USAID PRIME Program
Process Engineering Handbook

Version 1

March 2000

Computer Sciences Corporation
Federal Sector, Civil Group

USAID
PRIME
Principal Resource for
Information Management Enterprise-wide

USAID PRIME Program

Process Engineering Handbook

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Foreword

This Handbook is intended to help familiarize personnel with the U.S. Agency for International Development (USAID) Principal Resource for Information Management Enterprise-wide (PRIME) Program processes. It includes 17 process-related topics, each of which provides guidance in applying a key element of our Quality Management System (QMS). The QMS encompasses our Program organization and management responsibilities; documented policies, methodology, processes, standards, and procedures; tools; databases; and training necessary to support providing products and services that satisfy USAID requirements.

Compliance. Besides complying with USAID's contractual requirements, our processes satisfy

External benchmarks. Our goals are that our use of our documented processes be compliant with the following benchmarks:

- The Software Engineering Institute (SEI) Software Capability Maturity Model (SW-CMM) Levels 2 and 3. An independent, internal Software Capability Evaluation in March 2000 assessed the PRIME processes compliant with both levels.
- The SEI Software Acquisition CMM (SA-CMM) Levels 2 and 3. An external Software Acquisition Capability Evaluation in June 1999 assessed four Civil Group programs, including PRIME, as being overall compliant with Level 2.
- The International Organization for Standardization Quality Standard (ISO-9001). An external evaluation in May 1999 certified the PRIME processes as compliant with all elements of the ISO-9001 quality standard.

Internal CSC requirements. CSC's Civil Group (CG), the CSC business unit that includes our program, requires that we use the CG process baseline or an approved alternative. The CG baseline is described in the *Civil Group Process Baseline – Program Tailoring Guide* (in the Lotus Notes Civil Group Process Database). The Guide recognizes our QMS as a "fully validated alternative instantiation" of the CG Process Baseline.

This Handbook is produced by the USAID PRIME Program Process Engineering Office (PEO) and is posted in the USAID PRIME PEO Database. Comments and suggestions regarding its content should be directed to the PEO. Updates of this Handbook will be issued as necessary.

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Introduction

The USAID PRIME Program uses an established set of methods, activities and tools as its framework for product development. This Handbook is intended to provide summary information and guidance in using the key elements of our process framework.

The body of the Handbook consists of four areas:

- *Major Processes* – three critical processes that structure the way PRIME personnel do their work
- *Infrastructure* – the processes associated with facilitating process performance
- *Quality* – the processes (e.g., audits and reviews) associated with directly ensuring the production of quality products and services
- *Process Support* – the processes (e.g., measurement) associated with process engineering.

There are three to six two-page process topics in each area. No significance is attached to the assignment of individual topics to specific areas other than to simplify the appearance of the table of contents. In some cases, topics could be assignable to multiple areas.

Each topic is presented using the same format, which consists of

- A brief definition of the element and its significance/benefit to the TACs
- A description of the element to include process steps or components
- A list of "key points" of the element as it applies to a TAC to include material such as
  - Impact of the element on the TAC
  - TAC responsibilities with respect to the activities of the element
  - Identification of the organizational group that leads the associated activities or, if the TAC leads, that supports the activities
- Organizational elements to contact and documentation to consult for additional information.

The Handbook also contains an index, which lists commonly-used Program terms and acronyms and references their locations in the document, and six appendices, which provide further information that relates to one or more process topics.

This Handbook provides only summary information. Most of these process topics are addressed in detail in USAID PRIME Program documents (e.g., the Process Improvement Plan and the Quality Assurance Plan). Refer to Appendix C for identification of all USAID PRIME Program process-related databases and the related documents that each contains.

Configuration Management (CM)

Configuration Management (CM) is the organizational function tasked with establishing and maintaining the integrity of products and processes for all work for which our Program has responsibility. With CM, individuals can obtain the following information:

- (What are) the controlled documentation and systems on our Program
- Where the baseline versions are stored
- Who can change them
- How they can be changed.

Description

The CM function is centralized on our Program and CM representatives are matrixed to the various TACs. The following tables summarize key CM-related information, structured by what is controlled.

Documentation

	Program	TAC
Program-specific		
• Controlling Body	Program Configuration Control Board (CCB) A Program Configuration Review Board (CRB), which reviews and recommends changes to Program-level controlled documents, supports the CCB.	As defined in TAC CM Approach (in TAC PMP and supporting S&Ps). Options: • TAC Manager • TAC Configuration Review Board (CRB) • Combined board with customer.
• Controlled items & storage locations	USAID PRIME Document Library • PODs • Standards & Procedures (S&Ps) • Master Documents and Quality Record Lists (MDL and QRL) • Quality Management System (QMS) Implementation • Plans – CM, Process Improvement, QA, Security Management, Training • Handbooks This database also has links to SEAS Center-controlled documents.	USAID PRIME Local S&Ps DB for: • TAC-specific S&Ps <TAC> General Info DB for other controlled documents, including the TAC's • Process Approach • MDL • QRL.
Deliverable documents – Controlling Body	Program CCB controls many Program deliverables, including the Program-level plans described above.	• Prior to delivery: TAC, as defined in the TAC's CM Approach • After delivery: customer

Systems

Type	Controlling Body
Deliverable system components (software releases, etc.)	Prior to delivery: TAC, as defined in the TAC's CM Approach After delivery: customer
Hardware (workstations, printers, etc.)	SYTEL at Tech Hub location; PRIME elsewhere
Lotus Notes Databases	Database owners
Tools	Tool owners

Key Points

- We have two levels of CM, Program-level and TAC-level.

- The Program CM Plan defines CM requirements and responsibilities at the Program and TAC levels. The TACs, with CM concurrence, lay out in the TAC PMP (or supporting planning material) how the CM function is conducted on the TAC by defining responsibilities for CM activities and identifying
  - Products to be controlled
  - Procedures to control and manage changes
  - Mechanisms (e.g., Lotus Notes notification messages) to inform affected personnel of the status and content of controlled products, including approved and proposed changes.

- All deliverables are to be placed under CM control before delivery; deliverable software is placed under CM control before system testing begins.

- There are three types of controlling boards on this program: the Program CRB, the Program CCB, and TAC CRBs/IPTs.

- The Program-level CM Office (CMO) coordinates all CM activities across the Program and directs the activities of CM personnel assigned to individual TACs. The CMO serves as the recording secretary for all control boards.

- CCB/CRB and other review board meeting minutes, including action items, are ISO quality records and are handled as such.

- The Program CRB controls all Tech Hub desktop hardware and software. SYTEL, which serves on the Program CRB, makes any changes to both hardware and software. In particular, extra PC/workstation packages needed to perform TAC work may be requested; upon approval by the Program CRB (and USAID as appropriate), SYTEL will do the installing.

For More Information

- Contact: CMO for CM-related assistance.

- Consult:
  - Relevant SSDM material (SEAS Center Core Processes database)
    - SSDM Volume 4, Quality, Configuration, and Productivity Management.
    - POD 39, Configuration Management and Configuration Control Boards, which defines CM requirements
    - S&Ps -- 1600 series, CM, and SSDM DID 6107, Configuration Management Plan
  - USAID PRIME Program S&Ps (USAID PRIME Document Library database)
    - CMO 1601-01, CI Identification Schema
    - PMO 1603, Deviation/Waiver Requests
  - The "Lotus Notes Databases" and "Tools" topics in this handbook.

