • A special case was added for 12/31/2005 for Terra and Aqua, due to the addition of a leap second on this date. • Updated format to comply with standards.	Sec. 10.2.1 Sec. 10.4.4 All
03/07/08	R5V1	610	• Updated to reflect new directory structure.	All
02/04/09	R5V2	698	• Added new PGE CER1.0P2 NPP Preprocessor.	1.0
04/06/09	R5V3	702	• Updated CER1.2P1 input info to include NPP. • Added new PGE CER1.1P7. • Added preliminary information for new PGE CER1.1P8.	Secs. 4.3.1 & 4.3.2 Sec. 9.0 Sec. 10.0

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04/22/09	R5V4	709	• Updated PGE CER1.0P2 with requested operational procedure and new file naming convention.	Sec. 1.0
04/06/09	R5V5	703	• Updated preliminary information for PGE CER1.1P8 to make the final updates.	Sec. 10.0
			• Modified filenames with the ending ".dat" and changed them to ".DAT."	Secs. 9.3.2 & 9.3.3
			• Added PCF and Log files (and other columns) to the expected output table for CER1.0P2. (05/29/2009)	Table 1-4
			• Modified CER1.1P5 to read CER1.1P7 and modified the file directory name from CERESHOME/instrument/data/ancillary/static to CERESHOME/instrument/ancillary/CER1.3P3. (06/04/2009)	Secs. 9.0 & 13.3.4
			• Modified a filename in the Expected Output Table for CER1.0P2 from "NPPPEH" to "NPPEPH." (06/15/2009)	Table 1-4
			• Added "rm" to Destination column for log files. (06/17/2009)	Table 1-4
			• Modified filename path in CER1.0P2-env.csh script. (07/10/2009)	Sec. 1.3.2
			• Changed "CER1.1P3_PCFin to CER1.1P7_PCFin. (07/16/2009)	Sec. 9.4.2
			• Changed "run_CER1.1P1-6.pl CER1.1P5" to "run_CER1.1P8.pl CER1.1P8." (08/03/2009)	Sec. 10.4.3
			• Changed "CER1.1P5_input_find.pl" to "CER1.1P8_input_find.pl." (08/03/2009)	Sec. 10.4.4
			• Minor modifications made in filenames. (08/10/2009)	Secs. 10.3.3 & 10.4.2
			• Minor modification made in table title. (08/10/2009)	Table 10-5
			• Row added (-ed). (08/10/2009)	Table 13-4
			• Additional files and a new section added. (08/10/2009)	Secs. 13.3.4, 13.3.5, & 13.4.1
			• Removed Appendix C - Sample ASCII (PCFin) File Listing since PCFin files are no longer required. (09/17/2009)	App. C

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09/21/09	R5V6	723	• Added new environment variable InputArchive.	Secs. 4.2.2 & 4.3.2
			• Added input BDS name and location on *AMI*.	Sec. 4.3.1
			• Indicated PCFin instructions are only for the SGI platforms.	Sec. 4.4
			• Added indication that the ASCII file generator is only needed on the SGI systems.	Sec. 4.4.1
			• Added information for PCF generator on *AMI*.	Sec. 4.4.2
			• Added information on instructions for *AMI*.	Sec. 4.4.4
			• Updated name and how to call test file cleanup script.	Sec. 4.4.5
10/28/09	R5V7	731	• Added TRMM and Terra DPREP to table.	Table 10-2
			• Added new environment variable Input_Archive.	Sec. 10.2.2
			• Removed PCFin information.	Sec. 10.4
			• Removed PCFin creation instructions, replaced with PCF generation instructions and special BDS_Only for Build2.	Sec. 10.4.1
			• Removed PCFin ASCII file input references.	Sec. 10.4.3
			• Replaced Build1 with Build2.	Sec. 10.6
			• Changed BDS & QC report filenames to black as they are now included as output. Removed PCFin from table.	Table 10-7
02/18/10	R5V8	756	• Added sections for CER1.4P1, the C++ version of the BDSI subsetter, and CER1.4P2, the C++ version of the Gain Analyzer.	Secs. 14 & 15
			• Updates to all sections to add new data directory structure for input and output files for all PGEs. (03/23/2010)	All
			• Removed instructions to create ASCII file generation no longer needed on *AMI*. (03/23/2010)	
			• Added note for CER1.1P2, 4 & 6 that these PGEs have been disabled. (03/30/2010)	Secs. 3, 6 & 8
			• BQCRP, BQCRPS, BINHS, and BINEL output file destinations have been changed from "No Archive" to "Archive." (04/15/2010)	Table 10-6
			• GAIN, QCSW, QCTL, and QCWN output file destinations have been changed from "No Archive" to "Archive." (04/15/2010)	Table 15-6

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02/18/10 (Cont'd)	R5V8	756	• Updated to incorporate the new SGE run scripts. (04/26/2010)	Sec. 9.0
			• Exit code table title was corrected to read "1.4P1" instead of "1.3P1." (05/19/2010)	Table 14-5
			• Updated CER1.1P7 for new SGE script changes, including adding of new directory pcf under the rcf directory to match with other subsystems. (05/21/2010)	Sec. 9.0
			• Updated all PGEs to reflect new SGE scripts for running data. Added new PCF log file descriptions, removed PCFin file creation, updated runtimes, and required environment variables. Also, removed /QA as a destination designation, as it no longer exists. (07/05/2010)	All
			• Added "Available Through Ordering Tool" column and removed red "meta" from expected output tables. (09/13/2010)	All Expected Output Tables
			• Changed "Remove" to "Do not remove" in some input files. (10/26/2010)	Secs. 2.3.1, 4.3.1, 5.3.1, 7.3.1, 9.3.1, 10.3.1, 11.3.1, 11.3.2, 12.3.1, 13.3.1, 13.3.2, 13.3.3, 14.3.1, 14.3.2, & 15.3.1
			• Modified the "Destination" of some of the output files. (10/26/2010)	Tables 2-6, 5-6, 7-6, 9-6, 10-6, 12-6, 13-6, & 15-6
			• Added the "PGE" parameter. (11/30/2010)	Secs. 1.2.2, 2.2.2, 4.2.2, 5.2.2, 7.2.2, 9.2.2, 10.2.2, 11.2.2, 12.2.2, 13.2.2, 14.2.2, & 15.2.2
			• Added missing environment variable CC1_2. (02/01/2011)	Sec. 4.2.2
			• Added new environment variable InputArchiveSS. (02/01/2011)	Secs. 4.2.2, 11.2.2, & 14.2.2

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02/18/10 (Cont'd)	R5V8	756	• Fixed output destination for CER1.2P1 to reflect actual location of output file from PGE. (02/01/2011)	Table 4-6
			• Change InputArchive to InputArchiveSS to reflect proper location of input file. (02/01/2011)	Secs. 4.3.1, 11.3.1, 11.3.2, 14.3.1, & 14.3.2
			• Change CER1.1P3 to CER1.1P5. (02/01/2011)	Sec. 7.2.2
			• Added the "PROD" parameter. (02/04/2011)	Secs. 1.2.2, 2.2.2, 4.2.2, 5.2.2, 7.2.2, 9.2.2, 10.2.2, 11.2.2, 12.2.2, 13.2.2, 14.2.2, & 15.2.2
			• Updated the Special Case Considerations to show running them via the SGE_Driver rather than manually. (03/02/2011)	Secs. 2.4.3, 4.4.3, 5.4.3, 7.4.3, 9.4.3, 10.4.3, 11.4.3, 12.4.3, 13.4.3, 14.4.3, & 15.4.3
			• Updated the SGE directions to add new -platform option. (03/02/2011)	Secs. 4.4.2, 14.4.2, & 15.4.2
			• Removed PCF and QC tar files from PGE CER1.1P8 expected output file table. These files are not created by the newer C++ versions of the code. (03/09/2011)	Table 10-6
			• "No Archive" was modified to read "Archive" in the PCF expected output files. (03/10/2011)	Tables 10-6, 14-6, & 15-6
			• Modified directory path name. (03/17/2011)	Sec. 7.3.2
			• Added SGE log files to expected output tables. (3/23/2011)	Tables 1-6, 2-6, 4-6, 5-6, 7-6, 9-6, 10-6, 11-6, 12-6, 13-6, 14-6, & 15-6
04/04/11	R5V9	843	• Added new subdirectory dprep to the TRMM ephemeris/attitude directory path. This directory was added for *AMI* as we have ingested eph/att and dprep processed eph/att for TRMM. Ingested eph/att is now under the subdirectory level0.	Secs. 2.3.2, 2.3.3, 4.3.2, 10.3.2, 10.3.3, 13.3.2, & 13.3.3
			• Removed the reference to "-env" no longer used for PGEs running on *AMI*.	Secs. 6.4.2, 6.4.3, 6.4.5, 12.4.1, Tables 6-4 & 12-5 notes
			• Added summary file to the expected output listings and added definitions for new values yyyy, nn, and dd to the table note.	Tables 1-6, 2-6, 5-6, 7-6, 9-6, & 10-6

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04/04/11 (Cont'd)	R5V9	843	• Changed sge log file disposition to No Archive, rm, because this file does not need to be archived.	Table 1-6
			• Modified the correct path for the expected output file BINMEM. (07/07/2011)	Tables 2-6, 5-6, 7-6, & 9-6
			• The temporary file listings were updated to reflect the correct paths. (07/07/2011)	Table 4-7
			• Updated the expected output product tables for CER1.1P1, 3, 5, 7 and 8 and CER1.3P3 to add the new Web designation for QC report files and PCF files. (10/13/2011)	Tables 2-6, 5-6, 7-6, 9-6, 10-6, & 13-6
			• Changed CER1.3P2 to CER1.4P2. (10/13/2011)	Sec. 15.4
			• Changed primary contact from Brian Magill to Mark Timcoe. (10/13/2011)	Tables 14-1 & 15-1
			• Added "Web" to the destination column of PGE CER1.1P8 (PCF.log file) in the output table. (12/21/2011)	Table 10-6
02/08/12	R5V10	882	• Added "Web" to the destination column of PGE CER1.0P2 for the PCF, PCF.log, and the QCLog files.	Table 1-6
			• Added "Web" to the destination column of PGE CER1.3P3 for the PCF.log file.	Table 13-6
			• Added "Web" to the destination column of PGEs CER1.4P1, CER1.4P2 for PCF, and PCF.log files.	Tables 14-6 & 15-6
			• Added optional arguments for CER1.0P2-SGE_Driver.pl along with examples of usage.	Sec. 1.4.2
			• Removed disabled Ada PGEs that will never be run in production on *AMI*: CER1.1P1, 2, 3, 4, 5, 6, and 7. These PGEs are being replaced by the new C++ PGE CER1.1P8. (03/16/2012)	Secs. 2.0, 3.0, 5.0, 6.0, 7.0, 8.0, & 9.0
			• Moved PGE CER1.1P8 before PGE CER1.2P1 to mimic actual processing flow for Instrument. (03/16/2012)	Sec. 10 moved to Sec. 2.0
			• Removed disabled Ada PGE that will never be run in production on *AMI*: CER1.3P1. This PGE is being replaced by the new C++ PGE CER1.4P1. (03/16/2012)	Sec. 11.0

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02/08/12 (Cont'd)	R5V10	882	• Removed disabled Ada PGE that will never be run in production on *AMI*: CER1.3P2. This PGE is being replaced by the new C++ PGE CER1.4P2. (03/16/2012)	Sec. 12.0
			• Updated to add optional arguments for the SGE_Driver scripts for PGEs CER1.1P8, CER1.2P1, CER1.3P3, CER1.4P1, and CER1.4P2. (03/16/2012)	Secs. 10.4.2, 4.4.2, 13.4.2, 14.4.2, & 15.4.2 (Sec. no.s before Ada PGEs were removed)
			• Removed disabled Ada PGEs replaced by CER1.1P8, CER1.4P1, and CER1.4P2. (03/16/2012)	Document Overview
			• Updated Parent and Target PGE tables to remove disabled Ada PGEs. (03/16/2012)	Tables 1-3, 4-2, 13-2, 14-2, 14-3, & 15-2 (Table no.s before Ada PGEs were removed)
			• Updated PGE input sources to remove disabled Ada PGEs replaced by CER1.1P8, CER1.4P1, and CER1.4P2. (03/16/2012)	Secs. 4.3.1, 13.3.1, 14.3.1, 14.3.2, & 15.3.1 (Sec. no.s before Ada PGEs were removed)
			• Updated Appendix C with the appropriate PGEs and new Edition3 ancillary data files. (03/16/2012)	App. C
			• Modified a link and document title name. (04/09/2012)	References
12/22/11	R5V11	878	• Updated to remove *P6* Only restrictions for CER1.1P8.	Sec. 2.4.2
			• Updated directory names to correct directory names and add files for PGEs that are missing from the table.	Table B-2
			• Removed "_CC" from Offset filename; no longer part of the filename.	Table C-1
			• Added Spectral Correction Coefficient file for NPP-FM5 to table.	
			• The output file BINMEN directory was changed from data/BINMEN to data/MEM. (06/20/2012)	Table 2-6

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07/12/12	R5V12	911	• Changed responsibilty for PGE CER1.0P2 from Rich Spivak to Mark Timcoe and Thomas Grepiotis.	Table 1-1
12/22/11	R6V1	877	• Updated CER1.0P2 expected output table to archive the SGE log file to make it consistent with all the other PGEs.	Table 1-6
			• Updated CER1.2P1 expected output table to archive the SGE log file, added web to the PCF and PCF.log, and added the PCF summary file to the table.	Table 3-6
			• Updated CER1.3P3 expected output table to add the PCF summary file as a possible output file.	Table 4-6
			• Added new PGE CER1.4P3.	Sec. 7
			• Updated Appendix C table to add CER1.4P3 as a PGE that uses the ancillary data files that CER1.3P3 uses.	Table C-1
			• Changed contacts to developers of the new CER1.4P3 PGE. (12/06/2012)	Table 7-1
			• Updated to reflect that Edition3 is now the default for processing. Also, now to run Edition2 you must have "--" in front of the -ed 2. (12/06/2012)	Secs. 7.4.1 & 7.4.2
			• Remove IES_Only option as it is no longer valid. (12/06/2012)	Sec. 7.4.3, Table 7-4
			• Added the -ic and -sat ID parameters to the table and changed Edition2 to Edition3 in the -ed ID parameter row. (12/10/2012)	Table 7-4
			• Removed PCF.tar file not created for PGE CER1.4P3. (01/24/2013)	Table 7-6
03/21/13	R6V2	956	• Removed section on PGE CER1.3P3, being replaced by CER1.4P3 and no longer needed.	Sec. 4.0
			• Removed PGE CER1.3P3 from document overview cross-reference.	Document Overview
			• Removed PGE CER1.3P3 from the subsystem overview.	Subsystem Overview
			• Updated to include new value of -ed to support Edition4.	Table 7-4
			• Updated input gain files to include files for Edition4.	Sec. 7.3.4
			• Updated offset files to include files for Edition4.	Sec. 7.3.5

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03/21/13 (Cont'd)	R6V2	956	• Updated to add Edition4 as an option.	Secs. 7.4.1 & 7.4.2
			• Updated disposition of Log files for all PGEs. These files now need to be archived as there is no longer a tar file that contains these files. (06/04/2013)	Tables 2-6, 3-6, & 6-6.
			• Added rm to file disposition for IESs, QC report, etc. These data products are either not used in later processing or are read from the DPO and do not need to be stored in the production area after they are archived. (09/03/2013)	Tables 1-6, 2-6, 3-6, 4-6, 5-6, & 6-6
			• Changed CER1.1P7 to CER1.1P8. (09/03/2013)	Table 1-6
			• Removed 1.3P2. (09/03/2013)	Table 4-6
			• Changed BDS input file source from 1.3P3 to 1.4P3. (09/03/2013)	Sec. 3.3.1
			• Removed Do Not Remove; these files are read from the DPO and are not on the production disk. (09/03/2013)	Secs. 2.3.1, 2.3.2, 2.3.3, 3.3.2, 5.3.1, 6.3.1, 6.3.2, & 6.3.3
			• Changed CER1.3P1 to CER1.4P1 as CER1.3P1 has been replaced by CER1.4P1. (09/03/2013)	Table 2-6
			• Added descriptor stating that the file is used by CER1.4P1. (09/03/2013)	Sec. 3.3.1
			• Changed input BDS/BDSD disposition to remove after successful completion. (09/03/2013)	Secs. 4.3.1, 4.3.2
09/11/13	R6V3	979	• Added new Edition1, which is for NPP-FM5.	Secs. 6.3.5, 6.4.1, & 6.4.3
			• Removed "--" in script calls; no longer needed.	Sec. 6.4.2
			• Changed names of optional start and stop parameters to startt and stopt, because start is used as a parameter for the SGE Driver.	Table 6-4
			• Added rm to file disposition for QC reports.	Table 6-6
			• Updated to the latest Clouds PGEs that read the IES data from CER1.1P8.	Tables 2-3 & 2-6
			• Updated to the latest Clouds and Inversion PGEs that read the IES data from CER1.4P3.	Tables 6-3 & 6-6
			• Modified PM1ATTNR … filename. (10/08/2013)	Sec. 6.3.3

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09/11/13 (Cont'd)	R6V3	979	• Fixed some cross reference link issues. (10/10/2013)	All
			• Added special case instructions for 01/01/2006, due to leap second issues on that date. Also fixed examples for single dates to use -date instead of -start. (12/11/2013)	Secs. 2.4.3 & 6.4.3
			• Updated note to show that only TRMM is not run thru this PGE. (12/11/2013)	Sec. 6.0
			• Added an example for multiple data dates for Edition1. Removed the example to force the PGE to run on an x86 blade, as this delivery will make this PGE an x86-only PGE. (12/11/2013)	Sec. 6.4.2
			• Updated alternate contact for PGE CER1.4P3. (03/31/2014)	Table 6-1
			• Updated to add PGE CER1.4P3 subdirectory to the runlogs directory. (03/31/2014)	Sec. 6.5.3 & Table 6-6
04/30/14	R6V4	1012	• Changed alternate contact from Mark Timcoe to Denise Cooper.	Table 2-1
			• Removed PGE CER1.3P3 from target PGEs.	Table 2-3
			• Changed parameters -start and -stop to -startt and -stopt to avoid conflict with the SGE_Driver parameter -start.	Table 2-4
			• Changed long "-" to regular "-".	Sec. 2.4.1
			• Changed -start and -stop to -startt and -stopt to avoid conflict with the SGE_Driver parameter -start.	Sec. 2.4.2
			• Removed the note about using "--", which is no longer necessary.	Sec. 2.4.2
			• Removed the "--" in the examples.	Sec. 2.4.2 & Sec. 2.4.3
			• Added the CER1.1P8 subdirectory to the runlogs directory path. This new subdirectory has been added to make it easier to find runlogs for CER1.1P8.	Table 2-6
			• Added gain and offset files for Edition1 and Edition4 and removed PGE CER1.3P3 from the Used By column.	Table C-1
			• Added DPO to destination column for output files that need to be placed not only into the Archive, but into the DPO. (05/22/2014)	Tables 1-6, 2-6, 3-6, 4-6, 5-6, & 6-6

Document Revision Record

SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
04/30/14 (Cont'd)	R6V4	1012	• Updated PCF files for PGEs CER1.2P1 and CER1.4P3 from No Archive to Archive. (07/03/2014)	Tables 3-6 & 6-6
			• Removed "No" from "No Archive" in PGEs CER1.2P1 and CER1.4P3 output PCF.log file destination. (09/10/2014)	Tables 3-6 & 6-6
9/04/14	R6V5	1038	• Updated instructions for creating PCF; date parameter now entered the same way as a single date for the SGE_Driver script.	Tables 3-4 & 7-4, Secs. 3.4.1 & 7.4.1
			• Updated to add PGE CER1.0P3 as a source of the NPP eph/att data files for PGEs CER1.1P8 and CER1.4P3.	Secs. 3.3.2, 3.3.3, 7.3.2, & 7.3.3
			• Updated to add new NPP Level-0 filenames from PGE CER1.0P3.	Sec. 3.3.1
			• Updated cover page with new PGE CER1.0P3.	Cover
			• Added new PGE CER1.0P3 to the Document Overview.	Doc. Overview
			• Added new PGE CER1.0P3 description to the Subsystem Overview.	Subsystem Overview
			• Added new section for PGE CER1.0P3 after PGE CER1.0P2.	Sec. 2.0
			• Updated to add new Parent PGE CER1.0P3.	Table 3-2
			• Updated to add new Parent PGE CER1.0P3.	Table 7-2
			• Updated PGE CER1.2P1 and PGE CER1.4P1 – 3 descriptions to contain the proper definitions of the predecessor PGEs. Removed the sentence stating that PGE CER1.4P3 has not yet been delivered.	Subsystem Overview
			• Added PGEs CER1.4P3, CER1.0P2, and CER1.0P3 as a parent PGE for CER1.2P1.	Table 4-2
			• Added new filename for ephemeris data from PGE CER1.0P3 for NPP.	Sec. 4.3.2
			• Fixed reference to PGE CER1.3P1 to read PGE CER1.4P1 in example of screen output.	Sec. 5.5.2
			• Fixed reference to PGE CER1.3P2 in directory path for PGE CER1.4P2.	Sec. 6.4.2
			• Added new ephemeris and attitude data filenames for NPP from PGE CER1.0P3.	Secs. 7.3.2 & 7.3.3

Document Revision Record

SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
9/04/14 (Cont'd)	R6V5	1038	• Updated description of Table B-1 to include all of the Instrument PGEs.	App. B
			• Changed all references to PGE CER1.3P3 to PGE CER1.4P3.	Table B-2
			• Added new directories common/<instr> under ancillary for Instrument_Engineering_Coefficients files for each CERES instrument.	Table B-2
			• Changed reference to NPP gains and offsets from Ed3 to Ed1.	Table B-2
			• Updated to fix incorrect QC filename for CER1.0P3. (05/08/2015)	Table 2-6
			• Modified filename. (05/11/2015)	Sec. 2.3.1
			• Added (.met) to BQCAE output filename. (05/13/2015)	Table 2-6
01/15/15	R6V6	1052	• Updated to show files have moved to ancillary/common from ancillary/CER1.1P8.	Table B-2
			• Added missing Scan_Mode_Offset_Map and IC_Gnd_Ref_Data files to the ancillary data table.	Table B-2
			• Added PGE CER1.1P8 to IC_Gnd_Ref_Data as a PGE that uses this file. Also added CER1.4P1 to Digital_Location.YYYYMMDD as a PGE that uses the file.	Table C-1
01/06/16	R6V7	1104	• Updated tables to include new PGE specific directory for CER1.4P1 & CER1.4P2 runlogs.	Tables 5-6 & 6-6
			• Removed instructions for creating a PCF for CER1.4P1 & CER1.4P2.	Secs. 5.4.1 & 6.4.1
			• Removed instructions for running PGEs CER1.4P1 & CER1.4P2 on the command line.	Secs. 5.4.2 & 6.4.2
			• Added the PCF summary file to the output file tables for PGEs CER1.4P1 & CER1.4P2. (02/03/2016)	Tables 5-6 & 6-6
			• Modified .summary output filename. (02/08/2016)	Table 6-6
03/07/16	R6V8	1110	• Removed information for TRMM Ephemeris and Attitude data files since this PGE will not be used to process TRMM data.	Secs. 7.3.2 & 7.3.3

Document Revision Record

SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
03/07/16 (Cont'd)	R6V8	1110	• Updated the directories for CER1.4P3 gain and offset files. Removed information for TRMM since this PGE will not be used to process TRMM data.	Sec. 7.3.4 & 7.3.5
			• Removed instructions for creating a PCF for CER1.4P3. Also moved the instructions to the Special Case Considerations section as they are needed in that section.	Sec. 7.4.1 & 7.4.3
			• Removed instructions for running PGE CER1.4P3 on the command line.	Sec. 7.4.2
			• Updated to add new CER1.4P3/$PS1_1 subdirectories in the instrument/web directory to make it easier to locate QC files.	Table 7-6
			• Removed the Support Input File table and move the information to the Ancillary Data Files Table C-1. These two tables contain the same information; however, Table C-1 is missing the complete directory paths to the files.	Table B-2
			• Updated the Ancillary Data File table with the information from the Support Input File Table B-2. Removed the Format column and just added a note at the end of the table that all files are in ASCII format. This will make room for the additional directory paths to be added for each file. Changed the title from Filename to Location/Filename. Added the Toolkit data files required by the Instrument subsystem.	Table C-1

Preface

The Clouds and the Earth's Radiant Energy System (CERES) Data Management System supports the data processing needs of the CERES Science Team research to increase understanding of the Earth's climate and radiant environment. The CERES Data Management Team works with the CERES Science Team to develop the software necessary to support the science algorithms. This software, being developed to operate at the Langley Atmospheric Science Data Center (ASDC), produces an extensive set of science data products.

