

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

**Data Management System
(DMS)**

**Training Management Plan
Version 2**

for

**Tropical Rainfall Measuring Mission (TRMM),
Terra, and Aqua**

April 2009

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

Data Management System

Stakeholder-Commitment Sheet for the CERES Training Management Plan

This Stakeholder-Commitment Sheet is to demonstrate that the relevant stakeholders as identified in the CERES Data Management Plan are aware of and support the CERES processes described in the CERES Training Management Plan.

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Document Revision Record

The Document Revision Record contains information pertaining to approved document changes. The table lists the Version Number, the date of the last revision, a short description of the revision, and the revised sections. The document authors are listed on the cover.

Document Revision Record

Version Number	Date	Description of Revision	Section(s) Affected
V0.1	06/19/2006	<ul style="list-style-type: none"> • Initial version of CERES Training Management Plan. • Updated format to comply with standards. 	All All
V0.2	06/20/2006	<ul style="list-style-type: none"> • Added three worksheets from the Training Schedule/Matrix as Appendices B, C, and D. • Updated format to comply with standards. 	Apps. B, C, & D All
V0.3	06/21/2006	<ul style="list-style-type: none"> • Updated the acronym list. • Replaced all occurrences of "&" with "and" except changed M&A to MA. • Made corrections to Appendices B, C, and D. • Updated format to comply with standards. 	App. A All Apps. B, C, & D All
V1	07/07/2006	<ul style="list-style-type: none"> • Incorporated changes from June 29, 2006 Peer Review. The minutes from the Peer Review are the official record of the changes made for V1 of this document. • Updated format to comply with standards. • Converted document from FrameMaker to Word. (04/24/2008) 	All All All
V2	03/02/2009	<ul style="list-style-type: none"> • Removed references to SAIC or other specific contractor, except in the Document Revision Record where it will be maintained for the historical record. • Modified cover page to follow new standard. • Included updated Stakeholder-Commitment Sheet reflecting new staff. • Modified Preface to follow new standard. • Included new Acknowledgements page. • Modified Introduction to follow new standard. 	All Cover Page Stakeholder-Commitment Sheet Preface Acknowledgements page Introduction

Preface

The CERES DMS supports the data processing needs of the CERES Science Team to increase understanding of the Earth's climate and radiant environment. The CERES DMT 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 ASDC, produces an extensive set of science data products. The DMS consists of 12 subsystems each of which contains one or more PGEs.

The purpose of the Training Management Plan is to describe the task-specific training provided for the CERES DM staff in support of the CERES DM task.

The CERES Data Management Plan provides overall guidance to the CERES DMT.

Acknowledgements

This document reflects the collaborative efforts of the CERES DMT (in conjunction, as appropriate, with the CERES Science Team). The primary contributor to this document is:

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1.0 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 FM5 will fly on the NPP platform currently scheduled for launch in June 2010. 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 will carry the FM5 instrument, which will operate in the fixed azimuth scanning mode though it will have 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.

The purpose of the CERES Training Plan is to describe the task-specific training provided for the CERES DM staff in support of the CERES DM task.

All acronyms used in this document are defined in [Appendix A](#). They are not defined in the text.

This document is organized as follows:

Section [1.0](#) - Introduction

Section [2.0](#) - Background

Section [3.0](#) - Training Compliance Matrix, Checklist, and CMMI Process Areas Covered

Section [4.0](#) - Training Schedule/Matrix

Section [5.0](#) - Available CERES DM Training

Section [6.0](#) - Training Process

[Appendix A](#) - Acronyms

[Appendix B](#) - Training Schedule/Matrix - CERES Process

[Appendix C](#) - Training Schedule/Matrix - SAIC CMMI

[Appendix D](#) - Training Schedule/Matrix - SAIC CMM

2.0 Background

Ensuring that staff members are properly trained is an important aspect of the CERES DM task. The CERES DM task is very team oriented, and the DM contractor staff is composed of personnel that have been assigned to one or more teams. These teams include subsystem teams, the CM/Documentation Team, the QA Team, and the management team.

The careful screening of candidates during the hiring process ensures that much of what team members need to know as far as academic background, computer languages, computer hardware, software applications, project management, etc., is known to them when they first come through the door. However, knowledge of CERES and CERES DM processes clearly will need to be learned by individuals after they are onboard. The CERES DM task is a fairly process driven project. There are plans and other documentation describing these processes which are described in some detail in Section 8 of the CERES Data Management Plan (see Reference 1).