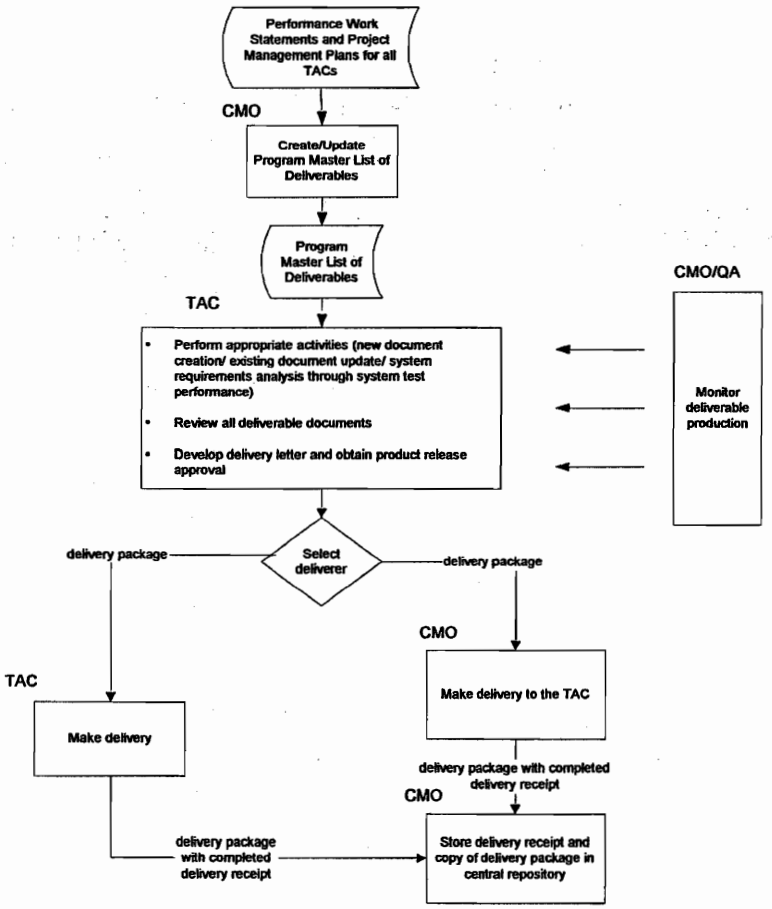
Delivery Process: Documents and Systems

Our Program generates products -- primarily documentation and system releases/components -- that are designated as contractual deliverables in each TAC's Performance Work Statement (PWS) and the corresponding Project Management Plan (PMP). Following our Program deliverable process, which describes how we manage the production of these products, can

- Simplify TAC document preparation by providing standard documentation formats
- Clarify TAC product delivery by indicating what is required of all TACs and when
- Facilitate Program-level monitoring and reporting on TAC deliverable production and delivery status.

Description

Our Program uses the improved delivery process described in USAID PRIME Program Procedure CMO-1602 (available late March/April) and illustrated in the following figure:



Key Points

- This delivery process applies to all deliverables -- including software and documents -- listed in each TAC's Performance Work Statement and/or its Project Management Plan. TACs may further define the process with TAC-specific S&Ps, especially for software deliverables.

- The delivery process entails the use of a delivery package. A delivery package contains the delivery letter (signed by the TAC Manager and reviewed by QAO), the completed product release approval form, the receipt letter, and the deliverable. Hard and soft versions of non-software deliverables are required to be delivered to the CMO for archiving; for software, the deliverable is placed in a CMO-controlled repository (e.g., CCC/Harvest).

- All deliverables are reviewed by appropriate TAC and other personnel, including QAO, and approved by the TAC Manager. The reviewers and approvers document their review summaries and delivery recommendation using the form in PMO-1504, Product Release Approval. QAO verifies deliverable format and use of required processes, not technical content.

- TACs may make their own deliveries but delivery packages for all deliverables are provided to CMO. At the time of delivery, the deliverer asks the person to whom the delivery is made to acknowledge the delivery by signing the receipt letter.

- There is a specific format for deliverable documents. For both new documents and revisions, TACs use the cover page of the document template provided in USAID PRIME S&P PMO-1502 Document Style Guidelines (in USAID PRIME Document Library). TACs use the entire template for new deliverable documents.

- In April, the CMO will begin using a USAID PRIME Program Master List of Deliverables, to support monitoring of the status of product deliveries.

- USAID may request any product generated by Program personnel using USAID resources. This ownership applies to draft deliverables as well as internal work products such as spreadsheets created to support or perform part of the work.

For More Information

- Contact: CMO for more information on the delivery process.

- Consult:

    - POD 24 , Transition of SEAS Center Products, and POD 43, Document Control (TAC-produced document identification, approval, control, and access) (SEAS Center Core Processes database)
    - Applicable documents in the 150x series of SSDM & USAID PRIME Program S&Ps - (Documentation identification, review, approval, distribution, and control) (SEAS Center Core Processes and USAID PRIME Document Library databases)
    - The "Document Reviews" topic in this handbook.

TAC Planning

This process covers the activities necessary to respond to the receipt of

- A new TAC Performance Work Statement (PWS) (which serves as a Statement of Work [SOW] for this Program)
- A modification to an existing TAC PWS, i.e., a TAC "Mod."

Description

The TAC planning process results in a Project Management Plan (PMP), a MS Project-based schedule, and detailed costing material. This process may be characterized by three review checkpoints that are designed to check the development of the information that will go into these products. These reviews are described in the following table.

Review	Purpose	Major Products	Internal Reviewers
TAC Owner Briefing (Internal dry-run & customer briefing)	To ensure that the TAC Manager & the TAC Owner basically agree on • What the TAC will provide -- the products and services specified by the PWS • How the TAC will do so & when • What defines/affects TAC success – assumptions, constraints, risks, potential issues	• TAC Owner Briefing slides • Rough Order of Magnitude (ROM) Cost Proposal	• Technical Director - Overall feasibility: technical, risk, & proposed cost • PCO - Financial & contractual • QA - Quality & conformance • PM or Business Manager - Approval to present TAC Owner Briefing
TAC Planning Review (internal review)	To approve • The management & technical approaches to be used • The planned costing & scheduling • The detailed planning & scheduling content is ready to be placed into baseline formats – MIST template (PMP), MS Project (schedule) To resolve issues that cannot be resolved at lower levels.	TAC Planning Review slides covering • PMP material • Assumptions & constraints • Complete tech approach • Management approach • Process approach • Training requirements • TAC metrics • Risk mgmt approach • Performance plan estimates • Scheduling information • Start & end dates of major activities (control accts) • Deliverables • Detailed Costing	• Technical Director - Feasibility: technical, risk, & proposed cost • PCO - Financial & contractual • QA - Quality & conformance • PEO/QA - Process Approach, Master Documents List (MDL), Quality Records List (QRL) • PM or Business Manager - Approval to finalize TAC planning products
TAC Planning Products Review (internal review)	To verify that the TAC Planning Process is completed.	• PMP (MIST) • Schedule (MIST) • Detailed Costing	• PCO - Financial & contractual • QA - Process, quality & conformance • PM or Business Manager - TAC planning products approval

Note: Some large TACs, such as those that provide Telecommunications and Operations (TCO) support or software development/maintenance support, develop planning packages after the PMP-related planning has been completed when necessary information is unavailable earlier. As the information becomes later available, the packages are developed to refine the PMP and schedule for particular parts of the TAC's work, such as a software release. The individual TACs determine which planning packages to establish and when to complete them as detailed cost accounts.

Key Points

- Each TAC produces three planning products: a PMP, a Microsoft Project-based schedule, and detailed costing. For new or modified TACs, all three products are due 30 days after the Business Manager receives the final PWS from the TAC Owner.
  - The TAC Manager develops the PMP. Its format and content are defined in the PMP template in the TAC's Project Plans section of the General Purpose Views (Double click on your TAC's Project Plans entry to access the template.). The PMP references more detailed planning material, in particular
    - TAC Process Approach, the list of S&Ps used to develop TAC products and services
    - TAC MDL, the list of all documents needed to develop TAC products and services
    - TAC QRL, the list of all records that will provide evidence that a quality-related process, procedure, or standard has been followed.
  - PCO develops the schedule using TAC inputs. Schedule format and content are specified.
  - PCO develops detailed costing using inputs requested from the TAC Manager. A ROM version of the costing is presented to USAID at the TAC Owner Briefing. The format and content of the costing are as specified by the FEDSIM contract.

- The PM or Business Manager approves all three planning products at the successful end of the third TAC planning review, the TAC Planning Products Review.

- The two earlier reviews – the TAC Owner Briefing and the TAC Planning Review – check the progress being made on the incremental development of the planning products.
  - Both earlier reviews are required for initial TAC planning.
  - For TAC Mods and for small TACs, the PM or Business Manager may scale back or waive these reviews if all involved parties (including the TAC Owner for the TAC O Briefing) agree the planning products can be easily updated or produced without creating interim products.