The Data Management System consists of 12 subsystems; each subsystem represents one or more stand-alone executable programs. Each subsystem executes when all of its required input data sets are available and produces one or more archival science products.

This Operator's Manual is written for the data processing operations staff at the Langley ASDC by the Data Management Team responsible for this Subsystem. Each volume describes all Product Generation Executables for a particular subsystem and contains the Runtime Parameters, Production Request Parameters, the required inputs, the steps used to execute, and the expected outputs for each executable included within this Subsystem. In addition, all subsystem error messages and subsequent actions required by the ASDC operations staff are included.

Acknowledgment is given to the CERES Documentation Team for their support in preparing this document.

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Introduction

CERES is a key component of EOS and NPP. The first CERES instrument (PFM) flew on TRMM, four instruments are currently operating on the EOS Terra (FM1 and FM2) and Aqua (FM3 and FM4) platforms, and NPP (FM5) platform. CERES measures radiances in three broadband channels: a shortwave channel (0.3 - 5 μm), a total channel (0.3 - 200 μm), and an infrared window channel (8 - 12 μm). The last data processed from the PFM instrument aboard TRMM was March 2000; no additional data are expected. Until June 2005, one instrument on each EOS platform operated in a fixed azimuth scanning mode and the other operated in a rotating azimuth scanning mode; now all are typically operating in the fixed azimuth scanning mode. The NPP platform carries the FM5 instrument, which operates in the fixed azimuth scanning mode though it has the capability to operate in a rotating azimuth scanning mode.

CERES climate data records involve an unprecedented level of data fusion: CERES measurements are combined with imager data (e.g., MODIS on Terra and Aqua, VIIRS on NPP), 4-D weather assimilation data, microwave sea-ice observations, and measurements from five geostationary satellites to produce climate-quality radiative fluxes at the top-of-atmosphere, within the atmosphere and at the surface, together with the associated cloud and aerosol properties.

The CERES project management and implementation responsibility is at NASA Langley. The CERES Science Team is responsible for the instrument design and the derivation and validation of the scientific algorithms used to produce the data products distributed to the atmospheric sciences community. The CERES DMT is responsible for the development and maintenance of the software that implements the science team's algorithms in the production environment to produce CERES data products. The Langley ASDC is responsible for the production environment, data ingest, and the processing, archival, and distribution of the CERES data products.

Document Overview

This document, CERES Geolocate and Calibrate Earth Radiances Subsystem 1.0 Release 5 Operator's Manual is part of the CERES Subsystem 1.0 Release 4 delivery package provided to the Langley Atmospheric Science Data Center (ASDC). It provides a description of the CERES Geolocate and Calibrate software and explains the procedures for executing the software Process Generation Executives (PGEs). A description of acronyms and abbreviations is provided in Appendix A; a comprehensive list of error messages that can be generated during the execution of the PGEs CER1.1P8, CER1.2P1, CER1.4P1, CER1.4P2, and CER1.4P3 are contained in Appendix B; and Ancillary Data Files for Subsystem CER1.0 are provided in Appendix C.

This document is organized as follows:

Introduction
Document Overview
Subsystem Overview

1.0 PGEName: CER1.0P2
2.0 PGEName: CER1.0P3
3.0 PGEName: CER1.1P8
4.0 PGEName: CER1.2P1
5.0 PGEName: CER1.4P1
6.0 PGEName: CER1.4P2
7.0 PGEName: CER1.4P3
References
Appendix A - Acronyms and Abbreviations
Appendix B - Error Messages for Subsystem CER1.0
Appendix C - Ancillary Data Files for Subsystem CER1.0

Subsystem Overview

CER1.0P2 - CERES (FM-5) NPP Preprocessor, NPP HDF5 Raw Data Records to Level-0

CER1.0P2 is specific to the NPOESS Preparatory Project (NPP). This PGE preprocesses HDF5 Raw Data Records (RDRs) sent by the Interface Data Processing System (IDPS). These records contain Science (APID=149), Calibration (APID=147), Diagnostic (APID=150), and Diary (APID=11) application packets, which the preprocessor writes into Level-0 files and Toolkit Attitude and Ephemeris files that are then used by the main subsystem. A construction record for each Level-0 and a descriptive log file are also produced by this PGE.

CER1.0P3 - CERES (FM-5) NPP Preprocessor, NPP EDOS 2-hr APID 11 Level-0 files to 24-hr Ephemeris and Attitude files

CER1.0P3 is specific to the NPOESS Preparatory Project (NPP). This PGE preprocesses the NPP EDOS 2-hr APID 11 Level-0 files for NPP ephemeris and attitude sent from EDOS. These records contain Diary (APID=11) application packets, within 2-hr Level-0 data files which the preprocessor reads and then writes into 24-hr SDP Toolkit Attitude and Ephemeris files that are then used by the main subsystem.

CER1.1P8 - CERES Geolocate and Calibrate Earth Radiances Subsystem 1.0 Main Processor (C++)

The CER1.1P8 runs the Instrument Main Processor software for TRMM 24-hour Level-0 data files, Terra 24-hour Level-0 data files, Aqua 24-hour Level-0 data files, and NPP 24-hour data files.

The Main Processor converts CERES Level-0 data into CERES Level-1B data. It converts all raw radiance values into filtered radiances and geolocates each of the CERES footprints at both the Earth's surface and at the Top-of-Atmosphere (TOA). It also converts all raw instrument data (voltages and temperatures) to engineering units. There are four types of Level-0 data which are ingested by the ASDC for processing: these are Science (APID=54, 131, 141, 149, 157, and 167), Calibration (APID=55, 132, 142, 147, 158, and 168), Diagnostic (APID=56, 133, 143, 150, 159, and 169), and Attitude (APID=500 for TRMM only) data. The Main Processor only processes Science, Calibration, and Diagnostic data. Attitude data is preprocessed by the

EOSDIS Core System (ECS) provided DPREP software before it is used by the Main Processor for geolocation calculations.

The output of the Subsystem 1.0 Main Processor consists of several Hierarchical Data Format (HDF) files designated: BDS, BDSD, BDSF, BDSG, BDSM, BDSP, BDSS, and up to 24 IESs. The BDS is generated from a Science Level-0 file, the BDSS is generated from a Solar Calibration Level-0 file, while the remainder of the BDSx's are generated from a Diagnostic Level-0 file. Main Processor execution will not necessarily produce one of each of the above files; instead, it may create any combination of the above files. For example, CER1.1P8 will not create any BDSS files unless there is Calibration data available for the processed data date.

CER1.2P1 - CERES Geolocate and Calibrate Earth Radiances Subsystem 1.0 BDS to Pre-ES8 Conversion Postprocessor

CER1.2P1 executes the BDS to Pre-ES8 Conversion Postprocessor. CER1.2P1 reads a BDS file created by CER1.1P1, CER1.1P3, CER1.1P5, CER1.1P7, or CER1.1P8 and generates a binary PRES8 file which is used by the CERES Processors for ERBE-like Inversion to Instantaneous TOA Fluxes, Subsystem 2.

CER1.4P1, CER1.4P2, and CER1.4P3 - CERES Geolocate and Calibrate Earth Radiances Subsystem 1.0 Gain Analysis and BDS Reprocessing

CER1.4P1 reads the BDS and BDSD looking for internal calibration events. When an internal calibration event is detected, the PGE writes out the information as a subset of the BDS/BDSD as a BDSI. CER1.4P2 reads in all the BDSIs for a month and analyzes the internal calibration events to create gain trend files, which are used by analysts to determine if there has been a shift of the gain coefficients. CER1.4P3 reads the Edition1-CV BDSs created by CER1.1P1, CER1.1P3, CER1.1P5, CER1.1P7, or CER1.1P8 and creates updated Edition1/2/3/4 BDS and IES files using the updated gain file for each edition. The gain files are produced using data from CER1.3P2 or CER1.4P2.

1.0 PGEName: CER1.0P2

CER1.0P2 - CERES NPP-FM5 HDF5 Raw Data Records to Level-0 Preprocessor

1.1 PGE Details

1.1.1 Responsible Persons

Table 1-1. CER1.0P2 Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Mark Timcoe	Thomas Grepiotis
Organization	SSAI	SSAI
Address	1 Enterprise Parkway	1 Enterprise Parkway
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1941	951-1940
Fax	951-1900	951-1900
LaRC email	Mark.G.Timcoe@nasa.gov	Arthur.T.Grepiotis@nasa.gov

1.1.2 E-mail Distribution List

E-mail distribution list can be obtained from the primary contact listed in Table 1-1.

1.1.3 Parent PGE(s)

Table 1-2. Parent PGEs for CER1.0P2

PGEName	Description
N/A	

1.1.4 Target PGE(s):

Table 1-3. Target PGEs for CER1.0P2

PGEName	Description
CER1.1P8	CERES Main instrument subsystem for TRMM/Terra/Aqua/NPP (C++)

1.2 Operating Environment

1.2.1 Runtime Parameters (List all Dynamic Parameters needed at Runtime)

Table 1-4. Runtime Parameters for CER1.0P2

Parameter ID (static value)	Parameter	Description	Data Type	Valid Values	m/o
	YYYYMMDD	Data Date	I(4)	>1996	m

YYYY - 4-digit year
MM - 2-digit month
DD - 2-digit day
m - mandatory parameter
o - optional parameter
hh - 2-digit hour
mm - 2-digit minute
ss - 2-digit seconds
ssssss - 6-digit milliseconds

1.2.2 Environment Script Requirements

Refer to the CERES internal paper (Reference 1) for a detailed description of the CERES environment parameters.

One Environment Script is required. This script must contain the following parameters:

PGE	-	PGE name, set to CER1.0P2
PROD	-	Set to YES for production, read input from the DPO
SS1_02	-	Sampling Strategy for Instrument: see Production Request[2]
PS1_02	-	Output Production Strategy for Instrument: see Production Request[2]
CC1_02	-	Configuration Code for Instrument: see CM Database
SW1_02	-	Software SCCR # for Instrument: see CM Database
DATA1_02	-	Data SCCR # for Instrument: see CM Database
SAT	-	Satellite: (see Note)
INST	-	Instrument: (see Note)
INSTRHOME	-	Instrument Home Directory
InputArchive	-	Directory from which to read the input data products, since this spacecraft has not yet launched this should be set to **$CERESHOME/instrument/data**
PCF_FILE_DIR	-	directory for the expected input PCF file
CER1_0P2_Ingest_Dir	-	directory where RDRs to be read reside
CER1_0P2_Output_Dir	-	output directory for Level 0 and construction record files
CER1_0P2_Log_Dir	-	output directory for Toolkit and CER1.0P2 log files
CER1_0P2_Att_Dir	-	output directory for Toolkit formatted Attitude files
CER1_0P2_Eph_Dir	-	output directory for Toolkit formatted Ephemeris files
Prod_Date	-	production processing date

Note: From the Production Request[2], the PGE CER1.0P2 requires that the SAT and INST parameters be the following:

SAT = **NPP** and INST = **FM5**

1.2.3 Execution Frequency (daily, hourly, or monthly)

Daily (1/day) - This PGE is to be processed once per day, for a maximum of 31 days per month, when all required input data are available.

1.2.4 Memory/Disk Space/Time Requirements

Memory:	340 MB
Disk Space:	440 MB
Total Run Time:	10 mins

1.2.5 Restrictions Imposed in Processing Order

Data for the day before must be present to run the requested data day. However, it is possible to run the system if these files are missing, but the output products may have missing data. This should only be done in emergency situations, when data are needed for immediate analysis, and will be requested by the CERES Data Management Team (DMT).

1.3 Processor Dependencies (Previous PGEs, Ingest Data)

Note: Include required .met files, header files, .. all required inputs

1.3.1 Input Dataset Name (#1): RDR – Raw Data Records

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

$InputArchive/NPPRDR/YYYY/

RCERX_RNSCA_npp_dYYYYMMDD_tHHMMSS_eHHMMSS_bnnnnn_c YYYYMMDDHHMMSSSSSSSS_orgid_domain.h5

where	**dYYYYMMDD**	**=**	**data start date**
	tHHMMSS	**=**	**data start time**
	eHHMMSS	**=**	**data stop time**
	bnnnnn	**=**	**orbit number**
	cYYYYMMDDHHMM	**=**	**creation date and time**
	SSSSSSSS	**=**	**microseconds**
	orgid	**=**	**a few ascii characters, unknown at this time**
	domain	**=**	**a few ascii characters, unknown at this time**
	X	**=**	**S, Science/Calibration RDR**
		=	**D, Diagnostic RDR**

1. Mandatory/Optional: **These files are Mandatory.**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY, MM, DD and DD-1.**
3. Waiting Period: **2 Days**

b. Provide the source of information (source PGE name or ingest source): **Interface Data Processing System (IDPS) via Land PEATE**

c. Alternate dataset, if one exists (maximum waiting period): **None.**

d. Typical file size: **1.34MB**

1.4 Operating Procedures (Procedure for each part of the processor's elements)

The Preprocessor production script, **run_CER1.0P2.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. The PCF is created by first sourcing an instrument-specific environment script, which contains the necessary environment definitions as listed in Section 1.2.2 above.

1.4.1 How to Generate the PCF

The PCF generator requires one (1) command line arguments:

(YYYYMMDD) input data date – 4-digit year, 2-digit month, 2-digit day

Note: If additional runtime parameters are requested, they will appear as part of the PCF file generator command line.

At the command line (>) type:

> cd $CERESHOME/instrument/CER1.0P2/rcf
> CER1.0P2_pcf_gen.pl YYYYMMDD

The following files will be generated in **$CERESHOME/instrument/CER1.0P2/rcf/pcf/:**

CER1.0P2_PCF_$SS1_02_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD
CER1.0P2_PCF_$SS1_02_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD.log

1.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **run_CER1.0P2.pl**, followed by the PCF filename, if processing manually. To run via SGE execute the production script by typing **CER1.0P2-SGE_Driver.pl** followed by the data date.

To run at the command line:

At the command line (>) type:

> cd $CERESHOME/instrument/CER1.0P2/rcf
> run_CER1.0P2.pl
CER1.0P2_PCF_$SS1_02_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD

To run using SGE:

Note: It is not necessary to manually create the PCF as described above when submitting a job using the SGE submission script.

To run a single date:

> cd $CERESHOME/instrument/CER1.0P2rcf
> CER1.0P2-SGE_Driver.pl -date YYYYMMDD

To run multiple sequential dates:

> cd $CERESHOME/instrument/CER1.0P2/rcf
> CER1.0P2-SGE_Driver -start YYYYMMDD -end yyyymmdd

There are several options for running jobs for multiple days in a given month. Specific platforms can also be designated.

Here are the optional arguments for **CER1.0P2-SGE_Driver.pl**:

[-clean]	**Delete any existing outputs that are encountered**
[-platform CPU]	**Run the PGE on the platform designated by CPU (i.e., *p6* or *x86*)**
[-date YYYYMMDD]	**Run the PGE on the data date specified by YYYYMMDD**
[-start YYYYMMDD]	**Run the PGE starting on the data date specified by YYYYMMDD**
[-end YYYYMMDD]	**Run the PGE ending on the data date specified by YYYYMMDD**

Below are some examples of executing the driver script with these arguments.

To run a single date:

> CER1.0P2-SGE_Driver.pl -date 20120229

To run multiple sequential dates:

> CER1.0P2-SGE_Driver.pl -start 20120201 -end 20120229

The example above runs Feburary 2012 for data days 1 to 29.

For any of the examples above you can add the platform option to specify either the *P6* or the *x86* platform.

For example:

> CER1.0P2-SGE_Driver.pl -date 20120229 -platform x86

or

> CER1.0P2-SGE_Driver.pl -date 20120229 -platform p6

The **CER1.0P2-SGE_Driver.pl** script will search for the required input data files and any existing data product files for the requested data date(s) and time(s) provided. If all the input data files are available and previously created output for this data date does not exist, the job will be submitted to the SGE queue. However, if any mandatory data files are missing the script will not submit the job to the SGE queue. Instead the information on which data files are missing or already exist can be found in the **CER1.0P2_PCF_$SS1_02_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD.log** file. Mandatory files may then be staged or existing output files can be deleted before attempting to rerun this job.

1.4.3 Special Case Considerations

None at this time.

All special requests must come from the Data Management Team.

1.4.4 Special Reprocessing Instructions

If reprocessing is done to correct an error during production, then all Level-0, Ephemeris and attitude files created during the previous run must be deleted. A script to remove all files from the failed run is available. The script **file_cleanup.pl** takes as in input parameter the PCF filename for the failed run. The environment variable **$CERESHOME** must be set in order for this script to work.

```
> cd $CERESHOME/instrument/test_suites
> source temp-inst-env.csh
> file_cleanup.pl CER1.0P2_PCF_NPP-
    FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD
```

1.5 Execution Evaluation

1.5.1 Exit Codes

The preprocessor CER1.0P2 terminates using the CERES-defined EXIT CODES as seen in Table 1-5. Other Exit Codes may appear from the program, which may be the result of a system, compiler, or ToolKit related error. In these cases, contact the responsible person (see Table 1-1) for assistance.

Table 1-5. Exit Codes for CER1.0P2

Exit Code	Definition	Action
0	Normal Exit	Proceed Normally
200	Abnormal Exit	Check the Log Files and take the appropriate action (see Appendix B).

1.5.2 Screen Messages (Use Table format for large number of messages)

A normal run of the production script, **run_CER1.0P2.pl**, will produce the following on standard out:

Starting CER1.0P2 with PCF FILE **CER1.0P2_PCF_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD**

Normal Return: 0

EXIT=0

Ending CER1.0P2 with PCF FILE **CER1.0P2_PCF_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD**

The above two lines signify a successful execution. Any other message indicates an error has occurred. Contact the responsible person (see Table 1-1) for assistance.

1.5.3 Log and Status Files Results (Include ALL Log Files)

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: **$CERESHOME/instrument/runlogs**.

1. **Report Log File: CER1.0P2_LogReport_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD**

The Report Log File contains Instrument-related informational messages. These messages may be strictly informative (Error Type = Status or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal).

2. **Status Log File: CER1.0P2_LogStatus_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD**

The Status Log File contains all messages created by the ToolKit and Instrument-related messages that can lead to abnormal ending of the Preprocessor. If an abnormal exit is encountered by the PGE, this file should be examined for '_E_', (error) or '_F_' (fatal) message types.

3. **User Log File: CER1.0P2_LogUser_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD**

The User Log File is not used at this time, but exists to satisfy the ToolKit requirements. Typically the _U_ and _N_ (User information and Notice) will be written to User Log File and Status Log File.

4. **CER1.0P2 Log file**: This log file has the following name:

CER1.0P2_QCLog_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD

A new log file of type 1, 2, and 3 is created for each new run, except in the case that these files already exist for the current run date, data date, production strategy and CC code, in which case each file will be appended.

A new log file of type 4 is created for each new run, except in the case that the file already exists for the current run date, data date, production strategy and CC code, in which case the existing log file will be overwritten.

If a run is successful, no warning or errors will be listed in any of the log files.

The top of the CER1.0P2 log file (type 4 in the above) will list the current date and number of input data files (Raw Data Records) found for the input process date.

For example:

```
-------------------------------------------------------------------------------
CER1.0P2 NPP Preprocessor run on Wed Feb 18 11:31:18 2009
-------------------------------------------------------------------------------
```

Found 21 RDRs for process date 20030319.

The calendar dates previous and after the process date are listed next. The number of unique granules that were found and will be replaced by newer data is written. The name of each RDR file processed is then listed, followed by a summary of the number of application packets found for each packet type.

For example:

```
Number of Packets
----------------------------------------
SCIENCE        =  0
CALIBRATION    =  290
DIAGNOSTIC     =  1417
DIARY          =  12421
----------------------------------------
```

If the number of packets found for a given type other than DIARY is greater than zero, Level-0 and construction records will be written for that type. The related messages will follow:

For example:

Writing CALIBRATION L0 file

done.

Writing DIAGNOSTIC L0 file

done.

If the number of DIARY packets is greater than zero, then SDP Toolkit Attitude and Ephemeris files are written, and the related message will follow:

Writing Toolkit Attitude and Ephemeris files

done.

1.5.4 Solutions to Possible Problems

The majority of problems seen to date deal with errors reading the input RDR files. At this point in time, there is not enough information available to provide any solutions.

1.5.5 Conditions for Subsystem and/or Target PGE(s) Terminal Failure (Halt all further processing)

a. Subsystem Termination

The PGE is expected to process 131 to 134 RDRs for any particular data date. At this time, no lower limit on the amount of data should be followed. However, after the spacecraft is launched a lower limit of TBD RDRs should be enforced before processing any RDRs for a data date.

b. Target PGE Termination

Simulated or zero-fill test data may cause issues with the target PGE, if it is determined that the data being processed is simulated or zero-fill it should not be sent on to the target PGE.

1.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process 31 times maximum, once for each day of the month.

Table 1-6. Expected Output File Listing for CER1.0P2

File Name[a]/Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
NPP_Gaaa_LZ_YYYY-MM-DDTHH-mm-ssZ_$Prod_Date.DAT @($CERESHOME/instrument/data/Level0/NPP/YYYY)	m	91.4	Daily	CER1.1P8	Archive, DPO, rm	No
NPP_Gaaa_LZ_YYYY-MM-DDTHH-mm-ssZ_$Prod_Date.CONS @($CERESHOME/instrument/data/Level0/NPP/YYYY)	m	.3 KB	Daily	CER1.1P8	Archive, DPO, rm	No
NPPATT.NYYYYDOY.$Prod_Date.DAT @($CERESHOME/instrument/data/NPPATT/YYYY)	m	5.5	Daily	CER1.1P8	Archive, DPO, rm	No
NPPEPH.NYYYYDOY.$Prod_Date.DAT @($CERESHOME/instrument/data/NPPEPH/YYYY)	m	5.5	Daily	CER1.1P8	Archive, DPO, rm	No
CER1.0P2_PCF_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD @($CERESHOME/instrument/CER1.0P2/rcf/pcf)	m	.02	Daily	N/A	Archive, Web, rm	No
CER1.0P2_PCF_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD.log @($CERESHOME/instrument/CER1.0P2/rcf/pcf)	m	.02	Daily	N/A	Archive, Web, rm	No
CER1.0P2_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD.summary **or** CER1.0P2_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD-yyyynndd.summary @($CERESHOME/instrument/CER1.0P2/rcf/pcf/summary)	o	.02	1/run	N/A	No Archive, rm	No
CER1.0P2_QCLog_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD @($CERESHOME/instrument/runlogs)	m	~1 KB	Daily	N/A	Archive, Web, rm	No
CER1.0P2_LogReport_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD @($CERESHOME/instrument/runlogs)	m	~1 KB	Daily	N/A	Archive, rm	No
CER1.0P2_LogStatus_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD @($CERESHOME/instrument/runlogs)	m	~1 KB	Daily	N/A	Archive, rm	No
CER1.0P2_LogUser_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD @($CERESHOME/instrument/runlogs)	m	~1 KB	Daily	N/A	Archive, rm	No
CER1.0P2_NPP-FM5_$PS1_02_$CC1_02_$Prod_Date.YYYYMMDD.onnnnn @($CERESHOME/instrument/sge_logs/CER1.0P2)	o		Daily	N/A	Archive, rm	No

a. See Section 1.2 for information on variable data values
If "**(.met)**" is written next to an expected Output Filename, then the metadata file **must** exist with the identical filename and .met extension.

b. VD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)
DB - File content is to be entered into the LaTIS Database
rm - remove
YYYY - 4-digit year
MM - 2-digit month {valid values: 01 .. 12}
DD - 2-digit day {valid values: 01 .. 31}

HH	-	2-digit hour of the day {valid values: 00 .. 23}
yyyy	-	4-digit year
nn	-	2-digit month {valid values: 01 .. 12}
dd	-	2-digit day {valid values: 01 .. 31}
m	-	mandatory output
o	-	optional output
EOD	-	End of Data Month
nnnnn	-	SGE job number, generated upon job submission
aaa	-	3 digit APID number
mm	-	minute
ss	-	seconds
DOY	-	day of year (1-366)

1.7 Expected Temporary Files/Directories

Table 1-7. Temporary Files Listing

Directory	File Name
$CERESHOME/instrument/CER1.0P2/rcf	MCFWrite_CER1.0P2_$SS1_02_$PS1_02_YYYYMMDD.temp
$CERESHOME/instrument/CER1.0P2/rcf	GetAttr_CER1.0P2_$SS1_02_$PS1_02_YYYYMMDD.temp

2.0 PGEName: CER1.0P3

CER1.0P3 - CERES NPP-FM5 EDOS Level-0 2-hr Data Files to 24-hr Ephemeris and Attitude Preprocessor

2.1 PGE Details

2.1.1 Responsible Persons

Table 2-1. CER1.0P3 Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Thomas Grepiotis	Denise L. Cooper
Organization	SSAI	SSAI
Address	1 Enterprise Parkway	1 Enterprise Parkway
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1940	951-1633
Fax	951-1900	951-1900
LaRC email	Arthur.T.Grepiotis@nasa.gov	Denise.L.Cooper@nasa.gov

2.1.2 E-mail Distribution List

E-mail distribution list can be obtained from the primary contact listed in Table 2-1.