3.0 Training Compliance Matrix, Checklist, and CMMI Process Areas Covered

Everyone on the CERES DMT must attend CERES DM overview training which is satisfied by the CERES DM Plan training as shown in the Training Compliance Matrix (Figure 3-1). The Training Compliance Matrix shows the various CERES DM plans along one axis and the different CERES DM teams along the other. The relevance of the plan's content for the different teams is shown as "Primary" or "Secondary" in the matrix. All team members have access to all plans and should at least be aware of all the plans. However, if a plan is shown as Primary importance for a team, members of that team must have training for the subject matter contained in the plan.

Team training requirements are captured in a training checklist; there is a training checklist for each CERES team. Figure 3-1 shows the training compliance matrix, the resulting checklists, and a list of the CMMI process areas that are associated with each of the CERES DM plans shown in the training compliance matrix.

Training Compliance Matrix

	Teams			
Plans	Subsystem	CM/Documentation	Quality Assurance	Management
Configuration Management	Primary	Primary	Primary	Primary
Data Management	Primary	Primary	Primary	Primary
Measurement and Analysis	Secondary	Primary	Primary	Primary
Process and Product Quality Assurance	Primary	Primary	Primary	Primary
Requirements Management	Primary	Secondary	Primary	Primary
Risk Management	Primary	Primary	Primary	Primary
Software Development	Primary	Primary	Primary	Primary
Training Management	Secondary	Secondary	Primary	Primary

	Subsystem	CM/Documentation	Quality Assurance	Management
<u>Configuration Management</u>	CM	CM	CM	CM
CM				
PI	DM	DM	DM	DM
<u>Data Management</u>		MA	MA	MA
PMC		PPQA	PPQA	PPQA
PP		REQM	REQM	REQM
<u>Measurement and Analysis</u>	RM	RM	RM	RM
MA	SD	SD	SD	SD
<u>Process and Product Quality Assurance</u>			TM	TM
PPQA				
<u>Requirements Management</u>				
REQM				
<u>Risk Management</u>				
PMC				
PP				
<u>Software Development</u>				
REQM				
VER				
VAL				
PI				
CM				
<u>Training Management</u>				
GP2.5 for all process areas				

CERES DM Training Checklist

CMMI Process Areas covered by the CERES DM plans

Figure 3-1. Training Compliance Matrix, Resulting Checklist, and Covered CMMI Process Areas

4.0 Training Schedule/Matrix

Information from the checklist (see [Figure 3-1](#)) feeds into the Training Schedule/Matrix which addresses all training (not just CERES specific) taken by the CERES DMT on an individual basis. The task management team is responsible for updating and maintaining the matrix which is stored on an individual workstation that is backed up routinely. The Training Schedule/Matrix contains three worksheets - CERES Process, SAIC CMMI, and SAIC CMM. The CERES Process worksheet shows both CERES process training and more formal CERES sponsored training. Contract required training is also shown. It contains a complete listing of all the employees on the CERES DM staff and their current position on the task along the vertical axis. Along the horizontal axis, each column shows completed or scheduled training. For each employee the matrix shows “R” for training required, “S” for training that is scheduled, or a date which indicates when the training is completed. A “Primary” entry in the Training Compliance Matrix maps into an “R” entry in the Training Schedule/Matrix. So, when an employee joins a team or changes position within the task, the management team determines what training is required based on the Training Compliance Matrix (see [Figure 3-1](#)). Once the training is scheduled, the “R” is converted to an “S.” When the training is completed, the training completion date is entered in place of the “S.” With task management approval exceptions can be made to the training shown in the Training Compliance Matrix on an individual basis. An email can be used to demonstrate the approval of an exception, and this will also be noted in the Training Schedule/Matrix (“W” for requirement waived). Also, training requirements included in the Training Schedule/Matrix are not limited to the CERES-specific training shown on the training checklists. The training actually received (or planned) should be recorded in the Training Schedule/Matrix.