- The Program Business Manager tracks the progress of each TAC and TAC Mod using the TAC Mod Process Tracking Tool/Data Base (under TAC 00 in MIST).

For More Information

- Contact: PEO for TAC planning-related assistance.

- Consult:
  - Comprehensive planning guidance, including detailed guidance documents and presentation templates (available in USAID PRIME Document Library in late March)
  - PMP preparation support (USAID PRIME MIST database, Help Files Views, PMP form info, Guidelines for PMP Sections) and the PMP template (USAID PRIME MIST database, General Purpose Views, All Planning and Status Docs)
  - Six SEAS Center PODs provide overall planning guidance; these and other applicable SEAS Center documentation are referenced in the "Plan project" Core Process in Appendix A.

Lotus Notes Databases

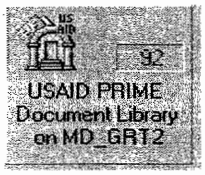
Lotus Notes is the primary electronic communication and document production and storage tool used on the USAID PRIME Program. It is

- Host to all key process assets - documents, reports, lessons learned, and trends
- Ensures visibility by senior managers and all
- Facilitates sharing across TACs and other SEAS Center programs/projects. (All three programs use Lotus Notes.)

Description

Lotus Notes is a Workgroup Computing Environment consisting of a collection of databases and an e-mail capability. Each database may contain sets of documents and support for the work flow processes to develop and update those documents. Specific USAID PRIME Program databases exist at both Program-level and TAC-level; other databases may contain information directly applicable to TACs.

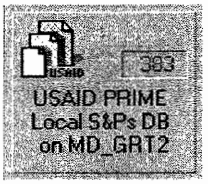
Individual Lotus Notes users may select the databases that appear on their workspaces. Eight key databases for TAC managers and personnel are depicted in the graphic below. Refer to Appendix C for an overview of these and other USAID PRIME Program databases.



USAID PRIME Document Library
(PRIME Level controlled documents)
Methodology & Processes (SSDM, directives, Program S&Ps etc.)
Program Plans
Program MDL & QRL

USAID PRIME MIST
PWSs (SOWs)
Project Management Plans
Senior Management Reviews
TAC Status Reports

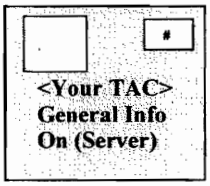
USAID PRIME PEO
(Process Engineering)
Process seminars/ briefings



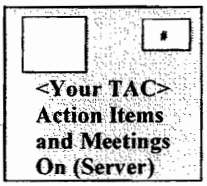
USAID PRIME Local S&Ps
TAC-specific Standards
TAC-specific Procedures

USAID PRIME CPAS
(Corrective and Preventive Action)
Audit Findings
Customer Problems
Program-level Issues
Corrective Action Plans

USAID PRIME SSMS
(Standard measurement)
Documentation
Tools
Discussion forum



<Your TAC> General Info DB
TAC Process Approach
Detailed Schedules
TAC Organization Chart



<Your TAC> Action Items and Meetings
TAC CRB Meeting Minutes & Actions
Other TAC Meetings/Actions

Key Points

- During employee check-in to the Program, the Program Lotus Notes support team
  - Coordinates
    - Obtaining a Lotus Notes account for the new team member (if not a CSC transfer from another CSC program)
    - Setting up Lotus Notes on the person's PC.
  - Sends the person an e-mail to guide installation of the standard Program databases on his/her PC. (The e-mail includes a document link to the Notes initialization databases – USAID CSC Notes Suite [for CSC personnel] and USAID Subcontractor Notes Suite [for subcontractor personnel].)

- At any time, databases can be added to your desktop via the command sequence:

1) Select the File Menu from the Lotus Notes title bar
2) Select the "Database" option
3) Select the "Open" option
4) Select the desired server (usually MD_GRT2 or MD_GRT4 for CSC; SSDPART for Subcontractors)
5) Select the desired database or folder. For Program databases, select the "Projects" folder and then select the desired database in that folder.

- Only the Program Lotus Notes support team may create new/modify existing Lotus Notes databases. Personnel who directly report to the Program Manager (such as the Business Manager, the QAO, and the PEO) approve creating new Program-level databases; TAC managers approve new databases for their TACs. The support team notifies appropriate Program personnel when Program-level databases are created, modified, or deleted.

- The "owner" of each database is identified in the "About This Database" menu option of the Help Menu of the Lotus Notes tool bar. The owner defines access rights to the database and ensures approved changes are made. Submit issues concerning the format, content, and use of a database to the database owner.

- The content of some databases is tightly controlled (e.g., approved standards/procedures); some databases are open to all (e.g., posting process improvement ideas).

For More Information

- Contact: The USAID PRIME Program Lotus Notes support group for Lotus Notes database-related assistance.

- Consult:

  - The Lotus Notes Help function, which is available via the title bar for each database
  - Lotus Notes training course information, posted in the USAID PRIME Training DB.

Tools

TAC personnel use various electronic tools to support their work processes.

Description

The following table identifies the major Program-wide and TAC-specific tools in use.

Name of Tool	Purpose	Location / Owner/Users
CCC/Harvest	Provides CM for NMS	Location: Ronald Reagan Building (RRB) NMS Server Owner: USAID Users: NMS personnel
Corrective and Preventive Action System (CPAS)	Records information relevant to corrective and preventive action. Entries result from • External assessments • Internal quality audits • Customer complaints • Senior management direction	Location: CPAS DB Owner: QAO Users: TAC Managers, QAO, PEO
Legacy Action Request System (LARS)	Provides CM for Legacy Systems	Location: Technology Hub Legacy Server (N drive) Owner: CMO Users: Legacy personnel
Lotus Notes	Provides for communicating, archiving, and sharing information across the Program and within each TAC	Location: All PRIME Program PCs Owner: CSC Corporate; many individual database owners vary Users: All TAC personnel
Management Information System Toolkit (MIST)	Provides for defining, updating, archiving, and communicating key TAC information. For each TAC it contains: • The original PWS (SOW) and its modifications • PMPs and other planning documents • Work authorizations • STOs and subcontractor evaluations • Weekly and monthly status reports • Metrics checklists • Other management information.	Location: USAID PRIME MIST Database Owner: Program Manager Users: All TAC personnel
Process Assurance Cycle (PAC)	Documents the TAC Manager's decision regarding work processes and related S&Ps to be used on the TAC.	Location: QAO personnel PCs Owner: QAO Users: TAC Managers
PPAF – Process Progress Assessment Form	Records TAC process assessment with respect to the Program "Core Processes." (See Appendix A.)	Location: USAID PRIME MIST Owner: USAID PRIME Program CCB Users: QAO/PEO personnel and TAC Managers
QuickCost 2000	Documents each TAC's earned value plan and produces the monthly USAID PRIME Program Status Report, which provides cost status information.	Location: SEAS Center Financial Network Owner: CG PCO; Program PCO tailors reports to satisfy Program needs Users: PCO for all TACs
Remedy	Provides change request and action request tracking and lessons-learned system for AID/W and field mission information technology problems	Location: RRB Athena Production Server Owner: USAID Users: TCO and Mission Support TAC personnel
RMT (Risk Management Tool)	Documents and quantifies TAC risks	Location: USAID PRIME Document Library Owner: SEAS Center CCB Users: Not used

Key Points

- There are six standard tools used by all TACs:

CPAS	MIST	PPAF
Lotus Notes	PAC	QuickCost 2000

- There are NO standard Program-wide tools for cost estimation and risk management. In particular, SLIM and RMT are not used.

- There are three CM-related tools that are used by specific TACs:

CCC/Harvest	LARS	Remedy

  Each TAC Manager may identify and obtain additional tools for the TAC's specific needs. These CM tools and Program-wide tools are listed or referenced in TAC PMPs.

- Each tool has an "owner," who is identified in the documentation accompanying the tool. (For the tools listed in the table on the facing page, the owner is identified in the table.) Problems with the use of tools are submitted to the tool owner.

- The CMO ensures that the tools used by each TAC are under CM control.

For More Information

- Contact: Specific tool owners.

- Consult: Individual tool documentation.