2.1.3 Parent PGE(s)

Table 2-2. Parent PGEs for CER1.0P3

PGEName	Description
N/A	N/A

2.1.4 Target PGE(s):

Table 2-3. Target PGEs for CER1.0P3

PGEName	Description
CER1.1P8	CERES Main instrument subsystem for TRMM/Terra/Aqua/NPP (C++)

2.2 Operating Environment

2.2.1 Runtime Parameters (List all Dynamic Parameters needed at Runtime)

Table 2-4. Runtime Parameters for CER1.0P3

Parameter ID (static value)	Parameter	Description	Data Type	Valid Values	m/o
-date	YYYYMMDD	Data Date	I(4)	>1996	m

YYYY - 4-digit year
MM - 2-digit month
DD - 2-digit day
m - mandatory parameter
o - optional parameter
hh - 2-digit hour
mm - 2-digit minute
ss - 2-digit seconds
ssssss - 6-digit milliseconds

2.2.2 Environment Script Requirements

Refer to the CERES internal paper (Reference 1) for a detailed description of the CERES environment parameters.

One Environment Script is required. This script must contain the following parameters:

PGE	-	PGE name, set to CER1.0P3
PROD	-	Set to YES for production, read input from the DPO
SS1_03	-	Sampling Strategy for Instrument: see Production Request[2]
PS1_03	-	Output Production Strategy for Instrument: see Production Request[2]
CC1_03	-	Configuration Code for Instrument: see CM Database
SW1_03	-	Software SCCR # for Instrument: see CM Database
DATA1_03	-	Data SCCR # for Instrument: see CM Database
SAT	-	Satellite: (see Note)
INST	-	Instrument: (see Note)
INSTRHOME	-	Instrument Home Directory
InputArchive	-	Directory from which to read the input data products, since this spacecraft has not yet launched this should be set to **$CERESHOME/instrument/data**
PCF_FILE_DIR	-	directory for the expected input PCF file
Prod_Date	-	production processing date

Note: From the Production Request[2], the PGE CER1.0P3 requires that the SAT and INST parameters be the following:

SAT = **NPP** and INST = **FM5**

2.2.3 Execution Frequency (daily, hourly, or monthly)

Daily (1/day) - This PGE is to be processed once per day, for a maximum of 31 days per month, when all required input data are available.

2.2.4 Memory/Disk Space/Time Requirements

Memory:	340 MB
Disk Space:	440 MB
Total Run Time:	10 mins

2.2.5 Restrictions Imposed in Processing Order

Data for the day before must be present to run the requested data day. However, it is possible to run the system if these files are missing, but the output products may have missing data. This should only be done in emergency situations, when data are needed for immediate analysis, and will be requested by the CERES Data Management Team (DMT).

2.3 Processor Dependencies (Previous PGEs, Ingest Data)

Note: Include required .met files, header files, .. all required inputs

2.3.1 Input Dataset Name (#1): NPP – APID 11 EDOS Level-0 Data Records

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

$InputArchive/CERES/Level0/NPP/YYYY/

NPP_G011_LZ_YYYY-MM-DDT00-00-00Z_Vnn.DAT
NPP_G011_LZ_YYYY-MM-DDT02-00-00Z_Vnn.DAT
NPP_G011_LZ_YYYY-MM-DDT04-00-00Z_Vnn.DAT
NPP_G011_LZ_YYYY-MM-DDT06-00-00Z_Vnn.DAT
NPP_G011_LZ_YYYY-MM-DDT08-00-00Z_Vnn.DAT
NPP_G011_LZ_YYYY-MM-DDT10-00-00Z_Vnn.DAT
NPP_G011_LZ_YYYY-MM-DDT12-00-00Z_Vnn.DAT
NPP_G011_LZ_YYYY-MM-DDT14-00-00Z_Vnn.DAT
NPP_G011_LZ_YYYY-MM-DDT16-00-00Z_Vnn.DAT
NPP_G011_LZ_YYYY-MM-DDT18-00-00Z_Vnn.DAT
NPP_G011_LZ_YYYY-MM-DDT20-00-00Z_Vnn.DAT
NPP_G011_LZ_YYYY-MM-DDT22-00-00Z_Vnn.DAT

where nn is the version number of the data file, in most cases the version number will be 01.

1. Mandatory/Optional: **These files are Mandatory.**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY, MM, DD.**
3. Waiting Period: **2 Days**

b. Provide the source of information (source PGE name or ingest source): **EDOS**

c. Alternate dataset, if one exists (maximum waiting period): **None.**

d. Typical file size: **0.5 MB**

2.4 Operating Procedures (Procedure for each part of the processor's elements)

The Preprocessor production script, **run_CER1.0P3.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. The PCF is created by first sourcing an instrument-specific environment script, which contains the necessary environment definitions as listed in Section 2.2.2 above.

2.4.1 How to Generate the PCF

The PCF generator requires one (2) command line arguments:

-date	static value, indicates that the data date follows
(YYYYMMDD)	input data date – 4-digit year, 2-digit month, 2-digit day

Note: If additional runtime parameters are requested, they will appear as part of the PCF file generator command line.

At the command line (>) type:

> cd $CERESHOME/instrument/CER1.0P3/rcf
> CER1.0P3_pcf_gen.pl -date YYYYMMDD

The following files will be generated in **$CERESHOME/instrument/CER1.0P3/rcf/pcf/:**

CER1.0P3_PCF_$SS1_03_$PS1_03_$CC1_03.YYYYMMDD
CER1.0P3_PCF_$SS1_03_$PS1_03_$CC1_03.YYYYMMDD.log

2.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **run_CER1.0P3.pl**, followed by the PCF filename, if processing manually. To run via SGE execute the production script by typing **CER1.0P3-SGE_Driver.pl** followed by the data date.

To run at the command line:

At the command line (>) type:

> cd $CERESHOME/instrument/CER1.0P3/rcf
> run_CER1.0P3.pl CER1.0P3_PCF_$SS1_03_$PS1_03_$CC1_03.YYYYMMDD

To run using SGE:

Note: It is not necessary to manually create the PCF as described above when submitting a job using the SGE submission script.

To run a single date:

> cd $CERESHOME/instrument/CER1.0P3/rcf
> CER1.0P3-SGE_Driver.pl -date YYYYMMDD

To run multiple sequential dates:

> cd $CERESHOME/instrument/CER1.0P3/rcf
> CER1.0P3-SGE_Driver -start YYYYMMDD -end yyyymmdd

There are several options for running jobs for multiple days in a given month. Specific platforms can also be designated.

Here are the optional arguments for **CER1.0P3-SGE_Driver.pl**:

[-clean]	**Delete any existing outputs that are encountered**
[-platform CPU]	**Run the PGE on the platform designated by CPU (i.e., *p6* or *x86*)**
[-date YYYYMMDD]	**Run the PGE on the data date specified by YYYYMMDD**
[-start YYYYMMDD]	**Run the PGE starting on the data date specified by YYYYMMDD**
[-end YYYYMMDD]	**Run the PGE ending on the data date specified by YYYYMMDD**

Below are some examples of executing the driver script with these arguments.

To run a single date:

> CER1.0P3-SGE_Driver.pl -date 20140808

To run multiple sequential dates:

> CER1.0P3-SGE_Driver.pl -start 20140808 -end 20140809

The example above runs August 2014 for data days 8 to 9.

This PGE only runs on the x86 platform; however, for any of the examples above you can add the platform option to specify the *x86* platform.

For example:

> CER1.0P3-SGE_Driver.pl -date 20120229 -platform x86

The **CER1.0P3-SGE_Driver.pl** script will search for the required input data files and any existing data product files for the requested data date(s) and time(s) provided. If all the input data files are available and previously created output for this data date does not exist, the job will be submitted to the SGE queue. However, if any mandatory data files are missing the script will not submit the job to the SGE queue. Instead the information on which data files are missing or already exist can be found in the **CER1.0P3_PCF_$SS1_03_$PS1_03_$CC1_03.YYYYMMDD.log** file. Mandatory files may then be staged or existing output files can be deleted before attempting to rerun this job.

2.4.3 Special Case Considerations

None at this time.

All special requests must come from the Data Management Team.

2.4.4 Special Reprocessing Instructions

If reprocessing is done to correct an error during production, then all of the Ephemeris and Attitude files created during the previous run must be deleted. A script to remove all files from the failed run is available. The script **file_cleanup.pl** takes as in input parameter the PCF filename for the failed run. The environment variable **$CERESHOME** must be set in order for this script to work.

> cd $CERESHOME/instrument/test_suites
> source temp-inst-env.csh
> file_cleanup.pl CER1.0P3_PCF_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD

2.5 Execution Evaluation

2.5.1 Exit Codes

The preprocessor CER1.0P3 terminates using the CERES-defined EXIT CODES as seen in Table 2-5. Other Exit Codes may appear from the program, which may be the result of a system, compiler, or ToolKit related error. In these cases, contact the responsible person (see Table 2-1) for assistance.

Table 2-5. Exit Codes for CER1.0P3

Exit Code	Definition	Action
0	Normal Exit	Proceed Normally
200	Abnormal Exit	Check the Log Files and take the appropriate action (see Appendix B).

2.5.2 Screen Messages (Use Table format for large number of messages)

A normal run of the production script, **run_CER1.0P3.pl**, will produce the following on standard out:

Starting CER1.0P3 with PCF FILE **CER1.0P3_PCF_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD**

Normal Return: 0

EXIT=0

Ending CER1.0P3 with PCF FILE **CER1.0P3_PCF_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD**

The above two lines signify a successful execution. Any other message indicates an error has occurred. Contact the responsible person (see Table 2-1) for assistance.

2.5.3 Log and Status Files Results (Include ALL Log Files)

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: **$CERESHOME/instrument/runlogs**.

1. **Report Log File: CER1.0P3_LogReport_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD**

The Report Log File contains Instrument-related informational messages. These messages may be strictly informative (Error Type = Status or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal).

2. **Status Log File: CER1.0P3_LogStatus_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD**

The Status Log File contains all messages created by the ToolKit and Instrument-related messages that can lead to abnormal ending of the Preprocessor. If an abnormal exit is encountered by the PGE, this file should be examined for '_E_', (error) or '_F_' (fatal) message types.

3. **User Log File: CER1.0P3_LogUser_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD**

The User Log File is not used at this time, but exists to satisfy the ToolKit requirements. Typically the _U_ and _N_ (User information and Notice) will be written to User Log File and Status Log File.

2.5.4 Solutions to Possible Problems

The majority of problems seen to date deal with errors reading the input RDR files. At this point in time, there is not enough information available to provide any solutions.

2.5.5 Conditions for Subsystem and/or Target PGE(s) Terminal Failure (Halt all further processing)

a. Subsystem Termination

The PGE is expected to process 12 Level-0 files for any particular data date.

b. Target PGE Termination

Simulated or zero-fill test data may cause issues with the target PGE, if it is determined that the data being processed is simulated or zero-fill it should not be sent on to the target PGE.

2.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process 31 times maximum, once for each day of the month.

Table 2-6. Expected Output File Listing for CER1.0P3

File Name[a]/Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
NPPATT.NYYYYDOY.V$Prod_Date.DAT @($CERESHOME/instrument/data/NPPATT/YYYY)	m	5.5	Daily	CER1.1P8	Archive, DPO, rm	No
NPPEPH.NYYYYDOY.V$Prod_Date.DAT @($CERESHOME/instrument/data/NPPEPH/YYYY)	m	5.5	Daily	CER1.1P8	Archive, DPO, rm	No
CER1.0P3_PCF_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD @($CERESHOME/instrument/CER1.0P3/rcf/pcf)	m	.02	Daily	N/A	Archive, Web, rm	No
CER1.0P3_PCF_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD.log @($CERESHOME/instrument/CER1.0P3/rcf/pcf)	m	.02	Daily	N/A	Archive, Web, rm	No
CER1.0P3_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD.summary **or** CER1.0P3_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD-yyyynndd.summary @($CERESHOME/instrument/CER1.0P3/rcf/pcf/summary)	o	.02	1/run	N/A	No Archive, rm	No
CER_BQCAE_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD(.met) @($CERESHOME/instrument/web)	m	~1 KB	Daily	N/A	Archive, Web, rm	No
CER1.0P3_LogReport_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD @($CERESHOME/instrument/runlogs/CER1.0P3)	m	~1 KB	Daily	N/A	Archive, rm	No
CER1.0P3_LogStatus_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD @($CERESHOME/instrument/runlogs/CER1.0P3)	m	~1 KB	Daily	N/A	Archive, rm	No
CER1.0P3_LogUser_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD @($CERESHOME/instrument/runlogs/CER1.0P3)	m	~1 KB	Daily	N/A	Archive, rm	No
CER1.0P3_NPP-FM5_$PS1_03_$CC1_03.YYYYMMDD.onnnnn @($CERESHOME/instrument/sge_logs/CER1.0P3)	o		Daily	N/A	Archive, rm	No

a. See Section 2.2 for information on variable data values
If "**(.met)**" is written next to an expected Output Filename, then the metadata file **must** exist with the identical filename and .met extension.

b.
- VD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)
- DB - File content is to be entered into the LaTIS Database
- rm - remove
- YYYY - 4-digit year
- MM - 2-digit month {valid values: 01 .. 12}
- DD - 2-digit day {valid values: 01 .. 31}
- HH - 2-digit hour of the day {valid values: 00 .. 23}
- yyyy - 4-digit year
- nn - 2-digit month {valid values: 01 .. 12}
- dd - 2-digit day {valid values: 01 .. 31}
- m - mandatory output
- o - optional output
- EOD - End of Data Month
- nnnnn - SGE job number, generated upon job submission
- aaa - 3 digit APID number

mm - minute
ss - seconds
DOY - day of year (1-366)

2.7 Expected Temporary Files/Directories

Table 2-7. Temporary Files Listing

Directory	File Name
$CERESHOME/instrument/CER1.0P3/rcf	MCFWrite_CER1.0P3_$SS1_03_$PS1_03_YYYYMMDD.temp
$CERESHOME/instrument/CER1.0P3/rcf	GetAttr_CER1.0P3_$SS1_03_$PS1_03_YYYYMMDD.temp

3.0 PGEName: CER1.1P8

CER1.1P8 - CERES Geolocate and Calibrate Earth Radiances Subsystem 1.0 for TRMM, Terra, Aqua and NPP

3.1 PGE Details

3.1.1 Responsible Persons

Table 3-1. Subsystem Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Thomas Grepiotis	Denise Cooper
Organization	SSAI	SSAI
Address	1 Enterprise Parkway	1 Enterprise Parkway
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1940	951- 1633
Fax	951-1900	951-1900
LaRC email	Arthur.T.Grepiotis@nasa.gov	Denise.L.Cooper@nasa.gov

3.1.2 E-mail Distribution List

E-mail distribution list can be obtained from the primary contact listed in Table 3-1.

3.1.3 Parent PGE(s)

Table 3-2. Parent PGEs for CER1.1P8

PGEName	Description
N/A	DPREP - Ephemeris and Attitude Data preprocessor for Aqua and Terra Source ECS Ingest
CER0.1P1	TRMM DPREP
CER1.0P2	RDR Preprocessor for NPP
CER1.0P3	EDOS Level-0 Ephemeris/Attitude file preprocessor for NPP

3.1.4 Target PGE(s)

Table 3-3. Target PGEs after CER1.1P8

PGEName	Description
CER1.2P1	Convert BDS to PRES8
CER1.4P1	BDSI Subsetter (C++ version)
CER4.1-4.1P4	Cloud Property Retrieval and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function for Terra
CER4.1-4.1P5	Cloud Property Retrieval and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function for Aqua
CER4.1-4.1P6	Cloud Property Retrieval and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function for all satellites (will replace CER4.1-4.1P4 & CER4.1-4.1P5 in the future)

3.2 Operating Environment

3.2.1 Runtime Parameters (List all Dynamic Parameters needed at Runtime)

Table 3-4. Runtime Parameters for CER1.1P8

Parameter ID (static value)	Parameter	Description	Data Type	Valid Values	m/o
-date	YYYYMMDD	Data Date	I(8)	YYYY>1996, MM = 01 – 12, DD = 01 - 31	
-o	opt	Write_Products	A(8)	opt = Default, Override, BDS_Only, IES_Only	o
-pge	opt	PGE Mode	A(20)	opt = CERES_Production, Instrument_Only	o
-partearth	opt	Write_Partial_Footprints	A(3)	opt = On, Off	o
-startt	opt	Requested Start Time	time	hh:mm:ss.ssssss	o
-stopt	opt	Requested Stop Time	time	hh:mm:ss.ssssss	o
-tcmode	opt	Second Time Constant Mode	A(3)	opt = On, Off	o
-apid	xx	APID to process	I(3)	141, 142, 143, 157, 158, 159	o
-ct	opt	Check for crosstalk and set radiance counts to fill value	A(3)	opt = On, Off	o
-wn	opt	Turn on/off WN channel update	A(3)	opt = On, Off	o

Table 3-4. Runtime Parameters for CER1.1P8

Parameter ID (static value)	Parameter	Description	Data Type	Valid Values	m/o
-ddc	opt	Turn on/off Double Drift Correction	A(3)	opt = On, Off	o
-ic	opt	Turn on/off radiance 3-channel intercomparison checking	A(3)	opt = On, Off	o
-sat	opt	Turn on/off radiance saturation checking for a specified set of channels	A(7)	opt = All_On, All_Off, SW_Off, TOT_Off, WN_Off, WS_Off, WT_Off, ST_Off	o

Note:

YYYY	-	4-digit year
MM	-	2-digit month
DD	-	2-digit day
m	-	mandatory parameter
o	-	optional parameter
hh	-	2-digit hour
mm	-	2-digit minute
ss	-	2-digit seconds
ssssss	-	6-digit milliseconds

3.2.2 Environment Script Requirements

Refer to the CERES internal paper (Reference 1) for a detailed description of the CERES environment parameters.

One Environment Script is required. This script must contain the following parameters:

PGE	-	PGE name, set to CER1.1P8
PROD	-	Set to YES for production, read input from the DPO
SS1	-	Sampling Strategy for Instrument: see Production Request[2]
PS1_0	-	Output Production Strategy for Instrument: see Production Request[2]
CC1	-	Configuration Code for Instrument: see CM Database
SW1	-	Software SCCR # for Instrument: see CM Database
DATA1	-	Data SCCR # for Instrument: see CM Database
SAT	-	Satellite: (see Note)
INST	-	Instrument: (see Note)
INSTRHOME	-	Instrument Home Directory
InputArchive	-	Directory from which to read the input data products, for all production processing this directory should be set to **/ASDC_archive/CERES**

Note: From the Production Request[2], the PGE CER1.1P8 requires that the SAT and INST parameters be the following: (this must agree with the APID, see Section 3.3.1).

SAT = **Aqua** and INST = **FM3** or **FM4 or**
SAT = **TRMM and** INST = **PFM or**
SAT = **Terra and** INST = **FM1 or FM2 or**
SAT = **NPP and** INST = **FM5**

3.2.3 Execution Frequency (daily, hourly, or monthly)

Daily (1/day) - This PGE is to be processed once per day, for a maximum of 31 days per month, when all required input data are available.

3.2.4 Memory/Disk Space/Time Requirements

Memory:	32 MB
Disk Space:	324 MB
Total Run Time:	3 hrs.

3.2.5 Restrictions Imposed in Processing Order

Data for the day before and the day after must be present to run the requested data day. However, it is possible to run the system if one or both of these files is missing, but the output products will have missing data. This should only be done in emergency situations, when data are needed for immediate analysis, and will be requested by the CERES Data Management Team (DMT).

3.3 Processor Dependencies (Previous PGEs, Ingest Data)

Note: Include required .met files, header files, .. all required inputs

3.3.1 Input Dataset Name (#1): Level-0 Data

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

$InputArchive/Level0/$SAT/YYYY/
TRMM:
TRMM_Gxxx_LZ_YYYY-MM-DDThh-mm-ssZ_Vnn.DAT
Terra and Aqua:
EOS_Gxxx_LZ_YYYY-MM-DDThh-mm-ssZ_Vnn.CONS
EOS_Gxxx_LZ_YYYY-MM-DDThh-mm-ssZ_Vnn.DAT1
NPP:
NPP_Gxxx_LZ_YYYY-MM-DDThh-mm-ssZ_yyyymmdd.DAT (from CER1.0P2)
or
NPP_Gxxx_LZ_YYYY-MM-DDThh-mm-ssZ_Vnn.DAT1 (from EDOS)

where xxx identifies the APID which are dependent upon the Instrument being processed, see Production Request[2]. And for NPP yyyymmdd is the production date of the file assigned by PGE CER1.0P2.

	PFM	FM1	FM2	FM3	FM4	FM5
Science =	**54**	**131**	**167**	**141**	**157**	**149**
Calibration =	**55**	**132**	**168**	**142**	**158**	**147**
Diagnostic =	**56**	**133**	**169**	**143**	**159**	**150**
Fixed Pattern =	**N/A**	**134**	**170**	**144**	**160**	**N/A**

All APIDs may not be present for any one data date; however, there should be at least one of the above APIDs for each data date. For any typical data date, there should be a Science (APID 141 and 157, one for each instrument FM3 and FM4) data file; however, not receiving a Science data file, does not mean the data cannot be processed.

1. Mandatory/Optional: **These files are Mandatory.**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY, MM, DD and data for DD-1 and DD+1 must also be available. At Launch of the Aqua Spacecraft, data for DD+1 need not be available.**
3. Waiting Period: **2 days**

b. Source of Information (Source is PGE name or Ingest Source):

SDPF for TRMM
EOS Data Operations System (EDOS) for Terra, Aqua, NPP (beginning mid-2015)
PGE CER1.0P2 or CER1.0P3 for NPP

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **93**

3.3.2 Input Dataset Name (#2): Ephemeris Data

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)

$InputArchive/TRMM_ED9D/dprep/YYYY
$InputArchive/AM1EPHN0/YYYY
$InputArchive/PM1EPHND/YYYY
$InputArchive/NPPEPH/YYYY

TRMM: TRMM_ED9D_OR_YYYY-MM-DDT00-00-00Z_Vnn.nat

Terra: AM1EPHN0001MMDDYYYYHH00000000000
or
AM1EPHN0.AYYYYDDD.HH00.vvv.yyyydddhhmmss

where HH = (00, 02, 04, ..., 22). There are 12 files for each data day, and a total of 14 files required for each PGE execution. For the new filenaming convention, DDD is the data day of year, vvv is the ESDT version number, yyyy is the

production year, ddd is the production day of year, hh is the production hour, mm is the production minute, and ss is the production second.

Aqua: PM1EPHND.PYYYYDDD.1200.vvv.yyyydddhhmmss

There is one file for each data day, covering Noon to Noon, there are 2 files required for each PGE execution. DDD is the data day of year, vvv is the ESDT version number, yyyy is the production year, ddd is the production day of year, hh is the production hour, mm is the production minute, and ss is the production second.

NPP: NPPEPH.NYYYYDDD.yyyymmdd.DAT (from CER1.0P2)
NPPEPH.NYYYYDDD.Vyyyymmdd.DAT (from CER1.0P3)

There is one file for each day. DDD is the data day of year, yyyymmdd is the production data date of the data file assigned by PGE CER1.0P2 or CER1.0P3.

There is one file for each data day covering Noon to Noon, and a total of 2 files required for each PGE execution, see Item 2 below. Where DDD is the data day of year, vvv is the ESDT version number, yyyy is the production year, ddd is the production day of year, hh is the production hour, mm is the production minute, and ss is the production second.

1. Mandatory/Optional: **These files are Mandatory.**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY and DDD-1 must also be available.**
3. Waiting Period: **2 days**

b. Source of Information (Source PGE name or Ingest Source):

TRMM DPREP
ECS DPREP, subscription from ECS for Terra and Aqua
PGE CER1.0P2 or CER1.0P3 for NPP

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **5.5**

3.3.3 Input Dataset Name (#3): Attitude Data

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.):

$InputArchive/TRMM_G500/dprep/YYYY
$InputArchive/AM1ATTNF/YYYY
$InputArchive/PM1ATTNR/YYYY
$InputArchive/NPPATT/YYYY

TRMM: TRMM_G500_LZ_YYYY-MM-DDThh-mm-ssZ_Vnn.DAT1.nat

Terra: AM1ATTNF001MMDDYYYYHH00000000000
or
AM1ATTNF.AYYYYDDD.HH00.vvv.yyyydddhhmmss

where HH = (00, 02, 04, ..., 22). There are 12 files for each data day, and a total of 14 files required for each PGE execution. For the new filenaming convention, DDD is the data day of year, vvv is the ESDT version number, yyyy is the production year, ddd is the production day of year, hh is the production hour, mm is the production minute, and ss is the production second.