The SAIC CMMI worksheet shows specific SAIC CMMI courses that have been completed for the same list of employees. Similarly, the SAIC CMM worksheet shows the SAIC CMM courses that have been completed for the same list of employees. The Training Schedule/Matrix is in the form of an Excel spreadsheet and may be found on the CERES PAL site. An example of each worksheet may be found in [Appendix B](#), [Appendix C](#), and [Appendix D](#) of this document.

5.0 Available CERES DM Training

A list of available CERES DM training has been prepared (see [Table 5-1](#)) showing the training areas and the scope of the training. Training may be performed by any member of the CERES CMMI Team. Members of this team must have considerable experience with CERES data management processes and be knowledgeable of the mapping of CERES processes into CMMI process areas. Members of the team authored or co-authored the CERES data management plans for implementing these processes. Also, it is the responsibility of the team to peer review the completed plans. Each member of the CERES CMMI Team must have taken the SEI-authorized 3-day Introduction to CMMI training.

Table 5-1. Availability of CERES DM Training

	Training Area	Description/Scope
1	Configuration Management Plan	CERES CM/Documentation Team CERES Documentation CM Web Site CERES Configuration Management Process
2	Data Management Plan	CERES DM Overview Experiment Description Data Flow and Processing Computer Resources and Tools CERES Organization Implementation Project Planning and Monitoring Documentation DMT Documentation and Report Descriptions and Maintenance CERES Documentation and Task Stakeholders
3	Measurement and Analysis Plan	CERES Measurement and Analysis Overview Measurement Specifics Measurement Collection and Storage Analysis Procedures CERES DMT Measurement and Analysis Plan Summary
4	Process and Product Quality Assurance Plan	CERES Process and Product Quality Assurance Overview Scope of the CERES PPQA Process QA Audit Schedule QA Procedures Reports

Table 5-1. Availability of CERES DM Training

	Training Area	Description/Scope
5	Requirements Management Plan	CERES Requirements Management Overview CERES Requirement Responsibility Matrix Requirement Conveyance Understanding of Requirements Acceptance Criteria Obtain Commitment Response to Provider Bidirectional Traceability Identify Inconsistencies Fields in a CERES Requirements Log
6	Risk Management Plan	CERES Risk Management Overview Identification of Risks Risk Assessment Report
7	Software Development Plan	CERES Software Development Overview Requirements Management Subsystem Product Integration, Verification, and Validation CM Validation and Product Integration ASDC Validation and Verification Checklist for Public Release of Data Products CERES DMT Peer Reviews
8	CERES DM Project Management	CERES DM task specific training geared for the task's management team
9	CERES DM Training	CERES DM approach to providing task specific training

6.0 Training Process

The CERES DM training process consists on four phases - initiate training, plan training, announce training, and conduct training. Training requests are typically initiated at the task management level based on requirements as demonstrated by the CERES DM Training Checklists though individual employees may request training.

Based then on an established need, the task management team will identify an instructor and with the instructor will plan and schedule a training session; this includes providing for all needed resources to properly conduct the training. Typically training designed to cover one of the CERES DM plans consists of a PowerPoint presentation by the plan author, or other instructor as designated by the task management team, to the target group to discuss the plan, explain its relevance for the specific audience, and to demonstrate ties to relevant CMMI process areas.

An email will be sent out to the target audience announcing the upcoming training schedule and meeting place. Whenever possible, copies of the plan to be discussed and the associated PowerPoint presentation will be attached; this is typically done by the training instructor.

The training instructor will conduct the training at the designated time and location. During the training the instructor will ensure that an attendance sheet is circulated for attendee signatures. The attendance sheet will identify the training, the date, time, and location of the training, the instructor, and all attendees and will be maintained by a member of the task management team and posted on the Web.

Training in other areas, as alluded to in Section 2.0 (computer languages such as Fortran, C, Perl, etc.; computer hardware; software tools such as Microsoft applications or FrameMaker), or refresher training is provided as required based on need and budget. One of the more practical means of accomplishing additional training is through company e-learning.