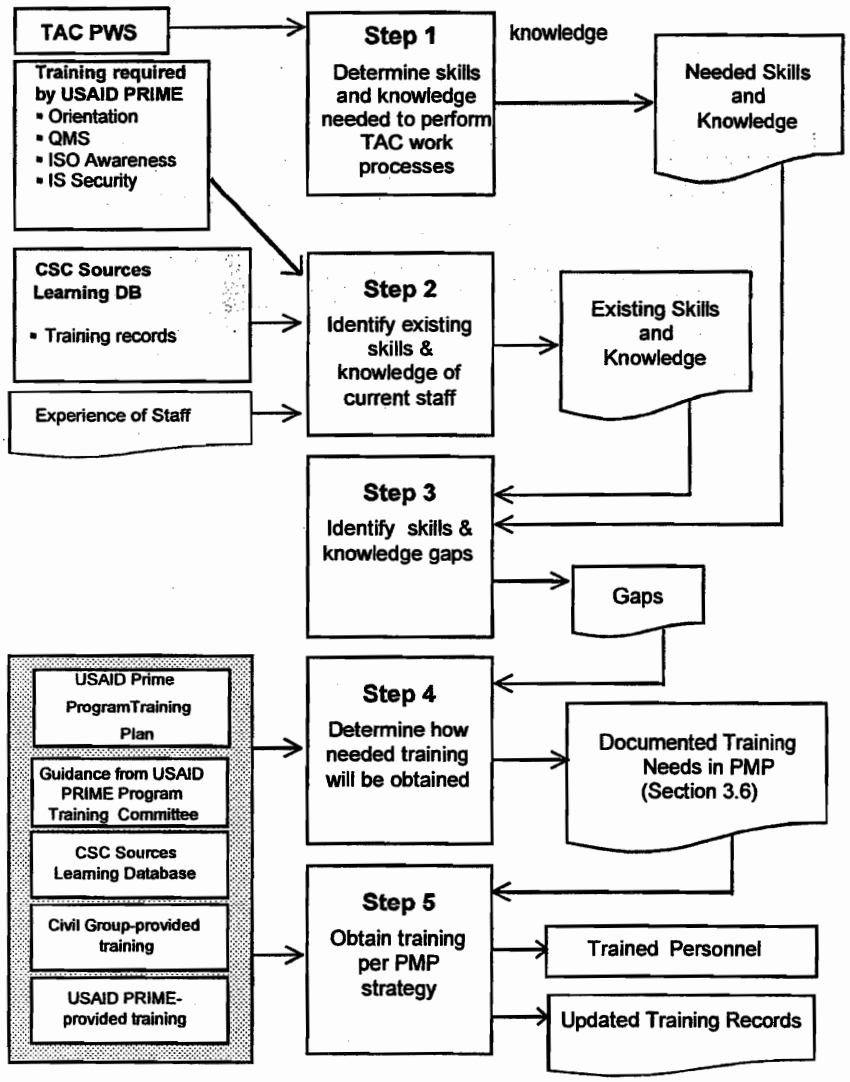
Training

Program training is performed, as needed, to provide Program personnel with the capabilities needed to satisfy TAC PWS requirements. TAC managers plan and schedule training within the context of the overall TAC planning process.

Description

Each TAC must identify the specific skills and knowledge necessary to perform TAC work and determine whether personnel assigned to the TAC have this requisite background. Gaps trigger training requirements. The TAC Manager documents these requirements and the strategy for satisfying them in the PMP as follows:

Program Training Process



Key Points

- Each TAC plans for any required training in Section 3.6 of the PMP.
- The Program Training Committee coordinates training, provides for mandatory training courses, and provides related guidance to TACs.
- The four mandatory courses for all USAID PRIME personnel are
  - USAID PRIME New Team Member (NTM) Orientation
  - Introduction to the USAID PRIME Quality Management System (QMS) Implementation. This course discusses the QMS, which covers our Program organization and management responsibilities, documented processes, tools, databases, and training necessary to support providing products and services that satisfy USAID TAC requirements.
  - ISO Awareness. (This course introduces the concept of benchmarks; defines and characterizes one specific benchmark, the ISO-9001 quality standard; and describes how we have used this standard to structure our USAID support.)
  - Information Systems Security Training, which explains proper use of the USAID network.
- Training records for all USAID PRIME personnel are stored in the CSC Sources Learning database. CSC personnel can access this database; subcontractors should contact a Training Committee member for designated staff who can access their records. CSC personnel enter records for CSC-coordinated/provided training. Records of external training are entered separately by specified CSC personnel.
- The USAID PRIME Program Training Plan defines our approach to planning individual and group training activities. In particular, the plan identifies PRIME-specific courses offered through in-house training and indicates how to obtain training through other sources, both internal and external to CSC.

For More Information

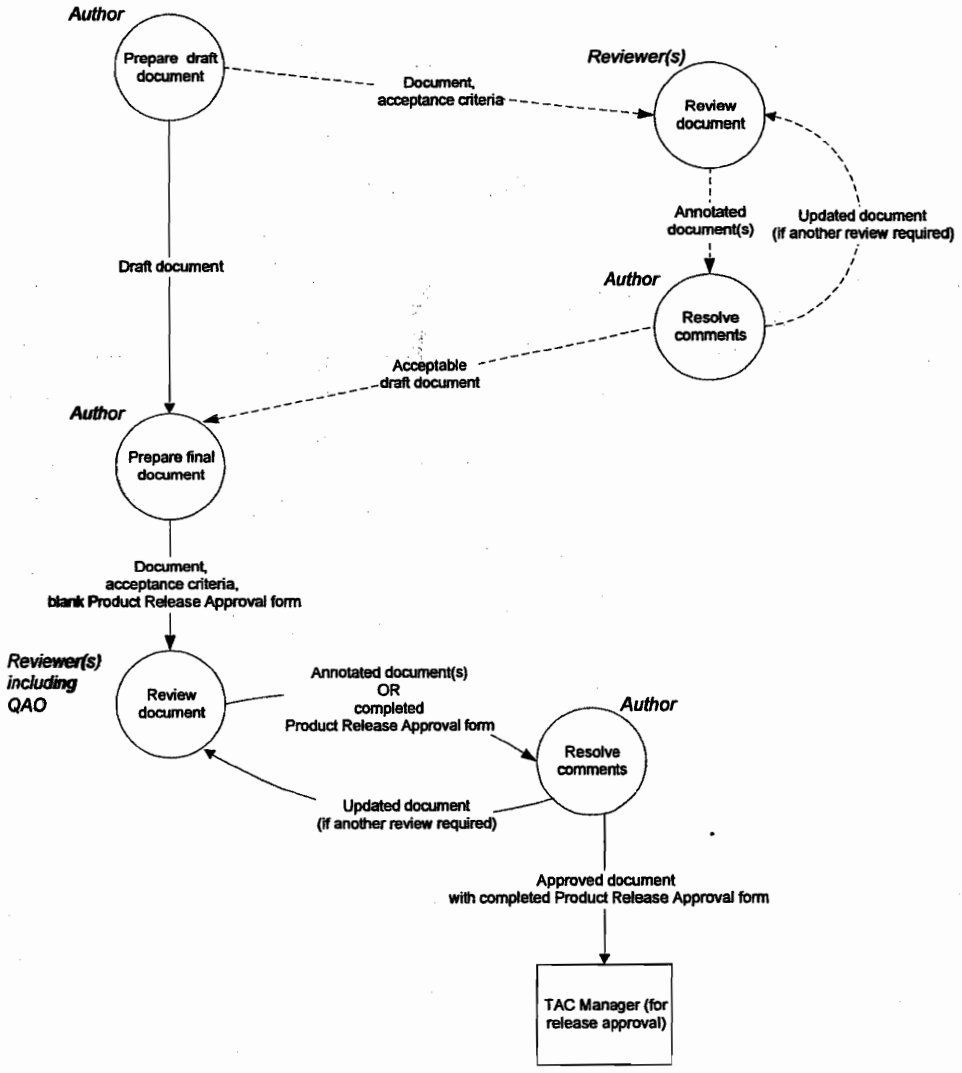
- Contact: USAID PRIME Program Training Committee
- Consult:
  - SSDM POD 36, Training Program (SEAS Center Core Processes database)
  - USAID PRIME Program Training Plan and the USAID PRIME Program Quality Management System Implementation manual (USAID PRIME Document Library database)
  - Monthly training schedule, mandatory training presentations, Training Committee meeting minutes, and other Program training-related information (USAID PRIME Training DB).