Aqua: PM1ATTNR.PYYYYDDD.HH00.vvv.yyyydddhhmmss

where HH = (00, 02, 04, ..., 22). There are 12 files for each data day, and a total of 14 files required for each PGE execution. For the new filenaming convention, DDD is the data day of year, vvv is the ESDT version number, yyyy is the production year, ddd is the production day of year, hh is the production hour, mm is the production minute, and ss is the production second.

NPP: NPPATT.NYYYYDDD.yyyymmdd.DAT (from CER1.0P2)
NPPATT.NYYYYDDD.Vyyyymmdd.DAT (from CER1.0P3)

Where DDD is the data day of year and yyyymmdd is the production date of the data set assigned by PGE CER1.0P2 or CER1.0P3.

1. Mandatory/Optional: **These files are Mandatory.**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY, MM, DD and data for DD-1, HH = 22 and DD+1, HH = 00 must also be available. For the new filenaming convention DDD-1, HH = 22 and DDD+1, HH= 00 must also be available.**
3. Waiting Period: **2 days**

b. Source of Information (Source PGE name or Ingest Source):

TRMM DPREP
ECS DPREP, subscription from ECS for Terra and Aqua
PGE CER1.0P2 or CER1.0P3 for NPP

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **0.45 per file**

3.4 Operating Procedures (Procedure for each part of the processor's elements)

The Main Processor production script, **run_CER1.1P8.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. The PCF is created by first sourcing the instrument-specific environment which defines the variables defined above in Section 3.2.2, then executing the PCF generator, **CER1.1P8_pcf_gen.pl**. To run via SGE execute the production script by typing **CER1.1P8-SGE_Driver.pl** followed by the data date.

3.4.1 How to Generate the PCF File

The PCF file generator requires four (2) command line arguments:

(-date)	5-character static code to indicate that a date follows
(YYYYMMDD)	4-digit year, 2-digit month, 2-digit day

On March 30, 2005 the Aqua-FM4 instrument experienced an anomaly which caused the loss of the Shortwave Channel. The following instructions should be used for all production processing of the Aqua-FM4 data beginning with this date:

The ASCII file generator requires eight (6) command line arguments:

(-date)	5-character static code to indicate that a date follows
(YYYYMMDD)	4-digit year, 2-digit month, 2-digit day
(-ic)	3-character static code to indicate the status of the 3-channel intercomparison test
(OFF)	3-character flag value to turn-off the 3-channel intercomparison test
(-sat)	4-character static code to indicate the status of the radiance saturation test
(SW_OFF)	7-character flag value to tell the software to not set all channel radiance values to the CERES fill-value when the Shortwave Channel data is saturated

Note: If additional runtime parameters are requested, they will appear as part of the ASCII file generator command line.

At the command line (>) type:

> cd $CERESHOME/instrument/CER1.1P8/rcf
> CER1.1P8_pcf_gen.pl -date YYYYMMDD -o BDS_Only

For Aqua-FM4 after March 30, 2005 use the following:

> cd $CERESHOME/instrument/CER1.1P8/rcf
> CER1.1P8_pcf_gen.pl -date YYYYMMDD -o BDS_Only -ic OFF -sat SW_OFF

The following file will be generated in **$CERESHOME/instrument/CER1.1P8/rcf/pcf:**

CER1.1P8_PCF_$SS1_$PS1_0_$CC1.YYYYMMDD &
CER1.1P8_PCF_$SS1_$PS1_0_$CC1.YYYYMMDD.log

3.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **run_CER1.1P8.pl**, followed by the PCF filename.

To run at the command line:

At the command line (>) type:

> cd $CERESHOME/instrument/CER1.1P8/rcf
> run_CER1.1P8.pl CER1.1P8_PCF_$SS1_$PS1_0_$CC1.YYYYMMDD

To run using SGE:

Note: It is not necessary to manually create the PCF as described above when submitting a job using the SGE submission scripts.

To run a single data date:

> CER1.1P8-SGE_Driver.pl -date YYYYMMDD

To run multiple sequential data dates:

> CER1.1P8-SGE_Driver.pl -start YYYYMMDD -end yyyymmdd

The **CER1.1P8-SGE_Driver.pl** script will search for the required input data files and any existing data product files for the requested data date(s) and time(s) provided. If all the input data files are available and previously created output for this data date does not exist, the job will be submitted to the SGE queue. However, if any mandatory data files are missing the script will not submit the job to the SGE queue. Instead the information on which data files are missing or already exist can be found in the **CER1.1P8_PCF_$SS1_$PS1_0_$CC1.YYYYMMDD.log** file. Mandatory files may then be staged or existing output files can be deleted before attempting to rerun this job.

There are several additional options for running CER1.1P8 jobs; they are as follows:

[-clean]	**Delete any existing output data files from previous runs**
[-platform CPU]	**Run CER1.1P8 on the designated platform**
[-date YYYYMMDD]	**Run CER1.1P8 for the specified data date (YYYYMMDD), see the example above**
[-start YYYYMMDD]	**Run CER1.1P8 starting on the specified data date (YYYYMMDD), see the example above**

[-end YYYYMMDD]	**Run CER1.1P8 ending on the specified data date (YYYYMMDD), see the example above**
[-ic aaa]	**Run CER1.1P8 with the specified intercomparison option (ON -- default, OFF)**
[-sat aaaaaa]	**Run CER1.1P8 with the specified saturation option (ALL_ON – default, ALL_OFF, SW_OFF, WN_OFF, TOT_OFF, ST_OFF, WS_OFF, WT_OFF)**
[-o aaaaaaaa]	**Run CER1.1P8 with the specified output data products (Default, BDS_Only, IES_Only), see Section 3.4.3 for examples using this parameter**
[-apid xxx]	**Run CER1.1P8 with the following APID only (054, 055, 056, 131, 132, 133, 134, 141, 142, 143, 144, 151, 152, 153, 154, 167, 168, 169, 170, 147, 149, 150), see Section 3.4.3 for examples using this parameter**
[-startt HH:MM:ss.ssssss]	**Run CER1.1P8 starting at the specified time (HH:MM:ss.ssssss)**
[-stopt HH:MM:ss.ssssss]	**Run CER1.1P8 stopping at the specified time (HH:MM:ss.ssssss)**

Examples of executing using these parameters:

To run on a specifc platform using SGE:

Note: The variable *cpu* represents the desired platform. It is either *x86* or *P6*.

To run a single date:

>cd $CERESHOME/instrument/CER1.1P8/rcf
>CER1.1P8-SGE_Driver.pl -date YYYYMMDD -platform *cpu*

To run multiple sequential dates:

>cd $CERESHOME/instrument/CER1.1P8/rcf
>CER1.1P8-SGE_Driver -start YYYYMMDD -end yyyymmdd -platform *cpu*

To run Aqua-FM4 after 03/29/2005 (SW channel failure):

> CER1.1P8-SGE_Driver.pl -date 20050401 -ic OFF -sat SW_OFF

To run Terra-FM1 or FM2 on 01/01/2009 (leap second):

> CER1.1P8-SGE_Driver.pl -date 20090101 -startt 00:01:00.000000

To run Terra-FM1 or FM2 on 12/31/2008 (leap second):

> CER1.1P8-SGE_Driver.pl -date 20081231 -stopt 23:45:59.999999

To run only Science data for Terra-FM1:

> CER1.1P8-SGE_Driver.pl -date 20120115 -apid 131

3.4.3 Special Case Considerations

An issue with running the data for Terra-FM2 on Jan. 1, 2006 was discovered that requires that this PGE be run manually for this data date. The PCF must be created by following the directions in Section 3.4.1 and then edited to remove the ephemeris and attitude data for Dec. 31, 2005 hour 22. Then the PGE can be run manually by following the directions in Section 3.4.2 to run the PGE.

If it becomes necessary to rerun only one type of Level-0 file (Science, Calibration or Diagnostic), this can be accomplished by using the following command to create the PCF file:

> cd $CERESHOME/instrument/CER1.1P8/rcf
> CER1.1P8-SGE_Driver.pl -date YYYYMMDD -apid APID

where APID is one of the following:

Science	**= 54, 131, 167, 141, 157 or 149**
Calibration	**= 55, 132, 168, 142, 158 or 147**
Diagnostic	**= 56, 133, 169, 143, 159 or 150**

This is only done by special request from the Data Management Team.

If a special request is made to run the Subsystem and only create the BDS, or IES products, it can be accomplished by using the following command to create the PCF file:

BDS Only:

> cd $CERESHOME/instrument/CER1.1P8/rcf
> CER1.1P8-SGE_Driver.pl -date YYYYMMDD -o BDS_Only

IES Only:

> cd $CERESHOME/instrument/CER1.1P8/rcf
> CER1.1P8-SGE_Driver.pl -date YYYYMMDD -o IES_Only

3.4.4 Special Reprocessing Instructions

If reprocessing is done to correct an error during production, then all BDS and IES files created during the previous run must be deleted. A script to remove all files from the failed run is available. The script **file_cleanup.pl** takes as in input parameter the PCF filename for the failed run. The environment variable $CERESHOME must be set in order for this script to work.

> cd $CERESHOME/instrument/test_suites
> source temp-inst-env.csh
> file_cleanup.pl CER1.1P8_PCF_$SS1_$PS1_0_$CC1.YYYYMMDD

3.5 Execution Evaluation

3.5.1 Exit Codes

The processor CER1.1P8 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 3-5. Other Exit Codes may appear from the program, which may be the result of a system, compiler, or ToolKit related error. In these cases, contact the responsible person (see Table 3-1) for assistance.

Table 3-5. Exit Codes for CER1.1P8

Exit Code	Definition	Action
0	Normal Exit	Proceed Normally
200	Abnormal Exit	Check the Log Files and take the appropriate action (see Appendix B)
205	Simulated Ephemeris or Attitude Data used in processing	WARNING: Error in processing or simulated data was requested by the Data Management Team. *Simulated data should only be used for Level-0 processing when requested by the Data Management Team. This data should not be sent to following subsystems. Data is for SS1 analysis purposes only.*

3.5.2 Screen Messages (Use Table format for large number of messages)

When running the production script, **run_CER1.1P8.pl**, a "heartbeat" will be sent to the screen in the following format:

processing scan : 22690
processing scan : 22691
Starting Processing Loop for SCIENCE
processing scan : 22692
processing scan : 22693
processing scan : 22694
.
.
.
Finished Processing Loop, Beginning Finalize for SCIENCE
processing scan : 23235
processing scan : 23236
Finished Processing for SCIENCE

(above will repeat for Calibration and Diagnostic, if available)

Instrument Subsystem completed with Exit Status = 0
Instrument Subsystem PGE 1.1P8 Complete for PCF file <PCF filename>

The above two lines signify a successful execution. Any other message indicates an error has occurred, contact the responsible person (see Table 3-1) for assistance.

3.5.3 Log and Status Files Results (Include ALL Log Files)

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: **$CERESHOME/instrument/runlogs**.

1. **Report Log File: CER1.1P8_LogReport_$SS1_$PS1_0_$CC1.YYYYMMDD**

The Report Log File contains Instrument-related informational messages. These messages may be strictly informative (Error Type = Status or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal). A comprehensive list of messages that can be generated during the execution of the PGE is contained in Appendix B.

2. **Status Log File: CER1.1P8_LogStatus_$SS1_$PS1_0_$CC1.YYYYMMDD**

The Status Log File contains all messages created by the ToolKit and Instrument-related messages that can lead to abnormal ending of the Main Processor. If an abnormal exit is encountered by the PGE, this file should be examined for '_E_', (error) or '_F_' (fatal) message types. A comprehensive list of error messages produced within the Main Processor can be found in Appendix B.

3. **User Log File: CER1.1P8_LogUser_$SS1_$PS1_0_$CC1.YYYYMMDD**

The User Log File is not used at this time, but exists to satisfy the ToolKit requirements. Typically the _U_ and _N_ (User information and Notice) will be written to User Log File and Status Log File.

3.5.4 Solutions to Possible Problems

The majority of problems seen to date deal with errors in the PCF file. Checking the PCF file for errors should always be the first step when problems occur.

3.5.5 Conditions for Subsystem and/or Target PGE(s) Terminal Failure (Halt all further processing)

a. Subsystem Termination

If the Ephemeris or Attitude data cannot be processed through DPREP for any reason, then processing should be halted unless a special request to use simulated data has been issued by the Data Management Team. If simulated data are used, these data should not be passed to the Target PGEs.

b. Target PGE Termination

If simulated Ephemeris or Attitude data are used to process the data for any particular data day, the resulting file should not be sent on to the Target PGE for further processing.

3.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process 31 times maximum, once for each day of the month.

Table 3-6. Expected Output File Listing for CER1.1P8

File Name[a]/Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_BDS_$SS1_$PS1_0_$CC1.YYYYMMDD(.met) @($CERESHOME/instrument/data/BDS/$SS1_ $PS1_0/YYYY/MM)	o	700	1/day	CER1.2P1, CER1.4P1	Archive, DPO	Yes
CER_BDSS_$SS1_$PS1_0_$CC1.YYYYMMDD(.met) @($CERESHOME/instrument/data/BDSS/$SS1_ $PS1_0/YYYY/MM)	o	12	1/day	N/A	Archive, DPO, rm	No
CER_BDSD_$SS1_$PS1_0_$CC1.YYYYMMDD(.met) @($CERESHOME/instrument/data/BDSD/$SS1_ $PS1_0/YYYY/MM)	o	10.7	1/day	CER1.4P1	Archive, DPO	No
CER_BDSG_$SS1_$PS1_0_$CC1.YYYYMMDD(.met) @($CERESHOME/instrument/data/BDSG/$SS1_ $PS1_0/YYYY/MM)	o	10	1/day	N/A	Archive, DPO, rm	No
CER_BDSP_$SS1_$PS1_0_$CC1.YYYYMMDD(.met) @($CERESHOME/instrument/data/BDSP/$SS1_ $PS1_0/YYYY/MM)	o	1.5	1/day	N/A	Archive, DPO, rm	No
CER_BDSM_$SS1_$PS1_0_$CC1.YYYYMMDD(.met) @($CERESHOME/instrument/data/BDSM/$SS1_ $PS1_0/YYYY/MM)	o	10	1/day	N/A	Archive, DPO, rm	No
CER_BINMEM_$SS1_$PS1_0_$CC1.YYYYMMDD(.met) @($CERESHOME/instrument/data/MEM/$SS1_ $PS1_0/YYYY/MM)	o	1.6	1/day	N/A	Archive, DPO, rm	No
CER_BDSF_$SS1_$PS1_0_$CC1.YYYYMMDD(.met) @($CERESHOME/instrument/data/BDSF/$SS1_ $PS1_0/YYYY/MM)	o	0.5	1/day	N/A	Archive, rm	No
CER_BQCRP_$SS1_$PS1_0_$CC1.YYYYMMDD(.met) @($CERESHOME/instrument/web)	m	0.03	1/day	N/A	Archive, Web, rm	No
CER_BQCRPS_$SS1_$PS1_0_$CC1.YYYYMMDD(.met) @($CERESHOME/instrument/web)	m	0.06	1/day	N/A	Archive, Web, rm	No
CER_BINHS_$SS1_$PS1_0_$CC1.YYYYMMDD(.met) @($CERESHOME/instrument/web)	m	0.003	1/day	N/A	Archive, Web, rm	No
CER_BINEL_$SS1_$PS1_0_$CC1.YYYYMMDD(.met) @($CERESHOME/instrument/web)	m	0.002	1/day	N/A	Archive, Web, rm	No

Table 3-6. Expected Output File Listing for CER1.1P8

File Name[a]/Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_IES_$SS1_$PS1_0_$CC1.YYYYMMDDHH(.met) @($CERESHOME/instrument/data/IES/$SS1_ $PS1_0/YYYY/MM)	o	39	1/hr	CER4.1-4.1P4, CER4.1-4.1P5, & CER4.1-4.1P6	Archive, DPO, rm	No
CER1.1P8_PCF_$SS1_$PS1_0_$CC1.YYYYMMDD @($CERESHOME/instrument/CER1.1P8/rcf/pcf)	m	.02	1/day	N/A	Archive, Web, rm	No
CER1.1P8_PCF_$SS1_$PS1_0_$CC1.YYYYMMDD.log @($CERESHOME/instrument/CER1.1P8/rcf/pcf)	m	.02	1/day	N/A	Archive, Web, rm	No
CER1.1P8_$SS1_$PS1_0_$CC1.YYYYMMDD.summary **or** CER1.1P8_$SS1_$PS1_0_$CC1.YYYYMMDD-yyyynndd.summary @($CERESHOME/instrument/CER1.1P8/rcf/pcf/summary)	o	.02	1/run	N/A	No Archive, rm	No
CER1.1P8_LogReport_$SS1_$PS1_0_$CC1.YYYYMMDD @($CERESHOME/instrument/runlogs/CER1.1P8)	m	0.005	1/day	N/A	Archive, rm	No
CER1.1P8_LogStatus_$SS1_$PS1_0_$CC1.YYYYMMDD @($CERESHOME/instrument/runlogs/CER1.1P8)	m	0.008	1/day	N/A	Archive, rm	No
CER1.1P8_LogUser_$SS1_$PS1_0_$CC1.YYYYMMDD @($CERESHOME/instrument/runlogs/CER1.1P8)	m	0.001	1/day	N/A	Archive, rm	No
CER1.1P8_$SS1_$PS1_0_$CC1.YYYYMMDD.onnnnn @($CERESHOME/instrument/sge_logs/CER1.1P8)	o		1/day	N/A	Archive, rm	No

a. See Section 3.2 for information on variable data values
If "**(.met)**" is written next to an expected Output Filename, then the metadata file **must** exist with the identical filename and .met extension.

b. VD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)
DB - File content is to be entered into the LaTIS Database
rm - remove
YYYY - 4-digit year
MM - 2-digit month {valid values: 01 .. 12}
DD - 2-digit day {valid values: 01 .. 31}
HH - 2-digit hour of the day {valid values: 00 .. 23}
yyyy - 4-digit year
nn - 2-digit month {valid values: 01 .. 12}
dd - 2-digit day {valid values: 01 .. 31}
m - mandatory output
o - optional output
EOD - End of Data Month
nnnnn - SGE job number, generated upon job submission

3.7 Expected Temporary Files/Directories

Table 3-7. Temporary Files Listing

Directory	File Name
$CERESHOME/instrument/CER1.1P8/rcf	MCFWrite_CER1.1P8_$SS1_$PS1_0_YYYYMMDD.temp
$CERESHOME/instrument/CER1.1P8/rcf	GetAttr_CER1.1P8_$SS1_$PS1_0_YYYYMMDD.temp

4.0 PGEName: CER1.2P1

CER1.2P1 - CERES Geolocate and Calibrate Earth Radiances Subsystem 1.0, BDS Conversion to Pre-ES8 (Satellite-Instrument independent processor)

4.1 PGE Details

4.1.1 Responsible Persons

Table 4-1. Subsystem Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Denise L. Cooper	Dale Walikainen
Organization	SSAI	SSAI
Address	1 Enterprise Parkway	1 Enterprise Parkway
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1633	951-1692
Fax	951-1900	951-1900
LaRC email	denise.l.cooper@nasa.gov	Dale.R.Walikainen@nasa.gov

4.1.2 E-mail Distribution List

E-mail distribution list can be obtained from the primary contact listed in Table 4-1.

4.1.3 Parent PGE(s)

Table 4-2. Parent PGEs for CER1.2P1

PGEName	Description
CER1.0P2	NPP RDR Preprocessor
CER1.0P3	NPP EDOS APID 11 Preprocessor
CER1.1P8	TRMM/Terra/Aqua/NPP C++ Level-0 Data Processor
CER1.3P3	TRMM/Terra/Aqua BDS Edition2/3 Update Processor (Ada version replaced with CER1.4P3)
CER1.4P3	TRMM/Terra/Aqua BDS Edition1/2/3/4 Update Processor (C++)

4.1.4 Target PGE(s)

Table 4-3. Target PGEs for CER1.2P1

PGEName	Description
CER2.2P1	ERBE-like Averaging to Monthly TOA Fluxes Main Processor
CER2.3P1	ERBE-like Monthly Overlap Processor for FAPS+RAPS Data from the First Day of the Next Month
CER2.3P2	ERBE-like Monthly Overlap Processor for FAPS+RAPS Data from the Last Day of the Previous Month

4.2 Operating Environment

4.2.1 Runtime Parameters (List all Dynamic Parameters needed at Runtime)

Table 4-4. Runtime Parameters for CER1.2P1

Parameter ID (static value)	Parameter	Description	Data Type	Valid Values	m/o
	YYYY	CERDataDateYear	I(4)	>1996	
-d	MM	CERDataDateMonth	I(2)	01..12	m
	DD	CERDataDateDay	I(2)	01..31	

Note:

YYYY - 4-digit year
MM - 2-digit month
DD - 2-digit day
m - mandatory input parameter

4.2.2 Environment Script Requirements

Refer to the CERES internal paper (Reference 1) for a detailed description of the CERES environment parameters.

One Environment Script is required. This script must contain the following parameters:

PGE - PGE name, set to CER1.2P1
PROD - Set to YES for production, read input from the instrument data directory
SS1 - Sampling Strategy for Instrument: see ProductionRequest[2]
PS1_0 - Output Production Strategy for Instrument: see Production Request[2]
CC1 - Configuration Code for CER1.1Px: see CM Database

CC1_2	-	Configuration Code for CER1.2P1: see CM Database
SW1	-	Software SCCR # for Instrument: see CM Database
DATA1	-	Data SCCR # for Instrument: see CM Database
SAT	-	Satellite: (see Note)
INST	-	Instrument: (see Note)
INSTRHOME	-	Instrument Home Directory
InputArchive	-	Directory from which to read the input data products, for all production processing this directory should be set to **/ASDC_archive/CERES**
InputArchiveSS	-	Directory from which to read the input data products from a previous PGE within the subsystem. Should be set to **$CERESHOME/instrument/data**

Note: The PGE CER1.2P1 is a Satellite/Instrument independent processor, but the SAT and INST parameters must be specified, "depending on the SamplingStrategy, SS1," in the .csh files as follows:

SAT = **TRMM** and INST = **PFM** or
SAT = **Terra** and INST = **FM1** or **FM2** or
SAT = **Aqua** and INST = **FM3** or **FM4 or**
SAT = **NPP** and INST = **FM5**

4.2.3 Execution Frequency (daily, hourly, or monthly)

Daily 1/day - This PGE is to be processed once per data-day, for a maximum total of 31 days per month, when input data are available.

4.2.4 Memory/Disk Space/Time Requirements

Memory:	318 Mb
Disk Space:	1140 Mb
Total Run Time:	1 min.

4.2.5 Restrictions Imposed in Processing Order

N/A - may be processed in any order.