References

1. CERES DMS Data Management Plan Version 5 for TRMM, Terra, and Aqua, March 2009, URL: <http://science.larc.nasa.gov/ceres/docs.html>

Appendix A

Abbreviations and Acronyms

ASDC	Atmospheric Sciences Data Center
CERES	Clouds and the Earth's Radiant Energy System
CERESlib	CERES library
CM	Configuration Management
CMM	Capability Maturity Model
CMMI	Capability Maturity Model Integrated
DB	Data Base
DM	Data Management
DMS	Data Management System
DMT	Data Management Team
EOS	Earth Observing System
ERBE	Earth Radiation Budget Experiment
ERBS	Earth Radiation Budget Satellite
ITS	Information Technology Security
MA	Measurement and Analysis
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NOW	Notification of Work
PAL	Process Asset Library
PGE	Product Generation Executable
PI	Product Integration
PMC	Project Monitoring and Control
PP	Project Planning
PPQA	Process and Product Quality Assurance
QA	Quality Assurance
REQM	Requirements Management
RM	Risk Management
SCCR	Software Configuration Change Request
S'COOL	Students' Cloud Observations On-Line
SD	Software Development
SAIC	Science Applications International Corporation
SEI	Software Engineering Institute
SS	Subsystem

TM	Training Management
TRMM	Tropical Rainfall Measuring Mission
URL	Universal Resource Locator
VAL	Validation
VER	Verification

Appendix B
Sample Training Schedule/Matrix - CERES Process

Sample Training Schedule/Matrix - CERES Process

Employee	Position	Configuration Management Plan	Data Management Plan	Measurement and Analysis Plan	Process and Product Quality Assurance Plan	Requirements Management Plan	Risk Management Plan	Software Development Plan	Training Management Plan	Delivery and Test Process	CMMI Introduction (Same content as SAIC SEI Intro to CMMI)	Fortran 90/95	Ada	NASA ITS
Ayers, Tammy	CM/Documentation	S	R	R		Sep-05	S			Dec-02	Jun-04	Mar-95		Feb-06
Boghosian, Jeff	SS Developer	S	R			R	S	R		Dec-02				Feb-06
Brown, Ricky	SS Developer	S	R			Sep-05	S	R		Dec-02		May-99		Feb-06
Caldwell, Thomas	SS Developer	S	R			Sep-05	S	R		Dec-02	Nov-04	May-99		Feb-06
Coleman, Lisa	Supervisor and SS Lead	S	R	R	S	Sep-05	S	R	S	Dec-02	Jun-04	May-99		Feb-06
Cooper, Denise	SS Lead	S	R			R	S	R		Dec-02	Jun-04	Jul-96		Feb-06
Hess, Phil	SS Developer	S	R			R	S	R		Dec-02				Feb-06
Koziana, Jim	Supervisor	S	R		S	R	S	R	S					
Miller, Walter	SS Lead	S	R	R	S	Sep-05	S	R		Dec-02	Jun-04	May-99		Feb-06
Nguyen, Cathy	SS Lead	S	R			Sep-05	S	R		Dec-02		May-99		Feb-06
Nolan, Sandy	SS Lead	S	R			Sep-05	S	R		Dec-02		May-99		Feb-06
Raju, Raja	SS Lead	S	R			Sep-05	S	R		Dec-02		May-99		Feb-06
Robbins, John	Advisor	S	R	R		R	S	R		Dec-02	Apr-02			Feb-06
Sothcott, Victor	SS Developer	S	R			Sep-05	S	R				Jul-96		Feb-06

Sample Training Schedule/Matrix - CERES Process

Employee	Position	Configuration Management Plan	Data Management Plan	Measurement and Analysis Plan	Process and Product Quality Assurance Plan	Requirements Management Plan	Risk Management Plan	Software Development Plan	Training Management Plan	Delivery and Test Process	CMMI Introduction (Same content as SAIC SEI Intro to CMMI)	Fortran 90/95	Ada	NASA ITS
Saunders, Joanne	CM/Documentation	S	R	R	S	Sep-05	S			Dec-02		Jul-96		Feb-06
Sun-Mack, Sunny	SS Lead	S	R			Sep-05	S	R		Dec-02	Jun-04	Jul-96		Feb-06
Walikainen, Dale	SS Lead	S	R			R	S	R		Dec-02	Jun-04			Feb-06
Zentz, Scott	SS Developer	S	R			R	S	R			Nov-04			Feb-06