Document Reviews

Document reviews constitute a mechanism whereby Program-produced documents, including presentations, are reviewed for correctness, completeness, quality, and compliance with requirements and standards prior to delivery. The intent is to schedule these activities so that any necessary changes can be identified and made quickly, thereby easily facilitating on-time delivery of high-quality products.

Description

The document review process consists of the following steps:



Legend
Dotted line - Optional but recommended process steps

Key Points

- All deliverables are reviewed by QAO and approved by the TAC Manager.

- Only final documents must be reviewed; however, two sets of earlier reviews are recommended:
  - An early review of the document's table of contents, purpose, and scope by the TAC QAO to assure that the planned document will satisfy its requirements as recorded in the TAC PMP and TAC PWS.
  - Internal reviews of draft versions. As indicated in the figure on the preceding page, the general review process used for final documents applies.

- The Business Manager provides Technical Publications staff to help review and edit documents but their assistance is not required.

For More Information

- Contact: QAO for review-related assistance.

- Consult:
  - POD 24, Transition of SEAS Center Products, and SSDM Procedure 1502, Document Management (SEAS Center Core Processes database)
  - USAID PRIME Program S&P PMO-1502, Document Style Guidelines, and USAID PRIME Program S&P PMO-1504, Product Release Approval (USAID PRIME Document Library database)
  - The "Delivery Process: Documents and Systems" topic in this handbook.

Internal Audits

Audits -- checking whether the TAC is following its approved, documented processes (process audits) and whether planned products are compliant with applicable requirements (product audits) -- benefit TACs: Checking process performance encourages process performance. Audit results also serve as a snapshot of a TAC's process maturity and as an indicator of what is working and what is not. Used together with the TAC's experiences, these results can help the TAC determine which, if any, processes to improve and how to do so. Finally, internal audits help TACs prepare for external audits (discussed in the "Industry Benchmarks" topic).

Description

The following table defines and describes our two process and two product internal audits:

Audit	Purpose	Team / Duration/ Occurrence (typical values)	Results Documented In:
Internal Quality Audit (Process Audit)	Identify any lack of compliance (CMM, ISO, PODs). Provide guidance in eliminating weaknesses	1 – 3 Program personnel, but not from the TAC being audited; 2 days; semi-annual	USAID PRIME QA General Info DB. Major deficiencies converted into Corrective Action Requests (CARS) and tracked in USAID PRIME CPAS Database.
In Progress Process Audit (IPPA) (Process Audit)	Determine whether agreed processes are being used and staff is knowledgeable of those processes.	1 member of QAO; 1 day; work segment activity started & artifacts being developed but time remains to correct the process approach: roughly at the 1/4 mark of the segment	<TAC> General Info DB
Physical Configuration Audit (PCA) (Product Audit)	Determine whether the product conforms to its technical documentation and excludes any unauthorized changes.	1 – 4 Program personnel, usually led by CMO; 1 day; prior to system delivery	<TAC> General Info DB
Functional Configuration Audit (FCA) (Product Audit)	Determine whether the product meets all requirements allocated to it.	1 – 4 Program personnel, usually led by CMO; 1 day; prior to system delivery	<TAC> General Info DB

The following table lists the typical steps of an internal quality audit along with the participating personnel:

Audit process steps	Responsible parties
1. Schedule & Form audit team	QAO
2. Prepare for audit	Audit team and TAC Manager (for consensus on audit scope & objectives)
3. Hold pre-audit meeting	TAC Manager and audit team
4. Conduct audit	Audit team and TAC interviewees
5. Assess audit results	Audit team
6. Hold closing meeting	TAC Manager and audit team
7. Develop audit report	Audit team
8. Identify corrective actions	TAC Manager and lead auditor
9. Implement actions	TAC
10. Verify resolution	Lead auditor

Key Points

- Our internal audit program applies to both TAC management and technical activities.
- The audit steps apply verbatim for process audits; for product audits these steps are specialized as their performance is linked to the delivery process and is described further in the topic, "Delivery Process: Documents and Systems."
- For process audits, a key audit planning activity is the establishing of the audit scope and objectives. Ideally, the audit should be designed to maximize its effect on helping the TAC to achieve its process objectives.
- Process audits can be more effective if they are viewed as improvement opportunities, not tests.
- TACs use their corrective action strategy to track audit finding actions to closure.

For More Information

- Contact: QAO for audit-related assistance.
- Consult:
  - Relevant SSDM material (SEAS Center Core Processes database)
    - POD 27, Quality Assurance
    - SSDM S&Ps 1400 series audit guidelines
      - SSDM S&P 1401, Physical Configuration Audit
      - SSDM S&P 1402, Functional Configuration Audit
      - SSDM S&P 1406, In-Progress Process Audit
      - SSDM S&P 1407, Internal Audits
    - SSDM S&P 1121, Corrective and Preventive Action (in the SEAS Center Core Processes database)
  - The USAID PRIME Quality Assurance Plan and PMO-1121, Corrective and Preventive Action Tracking (USAID PRIME Document Library database)

Process Assurance Cycle (PAC)

The Process Assurance Cycle (PAC) is a framework for

- Defining the products of a TAC and the processes and S&Ps to be used in their preparation
- Ensuring the availability of processes when needed and project team understanding of them
- Monitoring their use during the applicable work segments (e.g., life cycle phases).

The PAC process encourages communication and agreement among all TAC personnel throughout the life of the TAC to ensure that the best processes are used and process adjustments quickly occur when needed.

Description

The PAC consists of five primary activities, which are described in the following table:

Activity	Objective	Trigger	Products
TAC Process Approach	• Identify the processes and supporting Standards and Procedures (S&Ps) to be used to produce the TAC products and services	• Receipt of TAC/TAC Mod • Annual TAC planning period	• List of TAC S&Ps to be tailored or developed • Training needs
Pre-phase Process Review	• Revisit the TAC Process Approach to ensure it is still appropriate and that the activities and processes for the upcoming work remain applicable	• Next large segment of work (e.g., life-cycle phase) • Major change in TAC direction	• Updates to Process Approach/other products of "TAC Process Approach" activity • TAC training schedule • Schedule & assignments for S&Ps to be tailored/ developed
Phase Orientation Meeting (POM)	• Ensure TAC team readiness	• Completion of Pre-phase Process Review	• "Just-in-time" training schedule for TAC processes (as needed) • Update schedule/ assignments for S&P to be tailored or developed for next work segment
In-Progress Process Audit (IPPA) (see Note below)	• Determine whether the TAC is using the approved TAC Process Approach	• Complete 25% of work segment • Prior IPPA that identified substantive deficiencies	• Audit report (includes findings) • Recommended corrective actions • TAC and QA action items
End-of-Life-Cycle-Phase Audit (LCPA)	• Verify completion of all action items resulting from previous IPPAs during the life-cycle phase • Determine any lessons learned that may be applicable to follow-on efforts or other SEAS Center projects	• End of life-cycle phase	• Audit report (includes lessons learned)

Note: LCPA activities (e.g., incorporating lessons-learned into the next life-cycle phase) are typically performed as part of the Pre-phase Process Review.

Key Points

- All TACs use the PAC process.

- The TAC Process Approach
  - Should be developed or updated within two weeks of the date on which the TAC Manager accepts a new TAC or TAC Mod.
  - Consists of the list of S&Ps (SSDM, USAID PRIME Program, and TAC-specific) that the TAC will follow in developing the TAC products and services.
  - Is generated by analyzing the requirements of the new TAC or TAC Mod and then augmenting the applicable S&Ps from the "Core Processes" list and the list of the minimum S&Ps that should be applied on TACs. (The Core Processes are the 12 basic processes common to all TACs. Supporting S&Ps are identified for each process.)
  - Is placed in the TAC's General Info database.