4.3 Processor Dependencies (Previous PGEs, Ingest Data)

Note: Include required .met files, header files, .. all required inputs

4.3.1 Input Dataset Name (#1): Science BDS

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

$InputArchiveSS/BDS/$SS1_$PS1_0/YYYY/MM/CER_BDS_$SS1_$PS1_0_$CC1.YYYYMMDD

1. Mandatory/Optional: **This file is Mandatory.**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY, MM, DD.**

3. Waiting Period: **None**

b. Source of Information (Source is PGE name or Ingest Source):

CER1.1P8 and CER1.4P3

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **Do not remove; used by CER1.4P1.**

e. Typical file size (MB): **500**

4.3.2 Input Dataset Name (#2): Ephemeris Data

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)

$InputArchive/TRMM_ED9D/dprep/YYYY
$InputArchive/AM1EPHN0/YYYY
$InputArchive/PM1EPHND/YYYY
$InputArchive/NPPEPH/YYYY

Filenames vary by spacecraft:

TRMM: (one file per day)

TRMM_ED9D_OR_YYYY-MM-DDT00-00-00Z_Vnn.nat

Terra: (12 files per day)

AM1EPHN0001MMDDYYYYHH00000000000
or
AM1EPHN0.AYYYYDDD.HH00.vvv.yyyydddhhmmss

Aqua: (one file per day)

PM1EPHND.PYYYYDDD.HH00.vvv.yyyydddhhmmss

where
DDD is the data day of year
vvv is the ESDT version number
yyyy is the production year
ddd is the production day of year
hh is the production hour
mm is the production minute
ss is the production second

NPP (one file per day):

NPPEPH.NYYYYDDD.yyyymmdd.DAT (from CER1.0P2)
NPPEPH.NYYYYDDD.Vyyyymmdd.DAT (from CER1.0P3)

where
DDD is the data day of year
yyyy is the production year
mm is the production month
dd is the production day

1. Mandatory/Optional: **This file is Mandatory.**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY, MM, DD and data for DD-1 and DD+1 should also be available. For Terra DD-1, HH=22, DD+1, HH=00. For Terra new filenaming convention, DDD-1 and DDD+1 should also be available. For Aqua new filenaming convention, DDD-1 should also be available.**
3. Waiting Period: 2 days

b. Source of Information (Source PGE name or Ingest Source):

CER0.1P1 – DPREP (TRMM)
CER1.0P2 – CERES NPP RDR Preprocessor (NPP)
CER1.0P3 – CERES NPP EDOS APID 11 Preprocessor (NPP)

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **N/A**

Typical file size (MB): **TRMM: 0.09**
Terra: 0.45
Aqua: 5.5
NPP: 5.5

4.4 Operating Procedures (Procedure for each part of the processor's elements)

The BDS Conversion script, **run_CER1.2P1.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. The PCF is created by first sourcing the instrument-specific environment script containing the environment variables described in Section 4.2.2 above, then executing the PCF generator, **CER1.2P1_pcf_gen.pl**. . To run via SGE execute the production script by typing **CER1.2P1-SGE_Driver.pl** followed by the data date.

4.4.1 How to Generate the PCF File

The ASCII file generator requires four (4) command line arguments:

(-d)	2-character static code to indicate that the date follows,
(YYYY)	4-digit year,
(MM)	2-digit month,
(DD)	2-digit day,

At the command line (>) type:

> CER1.2P1_pcf_gen.pl -d YYYY MM DD

The following PCF files will be generated in **$CERESHOME/instrument/CER1.2P1/rcf/pcf**:

CER1.2P1_PCF_$SS1_$PS1_0_$CC1_2.YYYYMMDD
CER1.2P1_PCF_$SS1_$PS1_0_$CC1_2.YYYYMMDD.log

4.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **run_CER1.2P1.pl**, followed by the PCF filename, if processing manually. To run via SGE execute the production script by typing **CER1.2P1-SGE_Driver.pl** followed by the data date.

To run at the command line:

At the command line (>) type:

```
> cd $CERESHOME/instrument/CER1.2P1/rcf
> run_CER1.2P1.pl CER1.2P1_PCF_$SS1_$PS1_0_$CC1_2.YYYYMMDD
```

To run using SGE:

Note: It is not necessary to manually create the PCF as described above when submitting a job using the SGE submission script.

To run a single date:

```
>cd $CERESHOME/instrument/CER1.2P1/rcf
>CER1.2P1-SGE_Driver.pl -date YYYYMMDD
```

To run multiple sequential dates:

```
>cd $CERESHOME/instrument/CER1.2P1/rcf
>CER1.2P1-SGE_Driver -start YYYYMMDD -end yyyymmdd
```

To run on a specifc platform using SGE:

Note: The variable *cpu* represents the desired platform. It is either *x86* or *P6*.

To run a single date:

```
>cd $CERESHOME/instrument/CER1.2P1/rcf
>CER1.2P1-SGE_Driver.pl -date YYYYMMDD -platform cpu
```

To run multiple sequential dates:

```
>cd $CERESHOME/instrument/CER1.2P1/rcf
>CER1.2P1-SGE_Driver -start YYYYMMDD -end yyyymmdd -platform
    cpu
```

The **CER1.2P1-SGE_Driver.pl** script will search for the required input data files and any existing data product files for the requested data date(s) and time(s) provided. If all the input data files are available and previously created output for this data date does not exist, the job will be submitted to the SGE queue. However, if any mandatory data files are missing the script will not submit the job to the SGE queue. Instead the information on which data files are missing or already exist can be found in the **CER1.2P1_PCF_$SS1_$PS1_0_$CC1_2.YYYYMMDD.log** file. Mandatory files may then be staged or existing output files can be deleted before attempting to rerun this job.

There are several additional options for running CER1.2P1 jobs, they are as follows:

[-clean]	**Delete any existing output data files from previous runs**
[-platform CPU]	**Run CER1.2P1 on the designated platform (*p6* or *x86*), see example above**
[-date YYYYMMDD]	**Run CER1.2P1 for the specified data date (YYYYMMDD), see the example above**
[-start YYYYMMDD]	**Run CER1.2P1 starting on the specified data date (YYYYMMDD), see the example above**
[-end YYYYMMDD]	**Run CER1.2P1 ending on the specified data date (YYYYMMDD), see the example above**

4.4.3 Special Case Considerations

Create PRES8 when simulated Attitude/Ephemeris data are used in processing, **this mode is only used during testing,** when "real" Attitude/Ephemeris data are not available. **It should never be used for routine processing:**

```
> cd $CERESHOME/instrument/CER1.2P1/rcf
> CER1.2P1-SGE_Driver.pl -start YYYYMMDD -- -o Override
```

All special requests must come from the Data Management Team.

4.4.4 Special Reprocessing Instructions

If reprocessing is done to correct an error during production, then the existing PRES8 file created by the initial run should be deleted before reprocessing is done. A script to remove all files from the failed run is available. The script **file_cleanup.pl** takes as in input parameter the PCF filename for the failed run. The environment variable $CERESHOME must be set in order for this script to work.

```
> cd $CERESHOME/instrument/test_suites
> source temp-inst-env.csh
> file_cleanup.pl CER1.2P1_PCF_$SS1_$PS1_0_$CC1_2.YYYYMMDD
```

4.5 Execution Evaluation

4.5.1 Exit Codes

The processor CER1.2P1 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 4-5. Other Exit Codes may appear from the program, which may be the result of a system, compiler, or Toolkit related error. In these cases, contact the responsible person (see Table 4-1) for assistance.

4.5.2 Screen Messages (Use Table format for large number of messages)

Table 4-5. Exit Codes for CER1.2P1

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
203	Abnormal Exit	Check the Log Files and take the appropriate action (see Appendix B)
204	Simulated Ephemeris or Attitude Data used in processing	Error in processing, BDSs which were created using simulated data should not be processed by this PGE. Do not proceed to target PGE.
210	Normal Exit	No records available to be written to Pre-ES8, no Pre-ES8 created. This occurs when all geolocation or all radiance data is set to the CERES Default value, usually due to special operations.

When running the production script, **run_CER1.2P1.pl** the following messages are written to Standard Output:

Creating Pre-ES8
Instrument Subsystem completed with Exit Status = 0
Instrument Subsystem PGE 1.2 Complete for PCF file <PCF filename>

4.5.3 Log and Status Files Results (Include <u>ALL</u> Log Files)

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: **$CERESHOME/instrument/runlogs**.

1. **Report Log File: CER1.2P1_LogReport_$SS1_$PS1_0_$CC1_2.YYYYMMDD**

The Report Log File contains Instrument-related informational messages. These messages may be strictly informative (Error Type = Status or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal). A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

2. **Status Log File: CER1.2P1_LogStatus_$SS1_$PS1_0_$CC1_2.YYYYMMDD**

The Status Log File contains all messages created by the ToolKit and Instrument-related messages that can lead to abnormal ending of the Main Processor. If an abnormal exit is encountered by the PGE, this file should be examined for '_E_', (error) or '_F_' (fatal) message

types. A comprehensive list of error messages produced within the Main Processor can be found in Appendix B.

3. **User Log File: CER1.2P1_LogUser_$SS1_$PS1_0_$CC1_2.YYYYMMDD**

The User Log File is not used at this time, but exists to satisfy the ToolKit requirements. Typically the _U_ and _N_ (User information and Notice) will be written to User Log File and Status Log File.

4.5.4 Solutions to Possible Problems

The majority of problems seen to date deal with errors in the PCF file. Checking the PCF file for errors should always be the first step when problems occur.

4.5.5 Conditions for Subsystem and/or Target PGE(s) Terminal Failure (Halt all further processing)

a. Subsystem Termination

None at this time.

b. Target PGE Termination

If simulated Ephemeris or Attitude data was used to process the BDS data for any particular data day, the resulting file should <u>not</u> be sent on to the Target PGE for further processing. This is applicable when there are problems with the Ephemeris or Attitude data, but the Instrument housekeeping data needs to be processed.

4.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process daily.

Table 4-6. Expected Output File Listing for CER1.2P1

File Name[a]/Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_PRES8_$SS1_$PS1_0_$CC1_2.YYYYMMDD(.met) @($CERESHOME/instrument/data/PRES8/$SS1_$PS1_0/ YYYY/MM) (*AMI* only)	m	283	1/day	CER2.2P1, CER2.3P1, CER2.3P2	Archive, DPO, rm	No
CER1.2P1_PCF_$SS1_$PS1_0_$CC1_2.YYYYMMDD @($CERESHOME/instrument/CER1.2P1/rcf/pcf)	m	.02	1/day	N/A	Archive, Web, rm	No
CER1.2P1_PCF_$SS1_$PS1_0_$CC1_2.YYYYMMDD.log @($CERESHOME/instrument/CER1.2P1/rcf/pcf)	m	.02	1/day	N/A	Archive, Web, rm	No
CER1.2P1_$SS1_$PS1_0_$CC1_2.YYYYMMDD.summary **or** CER1.2P1_$SS1_$PS1_0_$CC1_2.YYYYMMDD-yyyynndd.summary @($CERESHOME/instrument/CER1.2P1/rcf/pcf/summary)	o	.02	1/run	N/A	No Archive, rm	No
CER1.2P1_LogReport_$SS1_$PS1_0_$CC1_2.YYYYMMDD @($CERESHOME/instrument/runlogs)	m	0.005	1/day	N/A	Archive, rm	No
CER1.2P1_LogStatus_$SS1_$PS1_0_$CC1_2.YYYYMMDD @($CERESHOME/instrument/runlogs)	m	0.008	1/day	N/A	Archive, rm	No
CER1.2P1_LogUser_$SS1_$PS1_0_$CC1_2.YYYYMMDD @($CERESHOME/instrument/runlogs)	m	0.001	1/day	N/A	Archive, rm	No
CER1.2P1_$SS1_$PS1_0_$CC1_2.YYYYMMDD.onnnnn @($CERESHOME/instrument/sge_logs/CER1.2P1)	o		1/day	N/A	Archive, rm	No

a. See Section 4.2 for information on variable data values
If "**(.met)**" is written next to an expected Output Filename, then the metadata file **must** exist with the identical filename and .met extension.

b. VD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)
DB - File content is to be entered into the LaTIS Database
rm - remove
YYYY - 4 digit year
MM - 2 digit month {valid values: 01 .. 12}
DD - 2 digit day {valid values: 01 .. 31}
HH - 2 digit hour of the day {valid values: 00 .. 23}
m - mandatory output
o - optional output
EOD - End of Data Month
nnnnn - SGE job number, generated upon job submission

4.7 Expected Temporary Files/Directories

Table 4-7. Temporary Files Listing

Directory	File Name
$CERESHOME/instrument/rcf	MCFWrite_CER1.2P1_$SS1_$PS1_0_YYYYMMDD.temp
$CERESHOME/instrument/rcf	GetAttr_CER1.2P1_$SS1_$PS1_0_YYYYMMDD.temp

5.0 PGEName: CER1.4P1

CER1.4P1 - CERES Geolocate and Calibrate Earth Radiances Subsystem 1.0, Create subsetted BDSI from BDS/BDSD for Internal Calibration Events

PGE CER1.4P1 will be run on a daily basis, however, BDSIs will only be created when an Internal Calibration Event is present in either the BDS or BDSD for that day. PGE_CER1.4P1 is the C++ version of PGE_CER1.3P1.

5.1 PGE Details

5.1.1 Responsible Persons

Table 5-1. Subsystem Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Mark Timcoe	Phil Hess
Organization	SSAI	SSAI
Address	1 Enterprise Parkway	1 Enterprise Parkway
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1941	951-1645
Fax	951-1900	951-1900
LaRC email	Mark.G.Timcoe@nasa.gov	Phillip.C.Hess@nasa.gov

5.1.2 E-mail Distribution List

E-mail distribution list can be obtained from the primary contact listed in Table 5-1.

5.1.3 Parent PGE(s)

Table 5-2. Parent PGEs for CER1.4P1

PGEName	Description
CER1.1P8	CERES Geolocate and Calibrate Earth Radiances Subsystem 1.0 for TRMM, Terra, Aqua and NPP

5.1.4 Target PGE(s)

Table 5-3. Target PGEs after CER1.4P1

PGEName	Description
CER1.4P2	CERES Internal Calibration Analyzer (C++)

5.2 Operating Environment

5.2.1 Runtime Parameters (List all Dynamic Parameters needed at Runtime)

Table 5-4. Runtime Parameters for CER1.4P1

Parameter ID (static value)	Parameter	Description	Data Type	Valid Values	m/o
	YYYY	CERDataDateYear	I(4)	>1996	
-d	MM	CERDataDateMonth	I(2)	01..12	m
	DD	CERDataDateDay	I(2)	01..31	
-pret	mm	Time prior to Internal cal to start subset	I(2)	01..60	o
-postt	mm	Time after Internal cal to stop subset	I(2)	01..60	o
-nf	nn	Maximum Number of BDSI files that can be created	I(2)	01..99	o

Note:

YYYY	-	4-digit year
MM	-	2-digit month
DD	-	2-digit day
mm>	->	2-digit minutes
m	-	mandatory parameter

5.2.2 Environment Script Requirements

Refer to the CERES internal paper (Reference 1) for a detailed description of the CERES environment parameters.

One Environment Script is required. This script must contain the following parameters:

PGE	-	PGE name, set to CER1.4P1
PROD	-	Set to YES for production, read input from the instrument data directory
SS1	-	Sampling Strategy for Instrument: see Production Request[2]
PS1_0	-	Output Production Strategy for Instrument: see Production Request[2]
CC1	-	Configuration Code for Instrument: see CM Database
CC1_3	-	Configuration Code for CER1.4P1: see CM Database
SW1_3	-	Software SCCR # for CER1.4P1: see CM Database
DATA1_3	-	Data SCCR # for CER1.4P1: see CM Database
SAT	-	Satellite: (see Note)
INST	-	Instrument: (see Note)
INSTRHOME	-	Instrument Home Directory
InputArchive	-	Directory from which to read the input data products, for all production processing this directory should be set to **/ASDC_archive/CERES**
InputArchiveSS	-	Directory from which to read the input data products from a previous PGE within the subsystem. Should be set to **$CERESHOME/instrument/data**

5.2.3 Execution Frequency (daily, hourly, or monthly)

Daily, the PGE should be run for each data date, however, BDSI(s) will be created only when an Internal Calibration event is present for that data date.

5.2.4 Memory/Disk Space/Time Requirements

Memory:	318 MB
Disk Space:	1140 MB
Total Run Time:	2 mins.

5.2.5 Restrictions Imposed in Processing Order

N/A - may be processed in any order.

5.3 Processor Dependencies (Previous PGEs, Ingest Data)

Note: Include required .met files, header files, .. all required inputs

5.3.1 Input Dataset Name (#1): BDS

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

$InputArchiveSS/BDS/$SS1_$PS1_0/YYYY/MM/
CER_BDS_$SS1_$PS1_0_$CC1.YYYYMMDD

1. Mandatory/Optional: **This file is Mandatory.**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY, MM, DD.**
3. Waiting Period: **None**

b. Source of Information (Source is PGE name or Ingest Source):

CER1.1P8

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **Remove after successful completion.**

e. Typical file size (MB): **500**

5.3.2 Input Dataset Name (#2): BDSD

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)

$InputArchiveSS/BDSD/$SS1_$PS1_0/YYYY/MM/
CER_BDSD_$SS1_$PS1_0_$CC1.YYYYMMDD

1. Mandatory/Optional: **Optional**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY, MM, DD.**
3. Waiting Period: **None**

b. Source of Information (Source PGE name or Ingest Source):

CER1.1P8

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **Remove after successful completion.**

e. Typical file size (MB): **10.7**

5.4 Operating Procedures (Procedure for each part of the processor's elements)

The **CER1.4P1** production script, **run_CER1.4P1.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. The PCF is created by first sourcing the instrument-specific environment which defines the variables defined above in Section 5.2.2, then executing the PCF generator, **CER1.4P1_pcf_gen.pl**. . To run via SGE execute the production script by typing **CER1.4P1-SGE_Driver.pl** followed by the data date.

5.4.1 How to Execute the Main Processor

To run using SGE:

Note: It is not necessary to manually create the PCF as described above when submitting a job using the SGE submission scripts.

To run a single data date:

> CER1.4P1-SGE_Driver.pl -date YYYYMMDD

To run multiple sequential data dates:

> CER1.4P1-SGE_Driver.pl -start YYYYMMDD -end yyyymmdd

To run on a specifc platform using SGE:

Note: The variable *cpu* represents the desired platform. It is either *x86* or *P6*. (This PGE runs only on the *x86* platform.)

To run a single date:

>cd $CERESHOME/instrument/CER1.4P1/rcf
>CER1.4P1-SGE_Driver.pl -date YYYYMMDD -platform *cpu*

To run multiple sequential dates:

>cd $CERESHOME/instrument/CER1.4P1/rcf
>CER1.4P1-SGE_Driver -start YYYYMMDD -end yyyymmdd -platform *cpu*

The **CER1.4P1-SGE_Driver.pl** script will search for the required input data files and any existing data product files for the requested data date(s) and time(s) provided. If all the input data files are available and previously created output for this data date does not exist, the job will be submitted to the SGE queue. However, if any mandatory data files are missing the script will not submit the job to the SGE queue. Instead the information on which data files are missing or already exist can be found in the **CER1.4P1_PCF_$SS1_$PS1_0_$CC1_3.YYYYMMDD.log** file. Mandatory files may then be staged or existing output files can be deleted before attempting to rerun this job.

There are several additional options for running CER1.4P1 jobs, they are as follows:

[-clean]	**Delete any existing output data files from previous runs**
[-platform CPU]	**Run CER1.4P1 on the designated platform (available for *p6* and *x86*), see example above**
[-date YYYYMMDD]	**Run CER1.4P1 for the specified data date (YYYYMMDD), see the example above**
[-start YYYYMMDD]	**Run CER1.4P1 starting on the specified data date (YYYYMMDD), see the example above**
[-end YYYYMMDD]	**Run CER1.4P1 ending on the specified data date (YYYYMMDD), see the example above**

The following parameters when requested, must be preceeded by "--", see examples below:

[-pret mm]	**Run CER1.4P1 and subset starting mm minutes before any internal calibration (00 .. 60)**

[-postt mm]	**Run CER1.4P1 and subset ending mm minutes after any internal calibration (00 .. 60)**
[-nf xxx]	**Run CER1.4P1 allow the creation of up to xx BDSIs (default 99)**

Examples of executing using these parameters:

To force the PGE to run and subset starting 20 mins. before any internal calibration:

> CER1.4P1-SGE_Driver.pl -start 20120101 -- -pret 20

To force the PGE to run and subset ending 40 mins. after any internal calibration:

> CER1.4P1-SGE_Driver.pl -date 20050401 -- -postt 40

To increase the number of BDSIs that can be created by this PGE to 150:

> CER1.4P1-SGE_Driver.pl -date 20090101 -- -nf 150

5.4.2 Special Case Considerations

This processor will only create BDSIs when Internal Calibration Data is present. A status code of ten (10) will be returned if no BDSIs are created.

It is possible that a run may create more than twelve (12) BDSIs for a data day, in this case the code will exit with an error code of 200 and a message that more than twelve (12) output files need to be created. In this case, it is possible to override the limit of twelve (12) BDSIs as follows:

> cd $CERESHOME/instrument/CER1.4P1/rcf
> CER1.4P1-SGE_Driver.pl -start YYYYMMDD -- -nf 20

where -nf indicates the number of possible output files, in the example the number of files is set to 20.

Then follow the instructions to create the PCF in Section 5.2.2 and run the PGE following the instructions in Section 5.2.3.

5.4.3 Special Reprocessing Instructions

If reprocessing is done to correct an error during production, then all BDSIs and QC files must be deleted before beginning reprocessing. A script to remove all files from the failed run is available. The script **file_cleanup.pl** takes as in input parameter the PCF filename for the failed run. The environment variable $CERESHOME must be set in order for this script to work.

> cd $CERESHOME/instrument/test_suites
> source temp-inst-env.csh
> file_cleanup.pl CER1.4P1_PCF_$SS1_$PS1_0_$CC1_3.YYYYMMDD

5.5 Execution Evaluation

5.5.1 Exit Codes

The processor CER1.4P1 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 5-5. Other Exit Codes may appear from the program, which may be the result of a system, compiler, or Toolkit related error. In these cases, contact the responsible person (see Table 5-1) for assistance.

Table 5-5. Exit Codes for CER1.4P1

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
10	Normal Exit	No BDSI files were created, no internal cal data present
200	Abnormal Exit	Check the Log Files and take the appropriate action (see Appendix B)

Note:

YYYY	-	4-digit year
MM	-	2-digit month
DD	-	2-digit day
m	-	mandatory parameter

5.5.2 Screen Messages (Use Table format for large number of messages)

When running the production script, **run_CER1.4P1.pl** for Terra Data, the following will be sent to the screen:

Compressing BDSI -- CER_BDSI_$SS1_$PS1_0_$CC1_3.YYYYMMDD01
compressing Internal_Calibration_BDS

BDS file to be compressed:
$CERESHOME/data/BDSI/$SS1_$PS1_0/YYYY/MM/CER_BDSI_$SS1_$PS1_0_$CC1_3.YYYYMMDD01

compressed BDS:
$CERESHOME/data/BDSI/$SS1_$PS1_0/YYYY/MM/CER_BDSI_$SS1_$PS1_0_$CC1_3.YYYYMMDD01_cpress

CER1.4P1 SUCCESSFUL -- Exit Status = 0
PGE CER1.4P1 Complete for PCF file <PCF filename>

The above two lines indicate a successful run.

NOTE: At this time for Aqua (FM3 and FM4) the following message will be seen:

CER1.4P1 SUCCESSFUL -- Exit Status = 0, no Internal Cal Events were found -- no BDSI files created

CER1.4P1 Complete for PCF file <PCF filename>

5.5.3 Log and Status Files Results (Include ALL Log Files)

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: **$CERESHOME/instrument/runlogs**.

1. **Report Log File: CER1.4P1_LogReport_$SS1_$PS1_0_$CC1_3.YYYYMMDD**

The Report Log File contains Instrument-related informational messages. These messages may be strictly informative (Error Type = Status or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal). A comprehensive list of these messages that can be generated during the execution of the PGE, is contained in Appendix B.

2. **Status Log File: CER1.4P1_LogStatus_$SS1_$PS1_0_$CC1_3.YYYYMMDD**

The Status Log File contains all messages created by the ToolKit and Instrument-related messages that can lead to abnormal ending of the Main Processor. If an abnormal exit is encountered by the PGE, this file should be examined for '_E_', (error) or '_F_' (fatal) message types. A comprehensive list of error messages produced within the Main Processor can be found in Appendix B.

3. **User Log File: CER1.4P1_LogUser_$SS1_$PS1_0_$CC1_3.YYYYMMDD**

The User Log File is not used at this time, but exists to satisfy the ToolKit requirements. Typically the _U_ and _N_ (User information and Notice) will be written to User Log File and Status Log File.

5.5.4 Solutions to Possible Problems

The majority of problems seen to date deal with errors in the PCF file. Checking the PCF file for errors should always be the first step when problems occur.

5.5.5 Conditions for Subsystem and/or Target PGE(s) Terminal Failure (Halt all further processing)

a. Subsystem Termination

None at this time.

b. Target PGE Termination

None at this time. The target PGE does not exist at this time.

5.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. The BDS files listed may or may not be created for any run of QuickLook data. Only the BDS associated with the requested APID will be created. The output files need not be archived. These files may be removed after the Level-0 data has been processed successfully.