R - Required
 S - Schedule
 W - Waived
 Date - Completed

**Appendix C
Sample Training Schedule/Matrix - SAIC CMMI**

Sample Training Schedule/Matrix - SAIC CMMI

Employee	Position	SAIC CMMI Developer/Tester	SAIC CMMI Project Management	SAIC CMMI Team Leader	SAIC CMMI Integrated Configuration Management	SAIC CMMI Integrated Measurements for Managers	SAIC CMMI Integrated Peer Review Process	SAIC CMMI Integrated Quality Assurance	SAIC CMMI Requirement Development and Management	SEI Introduction to CMMI	SEI CMMI for Staff	SAIC CMMI Common Approach Guidance	SAIC Software Engineering Principles (CMMI)	SAIC Software Test Process (CMMI)	SAIC Verification and Validation (CMMI)
Ayers, Tammy	CM/Documentation										Dec-05				
Boghosian, Jeff	SS Developer														
Brown, Ricky	SS Developer										Dec-05				
Caldwell, Thomas	SS Developer									Nov-04	Dec-05				
Coleman, Lisa	Supervisor and SS Lead										Dec-05				
Cooper, Denise	SS Lead										Dec-05				
Hess, Phil	SS Developer														
Miller, Walter	SS Lead										Dec-05				
Nguyen, Cathy	SS Lead										Dec-05				
Nolan, Sandy	SS Lead														

Sample Training Schedule/Matrix - SAIC CMMI

Employee	Position	SAIC CMMI Developer/Tester	SAIC CMMI Project Management	SAIC CMMI Team Leader	SAIC CMMI Integrated Configuration Management	SAIC CMMI Integrated Measurements for Managers	SAIC CMMI Integrated Peer Review Process	SAIC CMMI Integrated Quality Assurance	SAIC CMMI Requirement Development and Management	SEI Introduction to CMMI	SEI CMMI for Staff	SAIC CMMI Common Approach Guidance	SAIC Software Engineering Principles (CMMI)	SAIC Software Test Process (CMMI)	SAIC Verification and Validation (CMMI)	
Raju, Raja	SS Lead															
Robbins, John	Advisor										Dec-05					
Sothcott, Victor	SS Developer										Dec-05					
Saunders, Joanne	CM/Documentation															
Sun-Mack, Sunny	SS Lead										Dec-05					
Walikainen, Dale	SS Lead										Dec-05					
Zentz, Scott	SS Developer									Nov-04	Dec-05					

**Appendix D
Sample Training Schedule/Matrix - SAIC CMMI**

Sample Training Schedule/Matrix - SAIC CMMI

Employee	Position	SAIC Common Approach	SAIC Software Engineering Principles	Software Requirement Engineering and Management	SAIC Software Project Management	SAIC CMM Familiarization	SAIC Software Configuration Management	SAIC Introduction to Software Estimate	SAIC Software Test Process	SAIC Software Review	SAIC Software Quality Assurance	SAIC Project Management 1	SAIC Project Management 2	SAIC Project Management 3
Ayers, Tammy	CM/Documentation	Feb-96				Feb-96	May-96							
Boghosian, Jeff	SS Developer													
Brown, Ricky	SS Developer													
Caldwell, Thomas	SS Developer													
Coleman, Lisa	Supervisor and SS Lead													
Cooper, Denise	SS Lead				Jul-97									
Hess, Phil	SS Developer		Mar-97	Apr-97	Jul-97	Feb-96		Sep-97	Feb-96	Jul-96				
Miller, Walter	SS Lead	Mar-97	Mar-97	Apr-97	Jul-97							Apr-99		

Sample Training Schedule/Matrix - SAIC CMMI

Employee	Position	SAIC Common Approach	SAIC Software Engineering Principles	Software Requirement Engineering and Management	SAIC Software Project Management	SAIC CMM Familiarization	SAIC Software Configuration Management	SAIC Introduction to Software Estimate	SAIC Software Test Process	SAIC Software Review	SAIC Software Quality Assurance	SAIC Project Management 1	SAIC Project Management 2	SAIC Project Management 3
Nguyen, Cathy	SS Lead													
Nolan, Sandy	SS Lead					Feb-96								
Raju, Raja	SS Lead	Apr-96												
Robbins, John	Advisor					Feb-96						Apr-96		
Sothcott, Victor	SS Developer			Apr-97	Jul-97			Apr-99			Apr-96			
Saunders, Joanne	CM/Documentation						May-96							
Sun-Mack, Sunny	SS Lead													
Walikainen, Dale	SS Lead													
Zentz, Scott	SS Developer													