- The TAC Manager is involved in all PAC activities and specifically
  - Leads the Process Approach determination, review, and deployment (including POM conduct)
  - Schedules the IPPA, ensuring that TAC personnel who direct or perform the audited processes are available for the IPPA.

- QAO/PEO personnel advise and support the TAC Manager throughout the PAC process. QAO personnel perform the IPPA and the LCPA.

- A PAC Tool is available from QAO for documenting the selected S&Ps for software development/maintenance TACs. Other TACs document the TAC Process Approach in an appropriate form that provides similar information.

For More Information

- Contact: QAO/PEO for PAC-related assistance.

- Consult:

  - SSDM S&Ps 1510, Process Assurance Cycle, and 1406, In-Progress Process Audit (IPPA), which describe the PAC process (SEAS Center Core Processes database)
  - USAID PRIME Program POD 14, Use of Processes (USAID PRIME Document Library database)
  - Related-documents, which discuss and provide guidance on applying the Core Processes and the Minimum S&Ps list (QAO General Info DB and Appendices A and D of this handbook).

Program Reviews

Program senior management and staff reviews of individual TAC and Program support (i.e., QA) status are periodic, scheduled, and formal. Normal senior-TAC management interaction focuses primarily on immediate and near-term issues and risks. Program reviews

- Address these issues as well as trends and risks that represent longer-term concerns.
- Provide a forum for senior management to explore with TACs how to address issues from both TAC-specific and Program-wide perspectives. During TAC planning, for example, the Technical Director may advise a TAC that work on a deliverable could be structured to take advantage of a related activity of another TAC and, thus, reduce the effort and/or schedule needed to produce that deliverable.

Description

We use the following three sets of Program-level reviews:

Review	Participants	Purpose	Outcomes	Frequency
TAC planning - 3 reviews: • TAC Owner Briefing • TAC Planning Review • TAC Planning Products Review	• TAC Manager • PM / Program Business Manager • QAO (& PEO for second review as needed) • PCO/Program Control Office Manager • Technical Director (first two reviews)	Review development/update of TAC plans, schedules, & costing to satisfy Program and TAC Owner requirements. Uses an incremental approach to assess, by review • TAC Concept & ROM Costing • Detailed planning information & costs • Completed planning documentation – PMP, schedule, & detailed costs	• Approval of final planning products or to refine planning products to level needed for next review. • Disapproval: Indicated rework required.	During initial TAC planning & following receipt of each TAC Mod
TAC Status	• TAC Manager • PCO	Review schedule, cost, and budget variance and TAC risk status	• TAC Cost-Schedule Status Reports (CSSRs) • Overall color-coded TAC CSSR status: • Green • Red	Monthly for each TAC
Senior Management Review	• PM • Program Business Manager • PCO/Program Control Office Manager • QAO • PEO • Technical Director • CMO • Data Base Manager • TAC Managers	Review • Program Quality Management System (QMS) Implementation – organization & supporting Program policies, plans, standards, procedures, etc. • TAC and Program support group status	• Minutes & Action items recorded and tracked	Quarterly; more often as needed

Key Points

- *Planning Reviews.*
  - The TAC Planning Products Review is required for all TACs and all TAC Modifications. In some cases, the scope of the changes (or initial work) is small and/or so well understood that all involved parties may agree that the two earlier reviews are not necessary and the planning products can be easily updated (or produced). In these cases, the Business Manager may waive the earlier reviews with the concurrence of the TAC Owner for the TAC Owner Briefing.
  - The TAC Manager schedules the planning reviews.
  - All planning reviews should occur within 30 days of receiving an agreed-upon PWS.

- *TAC Status Reviews.* Each TAC has a monthly status review with PCO and the Business Manager. TAC Managers bring marked-up schedules (with the changes over the month indicated) and staffing and spending projections to the review. PCO uses the QuickCost tool to compare the schedule, cost, and budget variances to a set of thresholds (stored in USAID PRIME MIST database under TAC 00). Exceeding any of these threshold values yields a "Red" status; otherwise, the TAC status is "Green."

  A "Red" status results in a Red-Status Review as soon as possible with the Program Manager (or Business Manager), PCO, and the TAC Manager to review the cause of the variance and to ensure that appropriate corrective action is defined, approved, and implemented.

- *Senior Management Reviews (SMRs).* SMRs are held quarterly for selected TACs and Program-level groups, such as QAO and PEO. Criteria for selecting individual TACs for SMR review include significant budget and/or schedule variance, customer concerns, criticality of work, and documented risks. Program-level activities reviewed include process development and deployment, quality program status, and training.

  SMR agenda items typically include
  - Problems experienced by the Program/TAC and the corrective actions to solve them
  - Potential problems/risks and the preventive actions to avoid/mitigate them
  - Achievement of Program goals and objectives.

For More Information

- Contact: PEO/QAO on planning reviews and SMRs; PCO on status reviews.

- Consult:

  - POD 13, Monthly Status Assessments, for status reviews, including Red Flag Reviews, and POD 20, Senior Management Reviews (SEAS Center Core Processes database)
  - The "TAC Planning" topic in this handbook for more individual planning review detail.

Quality Records

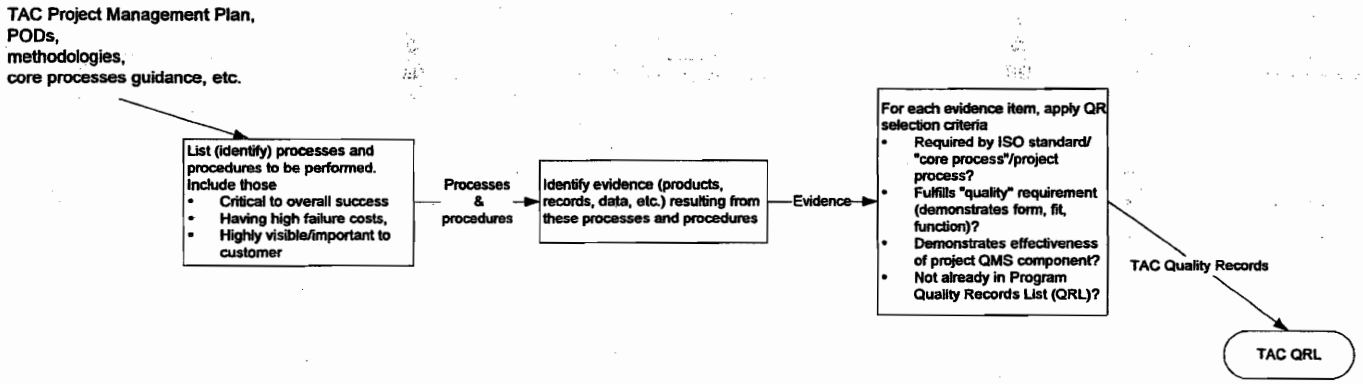
A "Quality Record" (QR) is an ISO term that describes the historical material that must be archived from process activities such as inspections, management reviews, and internal audits. Creating and maintaining QRs (1) helps a TAC objectively assess whether its work processes meet customer quality needs and improve the processes as needed and (2) simplifies audit/review preparation and conduct.

Description

A QR is evidence that a quality-related process, procedure, or standard has been followed and documents

- Completion of process steps focused on quality (e.g., reports/forms for inspections, reviews, tests)
- Authorization for product release (e.g., delivery records)
- Execution of ongoing processes that impact quality (e.g., preventive/corrective actions from applying defect causal analysis, reviews of process improvements)

Quality Record Lists (QRLs) are defined and maintained at Program and TAC levels. The following graphic depicts the steps used to develop a TAC QRL.



Typical TAC QRs include those that

- Track TAC products throughout preparation. Examples: TAC CRB meeting minutes, CM tool reports, release content records, ID/naming convention standards, in-process test results
- Control project processes. Examples: Approved S&Ps, TAC CRB meeting minutes, Master Documents List
- Verify design. Examples: design product peer inspection records, proof-of-concept demo reports, document review sign-off sheets
- Provide corrective/preventive action status.
- Ensure product compliance with requirements before release. Examples: PCA/ FCA checklists, product transition (delivery) records.

Key Points

- The Program and each TAC define, control, and archive QRs relevant to their work.