Table 5-6. Expected Output File Listing for CER1.4P1

File Name[a]/Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_BDSI_$SS1_$PS1_0_$CC1_3.YYYYMMDDnn(.met) @($CERESHOME/instrument/data/BDSI/$SS1_$PS1_0/YYYY/MM)	o	50	1 or more/ day	CER1.4P2	Archive, DPO, rm	No
CER1.4P1_PCF_$SS1_$PS1_0_$CC1_3.YYYYMMDD @($CERESHOME/instrument/CER1.4P1/rcf/pcf)	m	.02	1/day	N/A	Archive, Web, rm	No
CER1.4P1_PCF_$SS1_$PS1_0_$CC1_3.YYYYMMDD.log @($CERESHOME/instrument/CER1.4P1/rcf/pcf)	m	.02	1/day	N/A	Archive, Web, rm	No
CER1.4P1_$SS1_$PS1_0_$CC1_3.YYYYMMDD. summary **or** CER1.4P1_$SS1_$PS1_0_$CC1_3.YYYYMMDD-yyyynndd.summary @($CERESHOME/instrument/CER1.4P1/rcf/pcf/summary)	o	.02	1/run	N/A	No Archive, rm	No
CER1.4P1_LogReport_$SS1_$PS1_0_$CC1_3.YYYYMMDD@($CERESHOME/instrument/runlogs/CER1.4P1)	m	0.005	1/day	N/A	Archive, rm	No
CER1.4P1_LogStatus_$SS1_$PS1_0_$CC1_3.YYYYMMDD@($CERESHOME/instrument/runlogs/CER1.4P1)	m	0.008	1/day	N/A	Archive, rm	No
CER1.4P1_LogUser_$SS1_$PS1_0_$CC1_3.YYYYMMDD@($CERESHOME/instrument/runlogs/CER1.4P1)	m	0.001	1/day	N/A	Archive, rm	No
CER1.4P1_$SS1_$PS1_0_$CC1_3.YYYYMMDD @($CERESHOME/instrument/sge_logs/CER1.4P1)	o		1/day	N/A	Archive, rm	No

a. See Section 5.2 for information on variable data values
If "**(.met)**" is written next to an expected Output Filename, then the metadata file **must** exist with the identical filename and .met extension.

b.
- VD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)
- DB - File content is to be entered into the LaTIS Database
- rm - remove
- YYYY - 4-digit year
- MM - 2-digit month {valid values: 01 .. 12}
- DD - 2-digit day {valid values: 01 .. 31}
- HH - 2-digit hour of the day {valid values: 00 .. 23}
- m - mandatory output
- o - optional output
- EOD - End of Data Month
- OD - On Demand
- hr - hour
- nn - file number, there can be more than 1 BDSI for a day, in most cases, only 1 BDSI is produced
- nnnnn - SGE job number, generated upon job submission

5.7 Expected Temporary Files/Directories

Table 5-7. Temporary Files Listing

Directory	File Name
$CERESHOME/instrument/CER1.4P1/rcf	MCFWrite_CER1.4P1_$SS1_$PS1_0_YYYYMMDD.temp
$CERESHOME/instrument/CER1.4P1/rcf	GetAttr_CER1.4P1_$SS1_$PS1_0_YYYYMMDD.temp

6.0 PGEName: CER1.4P2

CER1.4P2 - CERES Geolocate and Calibrate Earth Radiances Subsystem 1.0, Analyze Gain Coefficients

PGE CER1.4P2 will be run on a monthly basis, and will create a file that will be manually analyzed to determine if there has been any drift in the gain coefficients. CER1.4P2 is the C++ version of CER1.3P2.

6.1 PGE Details

6.1.1 Responsible Persons

Table 6-1. Subsystem Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Mark Timcoe	Phil Hess
Organization	SSAI	SSAI
Address	1 Enterprise Parkway	1 Enterprise Parkway
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1941	951-1645
Fax	951-1900	951-1900
LaRC email	Mark.G.Timcoe@nasa.gov	Phillip.C.Hess@nasa.gov

6.1.2 E-mail Distribution List

E-mail distribution list can be obtained from the primary contact listed in Table 6-1.

6.1.3 Parent PGE(s)

Table 6-2. Parent PGEs for CER1.4P2

PGEName	Description
CER1.4P1	Create subsetted BDSI from BDS/BDSD for Internal Calibration Events

6.1.4 Target PGE(s))

Table 6-3. Target PGEs for CER1.4P2

PGEName	Description
None	Gain Trend files used for Analysis only

6.2 Operating Environment

6.2.1 Runtime Parameters (List all Dynamic Parameters needed at Runtime)

Table 6-4. Runtime Parameters for CER1.4P2

Parameter ID(static value)	Parameter	Description	Data Type	Valid Values	m/o
	YYYY	CERDataDateYear	I(4)	>1996	
-d	MM	CERDataDateMonth	I(2)	01..12	m
-maxBDSI	nn	Maximum number of BDSIs per day	I(2)	01..99	o
-psin	PS1_0	overrides ENV $PS1_0	text	N/A	o
-ccin	CC1_3	overrides ENV $CC1_3	I(6)		o
-inst	n	FM instrument number (diagnostic)	I(1)	1..6	o
--version		revision number for script			o

Note:

YYYY	-	4-digit year
MM	-	2-digit month
DD	-	2-digit day
mm>	->	2-digit minutes
m	-	mandatory parameter

6.2.2 Environment Script Requirements

Refer to the CERES internal paper (Reference 1) for a detailed description of the CERES environment parameters.

One Environment Script is required. This script must contain the following parameters:

PGE	-	PGE name, set to CER1.4P2
PROD	-	Set to YES for production, read input from the DPO
SS1	-	Sampling Strategy for Instrument: see Production Request[2]
PS1_0	-	Output Production Strategy for Instrument: see Production Request[2]
CC1_3	-	Configuration Code for CER1.4P1: see CM Database
CC1_4	-	Configuration Code for CER1.4P2: see CM Database
SW1_4	-	Software SCCR # for CER1.4P2: see CM Database
DATA1_4	-	Data SCCR # for CER1.4P2: see CM Database
SAT	-	Satellite: (see Note)
INST	-	Instrument: (see Note)
INSTRHOME	-	Instrument Home Directory
InputArchive	-	Directory from which to read the input data products, for all production processing this directory should be set to **/ASDC_archive/CERES**

6.2.3 Execution Frequency (daily, hourly, or monthly)

Monthly, the PGE should be run for each data month.

6.2.4 Memory/Disk Space/Time Requirements

Memory:	318 MB
Disk Space:	1140 MB
Total Run Time:	2 mins.

6.2.5 Restrictions Imposed in Processing Order

N/A - may be processed in any order.

6.3 Processor Dependencies (Previous PGEs, Ingest Data)

Note: Include required .met files, header files, .. all required inputs

6.3.1 Input Dataset Name (#1): BDSI

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

$InputArchive/BDSI/$SS1_$PS1_0/YYYY/MM/
CER_BDSI_$SS1_$PS1_0_$CC1_3.YYYYMMDDnn

1. Mandatory/Optional: **These files are Mandatory.**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY, MM.**
3. Waiting Period: **None**

b. Source of Information (Source is PGE name or Ingest Source):

CER1.4P1

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **37**

6.4 Operating Procedures (Procedure for each part of the processor's elements)

The **CER1.4P2** production script, **run_CER1.4P2.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. The PCF is created by first sourcing the instrument-specific environment which defines the variables defined above in Section 6.2.2, then executing the PCF generator, **CER1.4P2_pcf_gen.pl**. . To run via SGE execute the production script by typing **CER1.4P2-SGE_Driver.pl** followed by the data date.

6.4.1 How to Execute the Main Processor

To run using SGE:

Note: It is not necessary to manually create the PCF as described above when submitting a job using the SGE submission scripts.

To run a single data date:

> CER1.4P2-SGE_Driver.pl -date YYYYMM

To run multiple sequential data dates:

> CER1.4P2-SGE_Driver.pl -start YYYYMM -end yyyymm

To run on a specifc platform using SGE:

Note: The variable *cpu* represents the desired platform. It is either *x86* or *P6*. (This PGE runs only on the *x86* platforms.)

To run a single date:

>cd $CERESHOME/instrument/CER1.4P2/rcf
>CER1.4P2-SGE_Driver.pl -date YYYYMM -platform *cpu*

To run multiple sequential dates:

>cd $CERESHOME/instrument/CER1.4P2/rcf
>CER1.4P2-SGE_Driver -start YYYYMM -end yyyymm -platform *cpu*

The **CER1.4P2-SGE_Driver.pl** script will search for the required input data files and any existing data product files for the requested data date(s) and time(s) provided. If all the input data files are available and previously created output for this data date does not exist, the job will be submitted to the SGE queue. However, if any mandatory data files are missing the script will not submit the job to the SGE queue. Instead the information on which data files are missing or already exist can be found in the **CER1.4P2_PCF_$SS1_$PS1_0_$CC1_4.YYYYMMDD.log** file. Mandatory files may then be staged or existing output files can be deleted before attempting to rerun this job.

There are several additional options for running CER1.4P2 jobs, they are as follows:

[-clean]	**Delete any existing output data files from previous runs**
[-platform CPU]	**Run CER1.4P2 on the designated platform (available for *p6* and *x86*), see example above**
[-date YYYYMM]	**Run CER1.4P2 for the specified data month (YYYYMM), see the example above**
[-start YYYYMM]	**Run CER1.4P2 starting on the specified data month (YYYYMM), see the example above**
[-end YYYYMM]	**Run CER1.4P2 ending on the specified data month (YYYYMM), see the example above**

The following parameters when requested, must be preceeded by "--", see examples below:

[-maxBDSI xxx]	**Run CER1.4P2 allow the PGE to read up to xx BDSIs (default 12), see example in Sec. 6.4.3**

6.4.2 Special Case Considerations

It is possible that one or more of the data days in the month has more than twelve (12) BDSI files, in this case to ensure that all BDSI files are processed, the following must be done:

```
> cd $CERESHOME/instrument/CER1.4P2/rcf
> CER1.4P2-SGE_Driver.pl -start YYYYMM -- -maxBDSI 20
```

where -maxBDSI indicates the maximum number of BDSIs to process for any data day.

The example above sets the value to 20, however, the number should be set to the maximum number of BDSIs seen for any one data day in the month.

6.4.3 Special Reprocessing Instructions

If reprocessing is done to correct an error during production, then all output files must be deleted. A script to remove all files from the failed run is available. The script **file_cleanup.pl** takes as in input parameter the PCF filename for the failed run. The environment variable $CERESHOME must be set in order for this script to work.

```
> cd $CERESHOME/instrument/test_suites
> source temp-inst-env.csh
> file_cleanup.pl CER1.4P2_PCF_$SS1_$PS1_0_$CC1_4.YYYYMM
```

6.5 Execution Evaluation

6.5.1 Exit Codes

The processor CER1.4P2 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 6-5. Other Exit Codes may appear from the program, which may be the result of a system, compiler, or Toolkit related error. In these cases, contact the responsible person (see Table 6-1) for assistance.

Table 6-5. Exit Codes for CER1.4P2

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
200	Abnormal Exit	Check the Log Files and take the appropriate action (see Appendix B)

Note:
YYYY - 4-digit year
MM - 2-digit month
DD - 2-digit day
m - mandatory parameter

6.5.2 Screen Messages (Use Table format for large number of messages)

When running the production script, **run_CER1.4P2.pl** for Terra Data, the following will be sent to the screen:

CER1.4P2 SUCCESSFUL -- Exit Status = 0
PGE CER1.4P2 Complete for PCF file <PCF filename>

The above two lines indicate a successful run.

6.5.3 Log and Status Files Results (Include ALL Log Files)

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: **$CERESHOME/instrument/runlogs**.

1. **Report Log File: CER1.4P2_LogReport_$SS1_$PS1_0_$CC1_4.YYYYMM**

The Report Log File contains Instrument-related informational messages. These messages may be strictly informative (Error Type = Status or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal). A comprehensive list of these messages that can be generated during the execution of the PGE, is contained in Appendix B.

2. **Status Log File: CER1.4P2_LogStatus_$SS1_$PS1_0_$CC1_4.YYYYMM**

The Status Log File contains all messages created by the ToolKit and Instrument-related messages that can lead to abnormal ending of the Main Processor. If an abnormal exit is encountered by the PGE, this file should be examined for '_E_', (error) or '_F_' (fatal) message types. A comprehensive list of error messages produced within the Main Processor can be found in Appendix B.

3. **User Log File: CER1.4P2_LogUser_$SS1_$PS1_0_$CC1_4.YYYYMM**

The User Log File is not used at this time, but exists to satisfy the ToolKit requirements. Typically the _U_ and _N_ (User information and Notice) will be written to User Log File and Status Log File.

6.5.4 Solutions to Possible Problems

The majority of problems seen to date deal with errors in the PCF file. Checking the PCF file for errors should always be the first step when problems occur.

6.5.5 Conditions for Subsystem and/or Target PGE(s) Terminal Failure (Halt all further processing)

a. Subsystem Termination

None at this time.

b. Target PGE Termination

None at this time. The target PGE does not exist at this time.

6.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE.

Table 6-6. Expected Output File Listing for CER1.4P2

File Name[a]/Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_GAIN_$SS1_$PS1_0_$CC1_4.YYYYMM(.met) @($CERESHOME/instrument/data/GAIN/$SS1_ $PS1_0_4/YYYY/MM)	m		1/month	N/A	Archive, DPO, rm	No
CER_QCTL_$SS1_$PS1_0_$CC1_4.YYYYMM(.met) @($CERESHOME/instrument/data/QCTL/$SS1_ $PS1_0_4/YYYY/MM)	m		1/month	N/A	Archive, DPO, rm	No
CER_QCWN_$SS1_$PS1_0_$CC1_4.YYYYMM(.met) @($CERESHOME/instrument/data/QCWN/$SS1_ $PS1_0_4/YYYY/MM)	m		1/month	N/A	Archive, DPO, rm	No
CER_QCSW_$SS1_$PS1_0_$CC1_4.YYYYMM(.met) @($CERESHOME/instrument/data/QCSW/$SS1_ $PS1_0_4/YYYY/MM)	m		1/month	N/A	Archive, DPO, rm	No
CER1.4P2_PCF_$SS1_$PS1_0_$CC1_4.YYYYMM @($CERESHOME/instrument/CER1.4P2/rcf/pcf)	m	.02	1/month	N/A	Archive, Web, rm	No
CER1.4P2_PCF_$SS1_$PS1_0_$CC1_4.YYYYMM.log @($CERESHOME/instrument/CER1.4P2/rcf/pcf)	m	.02	1/month	N/A	Archive, Web, rm	No
CER1.4P2_$SS1_$PS1_0_$CC1_4.YYYYMM.summary **or** CER1.4P2_$SS1_$PS1_0_$CC1_4.YYYYMM-yyyynn.summary @($CERESHOME/instrument/CER1.4P2/rcf/pcf/summary)	o	.02	1/run	N/A	No Archive, rm	No
CER1.4P2_LogReport_$SS1_$PS1_0_$CC1_4.YYYY MM@($CERESHOME/instrument/runlogs/CER1.4P2)	m	0.005	1/month	N/A	Archive, rm	No
CER1.4P2_LogStatus_$SS1_$PS1_0_$CC1_4.YYYY MM@($CERESHOME/instrument/runlogs/CER1.4P2)	m	0.008	1/month	N/A	Archive, rm	No
CER1.4P2_LogUser_$SS1_$PS1_0_$CC1_4.YYYYMM @($CERESHOME/instrument/runlogs/CER1.4P2)	m	0.001	1/month	N/A	Archive, rm	No
CER1.4P2_$SS1_$PS1_0_$CC1_4.YYYYMM.onnnnn @($CERESHOME/instrument/sge_logs/CER1.4P2)	o		1/month	N/A	Archive, rm	No

a. See Section 6.2 for information on variable data values
If "**(.met)**" is written next to an expected Output Filename, then the metadata file **must** exist with the identical filename and .met extension.

b. VD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)
DB - File content is to be entered into the LaTIS Database
rm - remove
YYYY - 4-digit year
MM - 2-digit month {valid values: 01 .. 12}
DD - 2-digit day {valid values: 01 .. 31}
HH - 2-digit hour of the day {valid values: 00 .. 23}
m - mandatory output
o - optional output
EOD - End of Data Month
OD - On Demand
hr - hour
nnnnn - SGE job number, generated upon job submission

6.7 Expected Temporary Files/Directories

Table 6-7. Temporary Files Listing

Directory	File Name
$CERESHOME/instrument/CER1.4P2/rcf	MCFWrite_CER1.4P2_$SS1_$PS1_0_YYYYMM.temp
$CERESHOME/instrument/CER1.4P2/rcf	GetAttr_CER1.4P2_$SS1_$PS1_0_YYYYMM.temp

7.0 PGEName: CER1.4P3

CER1.4P3 - CERES Geolocate and Calibrate Earth Radiances Subsystem 1.0, BDS Reprocessing

PGE CER1.4P3 will be run on a daily basis after a delta delivery of updated gain coefficients has been made for a data month. This processor will be run approximately 2 months after initial processing of a data month.

NOTE: At this time, this processor is not used for TRMM; however, it may be used in the future for the TRMM data. The information in this section covers all spacecraft.

7.1 PGE Details

7.1.1 Responsible Persons

Table 7-1. Subsystem Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Thomas Grepiotis	Denise Cooper
Organization	SSAI	SSAI
Address	1 Enterprise Parkway	1 Enterprise Parkway
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1940	951-1633
Fax	951-1900	951-1900
LaRC email	arthur.t.grepiotis@nasa.gov	denise.l.cooper@nasa.gov

7.1.2 E-mail Distribution List

E-mail distribution list can be obtained from the primary contact listed in Table 7-1.

7.1.3 Parent PGE(s)

Table 7-2. Parent PGEs for CER1.4P3

PGEName	Description
CER1.1P8	CERES Geolocate and Calibrate Earth Radiances main processor for TRMM, Terra, Aqua and NPP
CER1.0P2	NPP RDR preprocessor
CER1.0P3	EDOS NPP APID 11 Ephemeris/Attitude preprocessor

7.1.4 Target PGE(s))

Table 7-3. Target PGEs for CER1.4P3

PGEName	Description
CER1.2P1	Convert BDS to Pre-ES8
CER4.1-4.1P6	Edition4 Cloud Property Retrieval and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function
CER4.5-6.5P4	Edition3A Inversion PGE for Terra
CER4.5-6.5P5	Edition3A Inversion PGE for Aqua
CER4.5-6.1P6	Edition4 Inversion PGE for Terra/Aqua
CER4.5-6.1P7	Edition1 Inversion PGE for NPP

7.2 Operating Environment

7.2.1 Runtime Parameters (List all Dynamic Parameters needed at Runtime)

Table 7-4. Runtime Parameters for CER1.4P3

Parameter ID (static value)	Parameter	Description	Data Type	Valid Values	m/o
-date	YYYYMMDD	Data Date	I(8)	YYYY>1996, MM = 01 – 12, DD = 01 - 31	m
-o	opt	Select BDS or IES Only processing	A(8)	BDS_Only	o
-tcmode	opt	Second Time Constant Mode	A(3)	opt = On, Off	o
-ic	opt	Turn on/off three channel intercomparison	A(3)	opt = On, Off	o
-sat	opt	Turn on/off individual/multiple radiance channel saturation checks	A(7)	opt = All_On, All_Off, SW_Off, TOT_Off, WN_Off, WS_Off, WT_Off, ST_Off	o
-wn	opt	Turn on/off WN channel update	A(3)	opt = On, Off	o
-ddc	opt	Turn on/off Double Drift Correction	A(3)	opt = On, Off	o
-startt	opt	Requested Start Time	time	hh:mm:ss.ss ssss	o

Table 7-4. Runtime Parameters for CER1.4P3

Parameter ID (static value)	Parameter	Description	Data Type	Valid Values	m/o
-stopt	opt	Requested Stop Time	time	hh:mm:ss.ss ssss	o
-ed	n	Edition selection (Edition3 is the default)	I(1)	2, 3, 4	o

Note:

YYYY	-	4-digit year
MM	-	2-digit month
DD	-	2-digit day
mm>	->	2-digit minutes
m	-	mandatory parameter

7.2.2 Environment Script Requirements

Refer to the CERES internal paper (Reference 1) for a detailed description of the CERES environment parameters.

One Environment Script is required. This script must contain the following parameters:

PGE	-	PGE name, set to CER1.4P3
PROD	-	Set to YES for production, read input from the DPO
SS1	-	Sampling Strategy for Instrument: see Production Request[2]
PS1_0	-	Input Production Strategy for CER1.4P3: see Production Request[2]
PS1_1	-	Output Production Strategy for CER1.4P3: see Production Request[2]
CC1	-	Configuration Code for Instrument: see CM Database
CC1_5	-	Configuration Code for CER1.4P3: see CM Database
SW1_5	-	Software SCCR # for CER1.4P3: see CM Database
DATA1_5	-	Data SCCR # for CER1.4P3: see CM Database
SAT	-	Satellite: (see Note)
INST	-	Instrument: (see Note)
INSTRHOME	-	Instrument Home Directory
InputArchive	-	Directory from which to read the input data products, for all production processing this directory should be set to **/ASDC_archive/CERES**

7.2.3 Execution Frequency (daily, hourly, or monthly)

Daily, the PGE should be run for each data month.

7.2.4 Memory/Disk Space/Time Requirements

Memory:	916 MB
Disk Space:	324 MB
Total Run Time:	90 mins.

7.2.5 Restrictions Imposed in Processing Order

N/A - may be processed in any order.

7.3 Processor Dependencies (Previous PGEs, Ingest Data)

Note: Include required .met files, header files, .. all required inputs

7.3.1 Input Dataset Name (#1): BDS

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

$InputArchive/BDS/$SS1_$PS1_0/YYYY/MM/
CER_BDS_$SS1_$PS1_0_$CC1.YYYYMMDD

1. Mandatory/Optional: **These files are Mandatory.**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY, MM, DD and DD-1.**
3. Waiting Period: **None**

b. Source of Information (Source is PGE name or Ingest Source):

CER1.1P8

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **450**

7.3.2 Input Dataset Name (#2): Ephemeris

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

$InputArchive/AM1EPHN0/YYYY
$InputArchive/PM1EPHND/YYYY
$InputArchive/NPPEPH/YYYY

Terra: AM1EPHN0001MMDDYYYYHH00000000000
or
AM1EPHN0.AYYYYDDD.HH00.vvv.yyyydddhhmmss

where HH = (00, 02, 04, ..., 22). There are 12 files for each data day, and a total of 14 files required for each PGE execution. For the new filenaming convention, DDD is the data day of year, vvv is the ESDT version number, yyyy is the production year, ddd is the production day of year, hh is the production hour, mm is the production minute, and ss is the production second.

Aqua: PM1EPHND.PYYYYDDD.1200.vvv.yyyydddhhmmss

There is one file for each data day, covering Noon to Noon, there are 2 files required for each PGE execution. DDD is the data day of year, vvv is the ESDT

version number, yyyy is the production year, ddd is the production day of year, hh is the production hour, mm is the production minute, and ss is the production second.

NPP: NPPEPH.NYYYYDDD.yyyymmdd.DAT (from CER1.0P2)
NPPEPH.NYYYYDDD.Vyyyymmdd.DAT (from CER1.0P3)

There is one file for each data day covering Midnight to Midnight. yyyymmdd is the production data date of the file. DDD is the data day of year.

1. Mandatory/Optional: **These files are Mandatory.**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY, MM, DD and data for DD-1 and DD+1 must also be available. For the new filenaming convention for Terra DDD-1, HH = 22 and DDD+1, HH = 00 must also be available. And for Aqua DDD-1 must also be available.**
3. Waiting Period: **None**

b. Source of Information (Source is PGE name or Ingest Source):

Terra: ECS DPREP, subscription from ECS
Aqua: ECS DPREP, subscription from ECS
NPP: CER1.0P2 or CER1.0P3

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB):
Terra: 0.45
Aqua: 5.5
NPP: 5.5

7.3.3 Input Dataset Name (#3): Attitude

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

$InputArchive/AM1ATTNF/YYYY
$InputArchive/PM1ATTNR/YYYY
$InputArchive/NPPATT/YYYY

Terra: AM1ATTNF001MMDDYYYYHH00000000000
or
AM1ATTNF.AYYYYDDD.HH00.vvv.yyyydddhhmmss

where HH = (00, 02, 04, ..., 22). There are 12 files for each data day, and a total of 14 files required for each PGE execution. For the new filenaming convention, DDD is the data day of year, vvv is the ESDT version number, yyyy is the production year, ddd is the production day of year, hh is the production hour, mm is the production minute and ss is the production second.

Aqua: PM1ATTNR.PYYYYDDD.HH00.vvv.yyyydddhhmmss

where HH = (00, 02, 04, ..., 22). There are 12 files for each data day, and a total of 14 files required for each PGE execution. For the new filenaming convention, DDD is the data day of year, vvv is the ESDT version number, yyyy is the production year, ddd is the production day of year, hh is the production hour, mm is the production minute and ss is the production second.

NPP: NPPATT.NYYYYDDD.yyyymmdd.DAT (from CER1.0P2)
NPPATT.NYYYYDDD.Vyyyymmdd.DAT (from CER1.0P3)

Where yyyymmdd is the production date of the data file. DDD is the data day of year.

1. Mandatory/Optional: **These files are Mandatory.**
2. Time Related Dependency: **Data must match the Runtime Parameters: YYYY, MM, DD and data for DD-1, HH = 22 and DD+1, HH = 00 must also be available. For the new filenaming convention DDD-1, HH = 22 and DDD+1, HH= 00 must also be available.**
3. Waiting Period: **None**

b. Source of Information (Source is PGE name or Ingest Source):

Terra: ECS DPREP, subscription from ECS
Aqua: ECS DPREP, subscription from ECS
NPP: CER1.0P2 or CER1.0P3

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB):
Terra: 0.45
Aqua: 0.45
NPP: 5.5

7.3.4 Input Dataset Name (#4): Gain Coefficients

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

<u>Edition1</u>:
NPP:
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM5/Edition1/FM5_Count_Conversion_Data-Ed1.YYYYMMDD

<u>Edition2:</u>
Terra:
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM1/Edition2/FM1_Count_Conversion_Data-Ed2.YYYYMMDD
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM2/Edition2/FM2_Count_Conversion_Data-Ed2.YYYYMMDD

Aqua:
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM3/Edition2/FM3_Count_Conversion_Data-Ed2.YYYYMMDD
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM4/Edition2/FM4_Count_Conversion_Data-Ed2.YYYYMMDD

<u>Edition3:</u>
Terra:
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM1/Edition3/FM1_Count_Conversion_Data-Ed3.YYYYMMDD
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM2/Edition3/FM2_Count_Conversion_Data-Ed3.YYYYMMDD

Aqua:
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM3/Edition3/FM3_Count_Conversion_Data-Ed3.YYYYMMDD
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM4/Edition3/FM4_Count_Conversion_Data-Ed3.YYYYMMDD

<u>Edition4:</u>
Terra:
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM1/Edition4/FM1_Count_Conversion_Data-Ed4.YYYYMMDD
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM2/Edition4/FM2_Count_Conversion_Data-Ed4.YYYYMMDD

Aqua:
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM3/Edition4/FM3_Count_Conversion_Data-Ed4.YYYYMMDD
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM4/Edition4/FM4_Count_Conversion_Data-Ed4.YYYYMMDD

where YYYYMMDD is the year, month and day the file was last updated. This date may vary for each of the above files. Several versions of each of these files may exist; however, only the file with the most current date should be used in production.

1. Mandatory/Optional: **These files are Mandatory.**

b. Source of Information (Source is PGE name or Ingest Source):

These files are delivered through CERES CM from the Instrument Subsystem Team. Updates to these files are made approximately every 4 months, except for TRMM, which will not require updated files.

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **Permanent, do not remove**

e. Typical file size (MB): **0.005 (4500 bytes)**

7.3.5 Input Dataset Name (#5): Instrument Offsets

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

Edition1:
NPP:
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/FM5/Edition1/FM5_Offsets-Ed1.YYYYMMDD

Edition2:
Terra:
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/FM1/Edition2/FM1_Offsets-Ed2.YYYYMMDD
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/FM2/Edition2/FM2_Offsets-Ed2.YYYYMMDD

Aqua:
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/FM3/Edition2/FM3_Offsets-Ed2.YYYYMMDD
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/FM4/Edition2/FM4_Offsets-Ed2.YYYYMMDD

Edition3:
Terra:
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/FM1/Edition3/FM1_Offsets-Ed3.YYYYMMDD
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/FM2/Edition3/FM2_Offsets-Ed3.YYYYMMDD

Aqua:
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/FM3/Edition3/FM3_Offsets-Ed3.YYYYMMDD
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/FM4/Edition3/FM4_Offsets-Ed3.YYYYMMDD

<u>Edition4:</u>
Terra:
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM1/Edition4/FM1_Offsets-Ed4.YYYYMMDD
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM2/Edition4/FM2_Offsets-Ed4.YYYYMMDD
Aqua:
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM3/Edition4/FM3_Offsets-Ed4.YYYYMMDD
$CERESHOME/instrument/ancillary/CER1.4P3/gains/FM4/Edition4/FM4_Offsets-Ed4.YYYYMMDD

where YYYYMMDD is the year, month and day the file was last updated. This date may vary for each of the above files. Several versions of each of these files may exist, however only the file with the most current date should be used in production.

1. Mandatory/Optional: **These files are Mandatory.**

b. Source of Information (Source is PGE name or Ingest Source):

These files are delivered through CERES CM from the Instrument Subsystem Team.

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **Permanent, do not remove**

e. Typical file size (MB): **0.005 (4500 bytes)**

7.4 Operating Procedures (Procedure for each part of the processor's elements)

The **CER1.4P3** production script, **run_CER1.4P3.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. The PCF is created by first sourcing the instrument-specific environment which defines the variables defined above in Section 7.2.2, and then executing the PCF generator, **CER1.4P3_pcf_gen.pl**. . To run via SGE execute the production script by typing **CER1.4P3-SGE_Driver.pl** followed by the data date.

7.4.1 How to Execute the Main Processor

To run using SGE:

To run a single data date for Edition1:

> CER1.4P3-SGE_Driver.pl -date YYYYMMDD -ed 1

To run a multiple data dates for Edition1:

> CER1.4P3-SGE_Driver.pl -start YYYYMMDD -end yyyymmdd -ed 1

To run a single data date for Edition2:

> CER1.4P3-SGE_Driver.pl -date YYYYMMDD -ed 2

To run multiple sequential data dates for Edition2:

> CER1.4P3-SGE_Driver.pl -start YYYYMMDD -end yyyymmdd -ed 2

To run a single data date for Edition3:

> CER1.4P3-SGE_Driver.pl -date YYYYMMDD

To run multiple sequential data dates for Edition3:

> CER1.4P3-SGE_Driver.pl -start YYYYMMDD -end yyyymmdd

To run a single data date for Edition4:

> CER1.4P3-SGE_Driver.pl -date YYYYMMDD -ed 4

To run multiple sequential data dates for Edition4:

> CER1.4P3-SGE_Driver.pl -start YYYYMMDD -end yyyymmdd -ed 4

The **CER1.4P3-SGE_Driver.pl** script will search for the required input data files and any existing data product files for the requested data date(s) and time(s) provided. If all the input data files are available and previously created output for this data date does not exist, the job will be submitted to the SGE queue. However, if any mandatory data files are missing the script will not submit the job to the SGE queue. Instead the information on which data files are missing or already exist can be found in the **CER1.4P3_PCF_$SS1_$PS1_1_$CC1_5.YYYYMMDD.log** file. Mandatory files may then be staged or existing output files can be deleted before attempting to rerun this job.

There are several additional options for running CER1.4P3 jobs, they are as follows:

[-clean]	**Delete any existing output data files from previous runs**
[-platform CPU]	**Run CER1.4P3 on the designated platform (only available for *x86*)**
[-date YYYYMMDD]	**Run CER1.4P3 for the specified data date (YYYYMMDD), see the example above**
[-start YYYYMMDD]	**Run CER1.4P3 starting on the specified data date (YYYYMMDD), see the example above**
[-end YYYYMMDD]	**Run CER1.4P3 ending on the specified data date (YYYYMMDD), see the example above**
[-ed x]	**Run CER1.4P3 for specified Edition (x = 3 -- default or 1, 2, 4)**

[-ic aaa]	**Run CER1.4P3 with the specified intercomparison option (ON -- default, OFF)**
[-sat aaaaaa]	**Run CER1.4P3 with the specified saturation option (ALL_ON – default, ALL_OFF, SW_OFF, WN_OFF, TOT_OFF, ST_OFF, WS_OFF, WT_OFF)**
[-o aaaaaaaa]	**Run CER1.4P3 with the specified output data products (Default, BDS_Only, IES_Only), see Sec. 4.4.3 for examples using this parameter**
[-startt HH:MM:ss.ssssss]	**Run CER1.4P3 starting at the specified time (HH:MM:ss.ssssss)**
[-stopt HH:MM:ss.ssssss]	**Run CER1.4P3 stopping at the specified time (HH:MM:ss.ssssss)**

Examples of executing using these parameters:

To run the PGE for Edition2:

> **CER1.4P3-SGE_Driver.pl -start 20120101 -end 20120131 -ed 2**

To run the PGE for Edition4:

> **CER1.4P3-SGE_Driver.pl -start 20120101 -end 20120131 -ed 4**

To run Aqua-FM4 Edition3 after 03/29/2005 (SW channel failure):

> **CER1.4P3-SGE_Driver.pl -date 20050401 -ic OFF -sat SW_OFF**

To run Aqua-FM4 Edition4 after 03/29/2005 (SW channel failure):

> **CER1.4P3-SGE_Driver.pl -date 20050401 -ed 4 -ic OFF -sat SW_OFF**

To run Terra-FM1 or FM2 Edition3 on 01/01/2009 (leap second):

> **CER1.4P3-SGE_Driver.pl -date 20090101 -startt 00:01:00.000000**

To run Terra-FM1 or FM2 Edition3 on 12/31/2008 (leap second):

> **CER1.4P3-SGE_Driver.pl -date 20081231 -stopt 23:45:59.999999**

To run Terra-FM1 or FM2 Edition4 on 01/01/2009 (leap second):

> **CER1.4P3-SGE_Driver.pl -date 20090101 -ed 4 -startt 00:01:00.000000**

To run Terra-FM1 or FM2 Edition4 on 12/31/2008 (leap second):

> **CER1.4P3-SGE_Driver.pl -date 20081231 -ed 4 -stopt 23:45:59.999999**

7.4.2 Special Case Considerations

Special Case 1:

It is possible that only BDS or IES files will be requested to be processed. The following will create only BDS output files:

> cd $CERESHOME/instrument/CER1.4P3/rcf
> CER1.4P3-SGE_Driver.pl -date YYYYMMDD -o BDS_Only

Special Case 2:

For 12/31/2005 when the leap second was introduced for Terra and Aqua, the existing IES creation code had a problem creating the IES for hour 23, therefore, a stop time is required to run this PGE. This is done as follows:

> cd $CERESHOME/instrument/CER1.4P3/rcf
> CER1.4P3-SGE_Driver.pl -date YYYYMMDD -stopt 22:59:59.999999

Special Case 3:

An issue with running the data for Terra-FM2 on Jan. 1, 2006 was discovered that requires that this PGE be run manually for this data date. The PCF must be created manually using the following directions:

The ASCII file generator requires six (4) command line arguments:

(-date)	5-character static code to indicate that the date follows
(YYYYMMDD)	4-digit year, 2-digit month, 2-digit day
(-ed)	3-character static code used to indicate that the Edition Selector follows
(n)	1-digit Edition Selector (2, 3, or 4, 3 is the default)

At the command line (>) type:

>cd $CERESHOME/instrument/CER1.4P3/rcf
> CER1.4P3_pcf_gen.pl -date YYYYMMDD -ed 1 (for Edition1) or
> CER1.4P3_pcf_gen.pl -date YYYYMMDD -ed 2 (for Edition2) or
> CER1.4P3_pcf_gen.pl -date YYYYMMDD (for Edition3) or
> CER1.4P3_pcf_gen.pl -date YYYYMMDD -ed 4 (for Edition4)

The following files will be generated in **$CERESHOME/instrument/CER1.4P3/rcf/pcf:**
CER1.4P3_PCF_$SS1_$PS1_1_$CC1_5.YYYYMMDD
CER1.4P3_PCF_$SS1_$PS1_1_$CC1_5.YYYYMMDD.log

Then the PCF needs to be edited to remove the ephemeris and attitude data for Dec. 31, 2005 hour 22. Then the PGE can be run manually as follows:

Execute the production script by typing the script name, **run_CER1.4P3.pl**, followed by the PCF filename.

At the command line (>) type:

> cd $CERESHOME/instrument/CER1.4P3/rcf
> run_CER1.4P3.pl CER1.4P3_PCF_$SS1_$PS1_1_$CC1_5.YYYYMMDD

7.4.3 Special Reprocessing Instructions

If reprocessing is done to correct an error during production, then all output files must be deleted. A script to remove all files from the failed run is available. The script **file_cleanup.pl** takes as in input parameter the PCF filename for the failed run. The environment variable $CERESHOME must be set in order for this script to work.

> cd $CERESHOME/instrument/test_suites
> source temp-inst-env.csh
> file_cleanup.pl CER1.4P3_PCF_$SS1_$PS1_1_$CC1_5.YYYYMMDD

7.5 Execution Evaluation

7.5.1 Exit Codes

The processor CER1.4P3 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 7-5. Other Exit Codes may appear from the program, which may be the result of a system, compiler, or Toolkit related error. In these cases, contact the responsible person (see Table 7-1) for assistance.

Table 7-5. Exit Codes for CER1.4P3

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
200	Abnormal Exit	Check the Log Files and take the appropriate action (see Appendix B)

Note:
YYYY - 4-digit year
MM - 2-digit month
DD - 2-digit day
m - mandatory parameter

7.5.2 Screen Messages (Use Table format for large number of messages)

When running the production script, **run_CER1.4P3.pl** for Terra Data, the following will be sent to the screen:

CER1.4P3 SUCCESSFUL -- Exit Status = 0
PGE CER1.4P3 Complete for PCF file <PCF filename>

The above two lines indicate a successful run.

7.5.3 Log and Status Files Results (Include ALL Log Files)

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: **$CERESHOME/instrument/runlogs/CER1.4P3**.

1. **Report Log File: CER1.4P3_LogReport_$SS1_$PS1_1_$CC1_5.YYYYMMDD**

The Report Log File contains Instrument-related informational messages. These messages may be strictly informative (Error Type = Status or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal). A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

2. **Status Log File: CER1.4P3_LogStatus_$SS1_$PS1_1_$CC1_5.YYYYMMDD**

The Status Log File contains all messages created by the ToolKit and Instrument-related messages that can lead to abnormal ending of the Main Processor. If an abnormal exit is encountered by the PGE, this file should be examined for '_E_', (error) or '_F_' (fatal) message types. A comprehensive list of error messages produced within the Main Processor can be found in Appendix B.

3. **User Log File: CER1.4P3_LogUser_$SS1_$PS1_1_$CC1_5.YYYYMMDD**

The User Log File is not used at this time, but exists to satisfy the ToolKit requirements. Typically the _U_ and _N_ (User information and Notice) will be written to User Log File and Status Log File.

7.5.4 Solutions to Possible Problems

The majority of problems seen to date deal with errors in the PCF file. Checking the PCF file for errors should always be the first step when problems occur.

7.5.5 Conditions for Subsystem and/or Target PGE(s) Terminal Failure (Halt all further processing)

a. Subsystem Termination

None at this time.

b. Target PGE Termination

None at this time. The target PGE does not exist at this time.

7.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE.

Table 7-6. Expected Output File Listing for CER1.4P3

File Name[a]/Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_BDS_$SS1_$PS1_1_$CC1_5.YYYYMMDD(.met) @($CERESHOME/instrument/data/BDS/$SS1_$PS1_ 1/YYYY/MM)[c]	m	700	1/day	CER1.2P1	Archive, DPO	Yes
CER_IES_$SS1_$PS1_1_$CC1_5.YYYYMMDDHH(.met) @($CERESHOME/instrument/data/IES/$SS1_$PS1_ 1/YYYY/MM)[d]	o	37	1/hr	CER4.1-4.1P6, CER4.5-6.5P4, CER4.5-6.5P5, CER4.5-6.2P6, & CER4.5-6.1P7	Archive, DPO, rm	No
CER_BQCBDS_$SS1_$PS1_1_$CC1_5.YYYYMMDD(.met) @($CERESHOME/instrument/web/CER1.4P3/$PS1_1)[c]	m	0.03	1/day	N/A	Archive, Web, rm	No
CER_BQCIES_$SS1_$PS1_1_$CC1_5.YYYYMMDD(.met) @($CERESHOME/instrument/web/CER1.4P3/$PS1_1)[d]	o	0.03	1/day	N/A	Archive, Web, rm	No
CER1.4P3_PCF_$SS1_$PS1_1_$CC1_5.YYYYMMDD @($CERESHOME/instrument/CER1.4P3/rcf/pcf)	m	.02	1/day	N/A	Archive, Web, rm	No
CER1.4P3_PCF_$SS1_$PS1_1_$CC1_5.YYYYMMDD.log @($CERESHOME/instrument/CER1.4P3/rcf/pcf)	m	.02	1/day	N/A	Archive, Web, rm	No
CER1.4P3_$SS1_$PS1_0_$CC1_5.YYYYMMDD.summary **or** CER1.4P3_$SS1_$PS1_0_$CC1_5.YYYYMMDD-yyyynndd.summary @($CERESHOME/instrument/CER1.4P3/rcf/pcf/summary)	o	.02	1/run	N/A	No Archive, rm	No
CER1.4P3_LogReport_$SS1_$PS1_1_$CC1_5.YYYYMMDD @($CERESHOME/instrument/runlogs/CER1.4P3)	m	0.005	1/day	N/A	Archive, rm	No
CER1.4P3_LogStatus_$SS1_$PS1_1_$CC1_5.YYYYMMDD @($CERESHOME/instrument/runlogs/CER1.4P3)	m	0.008	1/day	N/A	Archive, rm	No
CER1.4P3_LogUser_$SS1_$PS1_1_$CC1_5.YYYYMMDD @($CERESHOME/instrument/runlogs/CER1.4P3)	m	0.001	1/day	N/A	Archive, rm	No
CER1.4P3_$SS1_$PS1_1_$CC1_5.YYYYMMDD.onnnnn @($CERESHOME/instrument/sge_logs/CER1.4P3)	o		1/day	N/A	Archive, rm	No

a. See Section 7.2 for information on variable data values
If "**(.met)**" is written next to an expected Output Filename, then the metadata file **must** exist with the identical filename and .met extension.

b. VD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)
DB - File content is to be entered into the LaTIS Database
rm - remove
YYYY - 4-digit year
MM - 2-digit month {valid values: 01 .. 12}
DD - 2-digit day {valid values: 01 .. 31}
HH - 2-digit hour of the day {valid values: 00 .. 23}
m - mandatory output
o - optional output
EOD - End of Data Month
OD - On Demand

hr - hour
nnnnn - SGE job number, generated upon job submission

c. Not created when option IES-Only.
d. Not created when option BDS-Only.

7.7 Expected Temporary Files/Directories

Table 7-7. Temporary Files Listing

Directory	File Name
$CERESHOME/instrument/CER1.4P3/rcf	MCFWrite_CER1.4P3_$SS1_$PS1_1_YYYYMMDD.temp
$CERESHOME/instrument/CER1.4P3/rcf	GetAttr_CER1.4P3_$SS1_$PS1_1_YYYYMMDD.temp

References

1. Reference "Sampling Strategy, Production Strategy, and Configuration Code Implementation at the Langley TRMM and Terra Information System (LATIS)" internal paper for detail description of the CERES environment parameters. URL: http://ceres.larc.nasa.gov/Internal/intern_docs.php
2. Reference "DMT to DAAC Production Request." URL: http://ceres.larc.nasa.gov/dmt2daac.php

Appendix A
Acronyms and Abbreviations

APID	Application ID
Aqua	alias for EOS-PM1
ASDC	Atmospheric Science Data Center
BDS	Science Bi-Directional Scan HDF data product
BDSD	No-Archive Bi-Directional Scan HDF data product
BDSF	Fixed Pattern Bi-Directional Scan HDF data product
BDSG	Gimbal Error Bi-Directional Scan HDF data product
BDSI	Internal Calibration Bi-Directional Scan HDF data product
BDSM	Memory Dump Bi-Directional Scan HDF data product
BDSS	Solar Calibration Bi-Directional Scan HDF data product
BINEL	Instrument Command Error Log ASCII QC Report
BINHS	Instrument Command History ASCII QC Report
BINMEM	Instrument Memory Dump Binary data product
BQCRP	Instrument Production ASCII QC Report
BQCRPS	Instrument Housekeeping Statistics ASCII QC Report
CERES	Clouds and the Earth's Radiant Energy System
CM	Configuration Management
DAAC	Distributed Active Archive Center
DB	Data Base
DMT	Data Management Team
ECS	EOSDIS Core System
EOS	Earth Observing System
EOS-AM	EOS Morning Crossing Mission
EOS-PM	EOS Afternoon Crossing Mission
ERBE	Earth Radiation Budget Experiment
ERBS	Earth Radiation Budget Satellite
HDF	Hierarchical Data Format
IES	Instrument Earth Scans HDF data product
LaRC	Langley Research Center
LaTIS	Langley TRMM Information System
LW	Longwave
MB	Megabytes
met	metadata file
μm	microns
N/A	Not Applicable

NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
PCF	Process Control File
PGE	Product Generation Executives
QC	Quality Control
QL	QuickLook
PSF	Point Spread Function
PRE_SSF	Preliminary Single Satellite CERES Footprint TOA and Surface Fluxes
QC	Quality Control
SSAI	Science Systems and Applications Incorporated
SMF	Status Message File
SSF	Single Satellite CERES Footprint TOA and Surface Fluxes, Clouds
SW	Shortwave
Terra	alias for EOS-AM1
TOA	Top-of-Atmosphere
TRMM	Tropical Rainfall Measuring Mission
VD	Validation Days

Appendix B
Error Messages for Subsystem CER1.0

Appendix B contains a comprehensive list of messages that can be generated during the execution of a PGE. These messages are used to inform the operator or analyst of specific circumstances encountered during data processing. These messages may be strictly informative (Error Type = Status or Warning), or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal). All messages are written to the LogReport File and/or the LogStatus File of the processing instance.

Table B-1 contains a list of diagnostic messages for all of the Instrument PGEs. The table entry includes a pneumonic, the text associated with that pneumonic, and a set of Action Keys. Multiple Action Keys may be displayed in the Action Keys column. When multiple Action Keys appear, they should be followed in the order shown. For example, if the Action Keys are "2,3", the first action would be to check for a problem with the Production System Hardware or Software. If the Production System does not have a problem then the next step would be to check the PCF itself to find any possible errors, including, checking to see if files listed in the PCF exist. Those errors would then be corrected and the Main Processor would be rerun.

Table B-2 contains all required support input files necessary to run Instrument Subsystem CER1.0.

PGE CER1.2P1 has no diagnostic messages that are reported to the Log Files. All messages are in standard output and are explained at the time.

Operator Instructions:

If a PGE prematurely terminates, then take the following steps:

1. Look at the last few records on the LogStatus file.
2. Find the error message in the following Error Message listing(s), and follow the appropriate ACTION.
3. If an error message is not in the LogStatus File, then repeat steps 1 and 2 using the LogReport File.
4. If no information is derived, then call the responsible person in Table 3-1.
5. If the appropriate ACTION failed, then call the responsible person in Table 3-1.
6. In all cases, log all steps that were taken after the PGE failure, and send a copy to the responsible person listed in Table 3-1.

Action Keys for Table B-1: (Note if an ACTION does not work, call the Responsible Person in Table 3-1.)

1. Verify that file (nn) in Table B-2 exists. (nn is the Number of the possible missing file).
2. Check for problem in the Production System (hardware/software), correct, rerun.
3. Check that PCF is correct, fix any errors, rerun.

4. Data Error, order replacement Level-0/Ephemeris/Attitude File, rerun with new file.
5. No Action, call the Responsible Person in Table 3-1.