- The Program-level CCB controls the Program-level QRL, which is stored in the USAID PRIME Document Library; the TAC Manager controls the TAC-level QRL, which is stored in the <TAC> General Information Database.

- The template in Appendix D may be used to guide the preparation of TAC QRLs. TAC Managers, with support from QAO and PEO, determine which records are to be considered QRs and which are not. ***Do not include "business records" as quality records.*** Records not included in a TAC QRL:
  - Records in USAID PRIME Program QRL
  - TAC products--generally (e.g., requirements/design specifications, project plans, **BUT** evidence of review/ approval of these are QRs!)
  - Corporate/program-related records such as time charges, financial reports, etc.
  - Other records that relate to project performance but do not reflect quality-focused processes.

- Trained personnel review the QRs and the process for QR control during internal quality audits and external assessments.

For More Information

- Contact: QAO for QR-related assistance.

- Consult:

  - SEAS Center POD 42, Quality Records, which lays out the fore-mentioned requirements associated with quality records (SEAS Center Core Processes database)

  - Three documents that provide more detailed guidance regarding quality records(QAO General Info DB under ISO-9001, Guidance):
    - Preparation Guidance – Quality Records List
    - Core Quality Records – SEAS Center Projects (included as Appendix B in this handbook)
    - USAID PRIME Project "Minimum" S&Ps and Quality Records (included as Appendix D in this handbook)

  - The ISO discussion in the "Industry Benchmarks" topic in this handbook.

Software Product Peer Reviews and Inspections

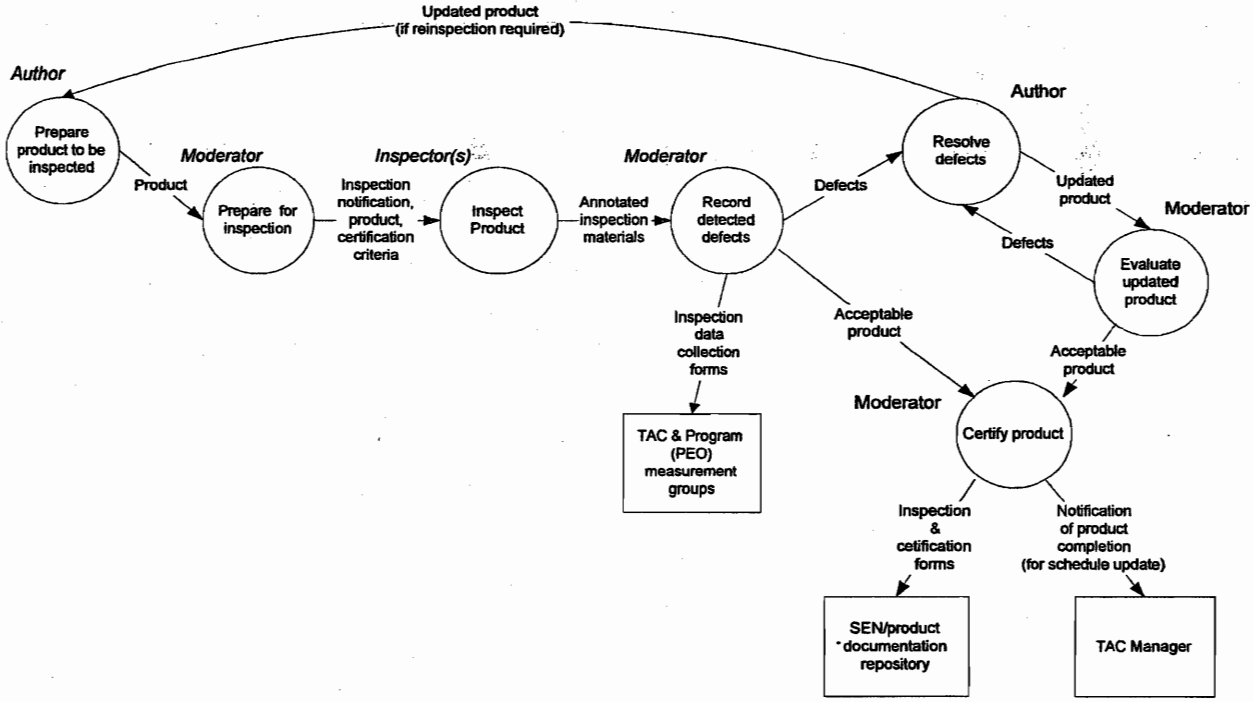
Software peer reviews and product inspections are used to review software development/ maintenance-related products for correctness, completeness, quality, and compliance with requirements and standards. If these review activities can be performed early enough, necessary changes can be made quickly, thereby helping the on-time delivery of high-quality products.

Description

Regardless of the life cycle used, developing or modifying software involves creating/updating requirements and design, implementation, and test artifacts. The review process involves reviewing these artifacts by peers ("peer reviews") and includes

- Notifying and providing reviewers with review and evaluation criteria information
- Performing the review and recording the results
- Sending the results to the required parties/repositories for author correction.

Formal software product reviews, termed "inspections," use predefined notification, record, and data collection forms (provided in SSDM S&P 1501) and follow the process depicted below.



Less formal software peer reviews may not use the predefined forms and/or may simplify the inspection process. For example, the author usually serves as the review moderator.

Key Points

- TACs review artifacts as they are produced from each life-cycle phase – analysis, design, implementation, and test. The specific reviews selected depend on factors such as the development methodology used (e.g., object-oriented) and the artifacts produced. In the case of maintenance activities, the methodology and artifacts depend strongly on the existing system, including its supporting documentation. For example, the lack of traditional software requirements for an existing system affects the standards and completion criteria applied for development products during maintenance.

- As with the other TAC processes, TACs may tailor the review process to satisfy their needs. For example, depending on such issues as
  - the availability of inspectors
  - the number of inspections planned
  - complexity of the software/software changes
  - the criticality of the applications,

  the TAC might consider:
  - combining/separating the moderator and lead inspector role
  - using "one-on-one" vice team inspections.

- TACs may also tailor or develop TAC-specific procedures to address unique TAC needs. For example, the NMS functional area within TAC 22 performs most of the Program software-related activity. That area has developed NMS 4100, Requirement Peer Review, to accommodate the requirements specification approach used on NMS.

For More Information

- Contact: QAO for peer reviews and inspections-related assistance.

- Consult:

  - Relevant SSDM material (SEAS Center Core Processes database)
    - SSDM S&P 1501, Inspection and Certification of Software Products
    - SSDM Standards 4xxx, Inspection and Certification of <specific software products>.

Industry Benchmarks

This Program undergoes periodic external evaluation of its process maturity – process definition and use – to assess the current state of our processes and to determine how to improve them. The auditors base their assessment on external "benchmarks" or measurement standards. The reason for complying with such standards is that a program assessed as operating at a high-process maturity with respect to these benchmarks will deliver higher quality products and services at a lower cost than a program assessed at a lower maturity level.

Description

Our Program uses the following three industry benchmarks to evaluate its process maturity:

- The Software Engineering Institute (SEI) Software Capability Maturity Model (SW-CMM)
- The SEI Software Acquisition CMM (SA-CMM)
- The International Organization for Standardization Quality Standard (ISO-9001).

These benchmarks are briefly characterized as follows:

Benchmark	Scope (Used to evaluate)	Benchmark Structure & Audit Approach	Audit Team/Duration/ Occurrence (typical values)
SW-CMM	Program software process capability.	• Staged model: 5 maturity levels encompassing 18 Key Process Areas. (See Appendix F for a listing of the levels and areas.) • Each stage associated with improved processes • Results in a rating indicating level at which the audited entity complies fully.	• 5 external auditors • 5-10 days • As needed to establish process maturity, results remain credible for about 18 months
SA-CMM	Program software acquisition capability	Similar to SW-CMM, staged model with 15 maturity levels encompassing 16 Key Process Areas.	• 5 external auditors • 5-10 days As needed to establish process maturity, results remain credible for about 18 months
ISO-9001	Program Quality Management System (QMS) including each TAC's process – plans, S&Ps, and evidence of use - for the design, development, production, installation and servicing ("maintenance") of quality products and services.	Single model with 20 elements covering all activities related to development of quality products. • Successful evaluations result in registration of audited entity. (See Appendix F for a listing of the elements.)	• 2 external auditors from BVQI • 5 days for registration audit, 1-2 days for surveillance audit • Semi-annual surveillance audits after registration

Key Points

- A USAID PRIME Program objective is to demonstrate compliance with the ISO-9001 standard, SW-CMM Levels 2, 3, and 4, and SA-CMM Levels 2 and 3.