Table B-1. Subsystem CER1.0 TK (SMF) Diagnostic Message Table

Message/Error Type		Action Key
INSTIES_E_ADVANCE_PAST_BUF_END	Attempt to move pointer past end of IES footprint linked list	5
INSTIES_E_BACKUP_BEFORE_BUF	Attempt to move pointer before beginning of IES footprint linked list	5
INSTIES_E_CREATE_ERROR	Vdata create error for IES Hour	2,3
INSTIES_E_DATA_WRITE_ERR	Vdata write error for IES Hour	2,3
INSTIES_E_END_OF_BUFFER	Dynamic Memory Allocation Problem when appending to the IES footprint linked list	5
INSTIES_E_FILE_NOT_AVAILABLE	Attempt to create a file number > hour 23, not allowed at this time	5
INSTIES_E_INVALID_INDEX	Invalid index passed to the IES footprint linked list	5
INSTIES_E_LIST_EMPTY	IES footprint linked list is empty	5
INSTIES_E_LIST_UNEXPECTED_ERR	Unexpected error encountered in linked list package	5
INSTIES_E_REC_ASSIGN_ERR	Vdata record assignment error for IES Hour	2
INSTIES_E_UNEXPECTED_EXCEPT	Unexpected Exception Encountered	2,5
INSTRAZ_E_INIT_TABLE	Azimuth Assy initialization error	1(28),2,3
INSTRBB_E_INIT_TABLE	Blackbody Assy initialization error	1(28),2,3
INSTRBRK_E_INIT_TABLE	Brake Assy initialization error	1(28),2,3
INSTRCFG_E_INIT_TABLE	Instrument Config initialization error	1(28),2,3
INSTRCMD_E_INIT_TABLE	Commanding initialization error	1(28),2,3
INSTRCVR_E_INIT_TABLE	Main Cover Assy initialization error	1(29),2,3
INSTRDAA_E_INIT_TABLE	DAA Assy initialization error	1(28),2,3
INSTRDET_E_INIT_TABLE	Detector Assy initialization error	1(28),2,3
INSTREL_E_INIT_TABLE	Elevation Assy initialization error	1(5,10,15,20.25, 33,28),2,3
INSTRICA_E_INIT_TABLE	ICA Assy initialization error	1(28),2,3
INSTRLO_E_CORRUPT_FILE_HDR	Unable to Open Level-0 File -- File Header Corrupt	4
INSTRLO_E_FILE_NOT_OPEN	Level-0 File not Open	2,3
INSTRLO_E_FIRST_PACKET_ERROR	Can't find first packet in Level-0 file	4
INSTRLO_E_HDR_APID_INVALID	Level-0 Header APID is not a valid APID	2,3,4
INSTRLO_E_HDR_BUF_SIZE_INVALID	Level-0 Variable Header buffer size is invalid	2,3,4
INSTRLO_E_HDR_CAL_APID_ERR	Level-0 Header APID not Calibration APID	3
INSTRLO_E_HDR_DIAG_APID_ERR	Level-0 Header APID not Diagnostic APID	3
INSTRLO_E_HDR_DT_UNKNOW	Level-0 Header Data Type flag does not indicate routine or QL processing, Data Type Flag	3
INSTRLO_E_HDR_NO_PKTS_ZER	Level-0 Header number of packets is zero	4
INSTRLO_E_HDR_SCI_APID_ERR	Level-0 Header APID not Science APID	3
INSTRLO_E_HDR_SELECT_OPTS	Level-0 Header Select Options Invalid	3,4
INSTRLO_E_HDR_TIME_ORDER	Level-0 Time of last packet earlier than first packet in file header	4

Table B-1. Subsystem CER1.0 TK (SMF) Diagnostic Message Table

Message/Error Type		Action Key
INSTRLO_E_INIT_TABLE_ERROR	Level-0 Failed to Initialize Internal File Table	2,3,4
INSTRLO_E_INVALID_HDR_NOAPID	Level-0 Header Number of APIDs /= 1	5
INSTRLO_E_INVALID_HDR_SC	Level-0 Header Spacecraft ID Invalid, SC ID	4
INSTRLO_E_INVALID_LOGICAL_ID	Level-0 Logical File ID is invalid	3
INSTRLO_E_MANAGE_TABLE_ERRO	Level-0 Manage Table Error	2
INSTRLO_E_NEXT_PHYSICAL_ERR	Level-0 Error opening next physical file	2,3
INSTRLO_E_PHYS_HEADER_ERROR	Level-0 Error reading Physical File Header	2,3,4
INSTRLO_E_PKT_NOT_FOUND	Level-0 Unable to find requested packet	5
INSTRLO_E_SEEK_1ST_PKT_ERROR	Level-0 Cannot find first packet in file	2,3,4
INSTRLO_E_SEEK_ERROR	Level-0 ToolKit seek error encountered	2,3,4
INSTRLO_E_START_STOP_TIME	Level-0 Start/Stop time for file is invalid	4
INSTRLO_E_UNABLE_TO_OPEN	Level-0 Unable to open physical file	3,4
INSTRLO_E_UNEXPECTED_EOF	Level-0 Unexpected EOF encountered	3,4
INSTRLO_E_UNEXPECTED_EXCEPT	Level-0 Unexpected Exception Encountered	5
INSTRLO_E_UNKNOWN_SPACECRAFT	Level-0 Unknown Spacecraft ID returned from ToolKit	5
INSTRLO_E_UNKNOWN_TOOLKIT_ERROR	Level-0 Unknown ToolKit Error	2,5
INSTRLO_E_UNKNOWN_UNIX	Level-0 Unknown UNIX error encountered	2,3
INSTRLO_E_VIRT_FILE_TABLE	Level-0 Error accessing Virtual File Table	2
INSTRLO_E_VS_NOT_OPEN	Level-0 Virtual Dataset not open	2
INSTRLO_W_START_NOT_FOUND	Level-0 Start Time not found	3
INSTRMAM_E_INIT_TABLE	MAM Assy initialization error	1(29),3
INSTRPK_E_ANALOG_INIT	Analog Lookup Table Initialize Failure	1(1),3
INSTRPK_E_DEVICE_ERROR	Device Error Found	2
INSTRPK_E_DIGITAL_INIT	Digital Lookup Table Initialize Failure	1(2),3
INSTRPK_E_PROGRAM_ERROR	Program Error Found	5
INSTRPK_E_STATUS_ERROR	Status Error Found	3
INSTRPK_E_STORAGE_ERROR	Storage Error Found	5
INSTRPK_E_UNEXPECTED_EXCEPT	Unexpected Exception Found	5
INSTRRAD_E_DEVICE_ERROR	Device Error Found	2,5
INSTRRAD_E_END_ERROR	End Error Found	5
INSTRRAD_E_NAME_ERROR	Name Error Found	1(2,3,4,8,9,13, 14,18,19,23,24, 31,32),3
INSTRRAD_E_NUMERIC_ERROR	Numeric Error Found	5
INSTRRAD_E_PROGRAM_ERROR	Program Error Found	5
INSTRRAD_E_STATUS_ERROR	Status Error Found	3
INSTRRAD_E_UNEXPECTED	Unexpected Exception Found	5
INSTRSCAN_E_GENERAL	Unanticipated Ada exception encountered	5
INSTRSOL_E_INIT_TABLE	Solar Assy initialization error	1(7,12,17,22,27, 28,35)3
INSTRSPA_E_NAME_ERROR	Name Error Found	3
INSTRSPA_E_PROGRAM_ERROR	Program Error Found	5

Table B-1. Subsystem CER1.0 TK (SMF) Diagnostic Message Table

Message/Error Type		Action Key
INSTRSPA_E_STATUS_ERROR	Status Error Found	3,5
INSTRSPA_E_UNEXPECTED_EXCEPT	Unexpected Exception Found	5
INSTRSWC_E_INIT_TABLE	Assy initialization error	3,5
INSTRTIME_E_CONSTRAINT	Unanticipated Ada constraint_error encountered	3,5
INSTRTIME_E_GENERAL	Unanticipated Ada exception encountered	5
INSTRTIME_N_MISC_TK_MSG	Return status from toolkit call is	2,5
INSTRSBSET_E_INVALID_BDS	Error with BDS Input File	1,2
INSTRSBSET_E_INVALID_BDSI	Error with output BDSI files	1,2
INSTRSBSET_E_SD_ERROR	Error processing SD record	1,2
INSTRSBSET_E_VDATA_ERROR	Error Processing VData record	1,2
INSTRSBSET_E_META_DATA_ERROR	Problems with writing Meta Data	1,2
INSTRSBSET_E_GENERAL	All other BDSI Subsetter errors	1,2
INSTRGAIN_E_BDSI_OPEN_ERR	Trouble Opening BDSI files	1,2
INSTRGAIN_E_SD_READ_ERR	Problems reading SD record	1,2
INSTRGAIN_E_SD_PROC_ERR	Problems processing SD record	1,2
INSTRGAIN_E_VDATA_READ_ERR	Problems reading VData record	1,2
INSTRGAIN_E_VDATA_PROC_ERR	Problems processing VData information	1,2
INSTRGAIN_E_VDATA_EXTRACT_ERR	Problems extracting VData Fields	1,2
INSTRGAIN_E_META_DATA_ERR	Problems writing meta data	1,2
INSTRGAIN_E_RESPONSE_OPEN_ERR	Could not open instrument response file	1,2
INSTRGAIN_E_RESPONSE_PARSE_ERR	Possible corruption of response file	1,2
INSTRGAIN_E_GND_REF_OPEN_ERR	Could not open ground reference file	1,2
INSTRGAIN_E_GND_REF_PARSE_ERR	Possible corruption of ground reference file	1,2
INSTRGAIN_E_GND_REF_MISSING	ground reference file not found	1,2
INSTRGAIN_E_DIGI_TABLE_ERR	Error using digital lookup table	1,2
INSTRGAIN_E_OUTPUT_ERR	Problems writing gain output files	1,2
INSTRGAIN_E_GENERAL_ERR	General error with gain analyzer program	1,2

Appendix C
Ancillary Data Files for Subsystem CER1.0

Location/Filename	Description	Used By PGE
Ancillary Data files used for all instruments:		
$CERESHOME/instrument/ancillary/PCF_Parameter_Map.txt	PCF Logical ID to file mapping	CER1.0P2, CER1.0P3, CER1.1P8, CER1.2P1, CER1.4P1, CER1.4P2 , CER1.4P3
$CERESHOME/instrument/ancillary/CER1.1P8/Analog_Location.YYYYMMDD	Location of all Analog Parameters in data stream	CER1.1P8
$CERESHOME/instrument/ancillary/common/Digital_Location.YYYYMMDD	Location of all Digital Parameters in data stream	CER1.1P8, CER1..4P1, CER1.4P2
$CERESHOME/instrument/ancillary/CER1.1P8/Instrument_Config_Logic_Table.YYYYMMDD	Overall instrument configuration logic table	CER1.1P8
$CERESHOME/instrument/ancillary/CER1.1P8/MAM_Configuration_Logic_Table.YYYYMMDD	Configuration logic table for MAM	CER1.1P8
$CERESHOME/instrument/ancillary/CER1.1P8/Main_Cover_Configuration_Logic_Table.YYYYMMDD	Look-up table for Main-Cover	CER1.1P8
$CERESHOME/instrument/ancillary/common/IC_Gnd_Ref_Data	Internal Calibration Ground Reference Data	CER1.1P8, CER1.4P2
FM1 Specific Ancillary Files:		
$CERESHOME/instrument/ancillary/CER1.1P8/FM1/FM1_Offsets.YYYMMDD	Count Conversion offset values for FM1	CER1.1P8
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition2/FM1/FM1_Offsets-Ed2.YYYMMDD	Count Conversion offset values for FM1 Edition2	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition3/FM1/FM1_Offsets-Ed3.YYYMMDD	Count Conversion offset values for FM1 Edition3	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition4/FM1/FM1_Offsets-Ed4.YYYMMDD	Count Conversion offset values for FM1 Edition4	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.1P8/FM1/FM1_Count_Conversion_Data.YYYYMMDD	Count Conversion coefficient values for FM1	CER1.1P8

Location/Filename	Description	Used By PGE
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition2/FM1/FM1_Count_Conversion_Data-Ed2.YYYYMMDD	Count Conversion coefficient values for FM1 for Edition2	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition3/FM1/FM1_Count_Conversion_Data-Ed3.YYYYMMDD	Count Conversion coefficient values for FM1 for Edition3	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition4/FM1/FM1_Count_Conversion_Data-Ed4.YYYYMMDD	Count Conversion coefficient values for FM1 for Edition4	CER1.4P3
$CERESHOME/instrument/ancillary/common/FM1/FM1_Scan_Mode_Offset_Map.YYYYMMDD	Count Conversion mapping of Instrument Mode to Offset Table used	CER1.1P8, CER1.4P3
$CERESHOME/instrument/ancillary/common/FM1/FM1_Elevation_Profiles.YYYYMMDD	Input file for instrument processing for FM1	CER1.1P8
$CERESHOME/instrument/ancillary/common/FM1/FM1_Instrument_Engineering_Coefficients.YYYYMMDD	Input file for instrument processing for FM1	CER1.1P8, CER1.4P3
$CERESHOME/instrument/ancillary/CER1.1P8/FM1/FM1_Instrument_Engineering_Limits.YYYYMMDD	Input file for instrument processing for FM1	CER1.1P8
FM2 Specific Ancillary Files:		
$CERESHOME/instrument/ancillary/CER1.1P8/FM2/FM2_Offsets.YYYYMMDD	Count Conversion offset values for FM2	CER1.1P8
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition2/FM2/FM2_Offsets-Ed2.YYYYMMDD	Count Conversion offset values for FM2 for Edition2	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition3/FM2/FM2_Offsets-Ed3.YYYYMMDD	Count Conversion offset values for FM2 for Edition3	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition4/FM2/FM2_Offsets-Ed4.YYYYMMDD	Count Conversion offset values for FM2 for Edition4	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.1P8/FM2/FM2_Count_Conversion_Data.YYYYMMDD	Count Conversion coefficient values for FM2	CER1.1P8
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition2/FM2/FM2_Count_Conversion_Data-Ed2.YYYYMMDD	Count Conversion coefficient values for FM2 for Edition2	CER1.4P3

Location/Filename	Description	Used By PGE
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition3/FM2/FM2_Count_Conversion_Data-Ed3.YYYYMMDD	Count Conversion coefficient values for FM2 for Edition3	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition4/FM2/FM2_Count_Conversion_Data-Ed4.YYYYMMDD	Count Conversion coefficient values for FM2 for Edition4	CER1.4P3
$CERESHOME/instrument/ancillary/common/FM2/FM2_Scan_Mode_Offset_Map.YYYYMMDD	Count Conversion mapping of Instrument Mode to Offset Table used	CER1.1P8, CER1.4P3
$CERESHOME/instrument/ancillary/common/FM2/FM2_Elevation_Profiles.YYYYMMDD	Input file for instrument processing for FM2	CER1.1P8
$CERESHOME/instrument/ancillary/common/FM2/FM2_Instrument_Engineering_Coefficients.YYYYMMDD	Input file for instrument processing for FM2	CER1.1P8, CER1.4P3
$CERESHOME/instrument/ancillary/CER1.1P8/FM2/FM2_Instrument_Engineering_Limits.YYYYMMDD	Input file for instrument processing for FM2	CER1.1P8
FM3 Specific Ancillary Files:		
$CERESHOME/instrument/ancillary/CER1.1P8/FM3/FM3_Offsets.YYYMMDD	Count Conversion offset values for FM3	CER1.1P8
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition2/FM3/FM3_Offsets-Ed2.YYYMMDD	Count Conversion offset values for FM3 for Edition2	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition3/FM3FM3_Offsets-Ed3.YYYMMDD	Count Conversion offset values for FM3 for Edition3	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition4/FM3FM3_Offsets-Ed4.YYYMMDD	Count Conversion offset values for FM3 for Edition4	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.1P8/FM3/FM3_Count_Conversion_Data.YYYYMMDD	Count Conversion coefficient values for FM3	CER1.1P8
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition2/FM3/FM3_Count_Conversion_Data-Ed2.YYYYMMDD	Count Conversion coefficient values for FM3 for Edition2	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition3/FM3/FM3_Count_Conversion_Data-Ed3.YYYYMMDD	Count Conversion coefficient values for FM3 for Edition3	CER1.4P3

Location/Filename	Description	Used By PGE
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition4/FM3/FM3_Count_Conversion_Data-Ed4.YYYYMMDD	Count Conversion coefficient values for FM3 for Edition4	CER1.4P3
$CERESHOME/instrument/ancillary/common/FM3/FM3_Scan_Mode_Offset_Map.YYYYMMDD	Count Conversion mapping of Instrument Mode to Offset Table used	CER1.1P8, CER1.4P3
$CERESHOME/instrument/ancillary/common/FM3/FM3_Elevation_Profiles.YYYYMMDD	Input file for instrument processing for FM3	CER1.1P8
$CERESHOME/instrument/ancillary/common/FM3/FM3_Instrument_Engineering_Coefficients.YYYYMMDD	Input file for instrument processing for FM3	CER1.1P8, CER1.4P3
$CERESHOME/instrument/ancillary/CER1.1P8/FM3/FM3_Instrument_Engineering_Limits.YYYYMMDD	Input file for instrument processing for FM3	CER1.1P8
FM4 Specific Ancillary Files:		
$CERESHOME/instrument/ancillary/CER1.1P8/FM4/FM4_Offsets.YYYMMDD	Count Conversion offset values for FM4	CER1.1P8
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition2/FM4/FM4_Offsets-Ed2.YYYMMDD	Count Conversion offset values for FM4 for Edition2	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition3/FM4/FM4_Offsets-Ed3.YYYMMDD	Count Conversion offset values for FM4 for Edition3	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition4/FM4/FM4_Offsets-Ed4.YYYMMDD	Count Conversion offset values for FM4 for Edition4	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.1P8/FM4/FM4_Count_Conversion_Data.YYYYMMDD	Count Conversion coefficient values for FM4	CER1.1P8
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition2/FM4/FM4_Count_Conversion_Data-Ed2.YYYYMMDD	Count Conversion coefficient values for FM4 for Edition2	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition3/FM4/FM4_Count_Conversion_Data-Ed3.YYYYMMDD	Count Conversion coefficient values for FM4 for Edition3	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition3/FM4/FM4_Count_Conversion_Data-Ed4.YYYYMMDD	Count Conversion coefficient values for FM4 for Edition4	CER1.4P3
$CERESHOME/instrument/ancillary/common/FM4/FM4_Scan_Mode_Offset_Map.YYYYMMDD	Count Conversion mapping of Instrument Mode to Offset Table used	CER1.1P8, CER1.4P3

Location/Filename	Description	Used By PGE
$CERESHOME/instrument/ancillary/common/FM4/FM4_Elevation_Profiles.YYYYMMDD	Input file for instrument processing for FM4	CER1.1P8
$CERESHOME/instrument/ancillary/common/FM4/FM4_Instrument_Engineering_Coefficients.YYYYMMDD	Input file for instrument processing for FM4	CER1.1P8, CER1.4P3
$CERESHOME/instrument/ancillary/CER1.1P8/FM4/FM4_Instrument_Engineering_Limits.YYYYMMDD	Input file for instrument processing for FM4	CER1.1P8
FM5 Specific Ancillary Files:		
$CERESHOME/instrument/ancillary/CER1.1P8/FM5/FM5_Offsets.YYYMMDD	Count Conversion offset values for FM5	CER1.1P8
$CERESHOME/instrument/ancillary/CER1.4P3/offsets/Edition1/FM5/FM5_Offsets-Ed1.YYYMMDD	Count Conversion offset values for FM5 for Edition1	CER1.4P3
$CERESHOME/instrument/ancillary/CER1.1P8/FM5/FM5_Count_Conversion_Data.YYYYMMDD	Count Conversion coefficient values for FM5	CER1.1P8
$CERESHOME/instrument/ancillary/CER1.4P3/gains/Edition1/FM5/FM5_Count_Conversion_Data-Ed1.YYYYMMDD	Count Conversion coefficient values for FM5 for Edition1	CER1.4P3
$CERESHOME/instrument/ancillary/common/FM5/FM5_Scan_Mode_Offset_Map.YYYYMMDD	Count Conversion mapping of Instrument Mode to Offset Table used	CER1.1P8, CER1.4P3
$CERESHOME/instrument/ancillary/common/FM5/FM5_Elevation_Profiles.YYYYMMDD	Input file for instrument processing for FM5	CER1.1P8
$CERESHOME/instrument/ancillary/common/FM5/FM5_Instrument_Engineering_Coefficients.YYYYMMDD	Input file for instrument processing for FM5	CER1.1P8, CER1.4P3
$CERESHOME/instrument/ancillary/CER1.1P8/FM5/FM5_Instrument_Engineering_Limits.YYYYMMDD	Input file for instrument processing for FM5	CER1.1P8
PFM Specific Ancillary Files:		
$CERESHOME/instrument/ancillary/CER1.1P8/PFM/PFM_Offsets.YYYMMDD	Count Conversion offset values for PFM	CER1.1P8
$CERESHOME/instrument/ancillary/CER1.1P8/PFM/PFM_Count_Conversion_Data.YYYYMMDD	Count Conversion coefficient values for PFM	CER1.1P8
$CERESHOME/instrument/ancillary/common/PFM/PFM_Scan_Mode_Offset_Map.YYYYMMDD	Count Conversion mapping of Instrument Mode to Offset Table used	CER1.1P8. CER1.4P3

Location/Filename	Description	Used By PGE
$CERESHOME/instrument/ancillary/common/PFM/PFM_Elevation_Profiles.YYYYMMDD	Input file for instrument processing for PFM	CER1.1P8
$CERESHOME/instrument/ancillary/common/PFM/PFM_Instrument_Engineering_Coefficients.YYYYMMDD	Input file for instrument processing for PFM	CER1.1P8, CER1.4P3
$CERESHOME/instrument/ancillary/CER1.1P8/PFM/PFM_Instrument_Engineering_Limits.YYYYMMDD	Input file for instrument processing for PFM	CER1.1P8
Ancillary Files read from CERESlib:		
$CERESHOME/lib/data/CERES_constants.dat	CERES Constants data file	CER1.0P2, CER1.0P3, CER1.1P8, CER1.2P1, CER1.4P1, CER1.4P2, CER1.4P3
$CERESHOME/lib/data/CERES_defaults.dat	CERES Defaults data file	CER1.0P2, CER1.0P3, CER1.1P8, CER1.2P1, CER1.4P1, CER1.4P2, CER1.4P3
$CERESHOME/lib/data/ceres_SI_FM1_day.YYYY MMDD.dat	Spectral Response Function information for Terra-FM1	CER1.4P2
$CERESHOME/lib/data/ceres_SI_FM2_day.YYYY MMDD.dat	Spectral Response Function information for Terra-FM2	CER1.4P2
$CERESHOME/lib/data/ceres_SI_PFM_day.YYYY MMDD.dat	Spectral Response Function information for TRMM-PFM	CER1.4P2
$CERESHOME/lib/data/ceres_SI_FM3_day.YYYY MMDD.dat	Spectral Response Function information for Aqua-FM3	CER1.4P2
$CERESHOME/lib/data/ceres_SI_FM4_day.YYYY MMDD.dat	Spectral Response Function information for Aqua-FM4	CER1.4P2
$CERESHOME/lib/data/ceres_SI_FM5_day.YYYY MMDD.dat	Spectral Response Function information for NPP-FM5	CER1.4P2
Required Toolkit files:		

Location/Filename	Description	Used By PGE
$PGSDIR/database/linux64/TD/leapsec.dat	The leap second file used by the toolkit during time conversions. This file must be updated on a regular basis as the toolkit checks the date at the top of the file to ensure that this file is up-to-date. If the file has not been updated within a certain time period an error will be sent by the toolkit causing the PGE to fail.	CER1.0P2, CER1.0P3, CER1.1P8, CER1.2P1, CER1.4P1, CER1.4P2, CER1.4P3
$PGSDIR/database/linux64/TD/utcpole.dat	The utcpole file used by the toolkit during time conversions. This file accounts for the change in rotation of the earth for geolocation and coordinate conversion calculations. This file is updated twice a week by the Naval Observatory. The toolkit checks the date at the top of the file to ensure that this file is up-to-date. If the file has not been updated within a certain time period an error will be sent by the toolkit causing the PGE to fail.	CER1.0P2, CER1.0P3, CER1.1P8, CER1.2P1, CER1.4P1, CER1.4P2, CER1.4P3
$PGSDIR/database/linux64/CBP/de200.eos	**This file is in binary format**. The file is used by the toolkit to for geolocation and coordinate conversion calcuations.	CER1.0P2, CER1.0P3, CER1.1P8, CER1.2P1, CER1.4P1, CER1.4P2, CER1.4P3
$PGSDIR/database/common/CUC/udunits.dat	This file is used by the toolkit for calculations related to unit conversions.	CER1.0P2, CER1.0P3, CER1.1P8, CER1.2P1, CER1.4P1, CER1.4P2, CER1.4P3
$PGSDIR/database/linux64/CSC/earthfigure.dat	This file is updated by CERES to include the parameters to properly calculate the CERES TOA. CERES also used the WGS84 values provided when calculating geolocation at the earth's surface.	CER1.0P2, CER1.0P3, CER1.1P8, CER1.2P1, CER1.4P1, CER1.4P2, CER1.4P3
$PGSDIR/database/common/EPH/sc_tags.dat	This file contains that spacecraft tags that the toolkit uses to do geolcation, etc. CERES reuses the values for Aqua (PM1) for NPP and J01 spacecraft, since the toolkit has not been updated to accept those spacecraft. The values for Aqua are used, because the NPP and J01 spacecraft follow the Aqua orbit. And the data packets and time formats within the packets are the same as Aqua.	CER1.0P2, CER1.0P3, CER1.1P8, CER1.2P1, CER1.4P1, CER1.4P2, CER1.4P3

NOTE: All files formats are ASCII.

YYYY	4-digit year
MM	2-digit month (valid values: 01 .. 12)
DD	2-digit day (valid values: 01 .. 31)