- The Program became ISO-registered in May 1999 and must undergo surveillance audits every six months by the Registrar, BVQI, to maintain the registration. All Program TACs and support organizations participate in ISO audits on a rotating basis. Once achieved, registration can be lost if major weaknesses remain uncorrected following a surveillance audit.

- All Program TACs involved in software development or maintenance participate in all SW-CMM assessments, which are termed Software Capability Evaluations (SCEs).

- The SA-CMM has been adopted by the Program to define how we buy (subcontract) services or software products. All Program elements involved in software products/services acquisition participate in SA-CMMs assessments, also termed SCEs.

- ISO Awareness Training is required for all Program personnel. No further preparation is required to prepare for benchmark audits; simply follow your documented processes.

For More Information

- Contact: PEO for ISO-related assistance.

- Consult:

  - POD 1, Use of SEAS Program Office Directives (PODs) (SEAS Center Core Processes database)
  - Overview and training presentations on ISO and the SW-CMM (USAID PRIME Training DB)
  - Weekly Process Deployment presentations regarding Industry Benchmarks (USAID PRIME PEO Database, "4. ISO-9001 Related Documents" view, Deployment Team Meetings category) (Several of the PowerPoint presentations stored in the Deployment Team Meetings category concern topics related to all three benchmarks.)
  - The USAID PRIME ISO-9001 Employee Awareness Handbook, which contains key information regarding ISO requirements, the registration process, and helpful tips.

Measurement

Measurement supports the Program and TACs in three areas:

- Managing the work processes
- Understanding the processes used and their affect on products and services
- Guiding change to the processes.

Measurement is a planned activity that is addressed in the PMP for each TAC. The Program policies, methodology, standards, procedures, and guidebooks integrate measurement into the performance of the work on TACs.

Description

TACs take the following measurements:

Measurement	Purpose	Occurrence	Supporting Tools	Products	Storage Location
TAC performance status	Determine whether TAC is ahead, as planned, or behind schedule and cost plans	Monthly	MS Project (TAC schedule), Quick Cost (updated TAC performance information)	Updated schedule baseline and cost estimate	USAID PRIME MIST
TAC local measures	TAC-specific, TAC approach in PMP sections 3.7 & 3.8.	As indicated in TAC PMP	As required	As required	<TAC> General Info DB
TAC process status	Check level of process definition, deployment, & use for each core process	Quarterly	Project Process Assessment Form (PPAF)	Completed PPAF	USAID PRIME MIST
Software TAC summary	Analyze current Program level characteristics and capabilities.	Quarterly	Quarterly Summary Form (QSF)	Completed QSF	USAID PRIME SSMS DB
Software TAC product and quality	Understand Program software process & products; build engineering models to reflect Program capabilities/ expectations.	Delivery of major release	Project Close-out Form (PCF)	Completed PCF	USAID PRIME SSMS DB

Key Points

- All TACs participate in Program measurement activities to some extent. The minimum measures required of all TACs are listed in the preceding table.
- All TACs provide planning information (cost and schedule) to PCO to support performance measurement. Some TACs use earned value methods that require TACs to implement internal measurement activities.
- TACs use appropriate measures to monitor the quality of the products and services provided to USAID.
- TACs integrate measurement into internal process improvement efforts.
- Software TACs provide measurements of each released product and of the processes that produced the products.
- The PEO measurement activities are focused on characterizing the products and services provided to USAID.
- Program-level measurement information (guidance, accumulated data, and analysis) is contained in the USAID PRIME SSMS database.

For More Information

- Contact: PEO for more information about Program and TAC measurement.
- Consult:
  - POD 38, SEAS Measurement Program (SEAS Center Core Processes database)
  - USAID PRIME SSMS Handbook and USAID PRIME Program S&Ps PEO-1701, Measurement Data Identification, and PEO-1702, Measurement Data Collection and Analysis (USAID PRIME Document Library)
  - USAID PRIME Software Profile (USAID PRIME PEO Database, Draft PEO Assets).

Policies, Processes, Standards, and Procedures

Our Program has a complete set of documentation describing how we do business. The processes are documented so that

- TACs can perform work processes in a consistent, standardized manner
- The processes can be easily modifiable and extendible to reflect improvements and to address TAC needs.

Description

TACs operate within a three-level "process" environment: Center, Program, and TAC. The levels correspond to scope, e.g., Center artifacts apply to all projects in the SEAS Center. The following matrix defines the applicable process elements and indicates the number and location of the associated artifacts:

Process elements	Definition	Number of & Location (i.e., Lotus Notes database identifier) of Applicable Process Artifacts by Organizational Level		
		SEAS Center	USAID PRIME Program	TAC
Policies	Management Directives: • Above TAC-level – Program Office Directives (PODs). The PODs mainly pertain to management process requirements that projects must follow; e.g., MIST use, planning, CM, QA, measurement, and quality records. • TAC-level – Policies. Option exists, no current TAC-level policies.	25 (SEAS Center Core Processes)	1 (USAID PRIME Document Library)	0 (if needed by a TAC, place in <TAC> General Info DB)
Processes	Processes needed to perform TAC work: • Program-level – Core Processes (e.g., plan project, monitor project activities) identify the basic processes performed by all TACs • TAC-level – Additional work processes required to satisfy the PWS. A specific listing is optional, TAC processes usually organized by major WBS element.	-	12 core processes (USAID PRIME QA General Info DB)	TAC-specific (Used to create TAC Process Approach in <TAC> General Info DB)
Standards	(Interim or final) Product formats and guidance in producing them.	Large set (SEAS Center Core Processes)	1 (USAID PRIME Document Library)	TAC-specific (USAID PRIME Local S&Ps DB)
Procedures	Specific process steps detailing how part of a process is to be performed. "Procedures" is a "catch-all" phrase that includes procedures, procedure instructions, and work instructions.	Large set (SEAS Center Core Processes)	16 (USAID PRIME Document Library)	TAC-specific (USAID PRIME Local S&Ps DB)

Key Points

- TACs comply with all PODs.
- As part of the Process Assurance Cycle (PAC), TACs perform the following:
  - Identify the processes needed to perform TAC work. TACs start with the core processes and augment/tailor them to develop products needed to meet all PWS requirements.
  - Determine, for each TAC process, the key process steps that need to be documented as S&Ps and deployed (training and availability). Try to minimize new S& P development by using, to the extent possible, S&Ps that already exist at the SEAS Center, Program, or TAC (including other TACs) level.
  - Check whether each S&P on the "minimum" SSDM and Program S&Ps for USAID PRIME Projects list (in USAID PRIME QA General Info DB/ISO-9001/Guidance) is already in its S&P list. If not, the TAC opts to include it, request a waiver for it, or use a TAC-specific, compliant alternative.
- A TAC lists or references the S&Ps to be used in the TAC's PMP.
  - The reference may be to a TAC Process Approach document that is stored in the TAC's General Info DB. This document lists the S&Ps to be used. It may also indicate
    - Which S&Ps are used by which TAC personnel/groups for which activities
    - Applicable Program or TAC-level training to be provided for the processes/S&Ps.
  - An advantage of referencing a list of the S&Ps in the PMP rather than identifying them individually is that changes to the list can be made without updating the PMP itself.

For More Information

- Contact: PEO/QAO for process-related assistance.
- Consult:
  - POD 1, Use of SEAS Program Office Directives, and POD 14, Use of SSDM (SEAS Center Core Processes database)
  - USAID PRIME Program POD 14, Use of Processes, and the USAID PRIME Quality Management System Implementation document, which describes the USAID PRIME Program organization and supporting process infrastructure (USAID PRIME Document Library database)
  - The "Process Assurance Cycle (PAC)" topic in this handbook; Appendix A for a complete discussion of the core processes; and Appendix E for one-sentence impact summaries on TACs of each POD.

Process Improvement: The Quality Improvement Paradigm

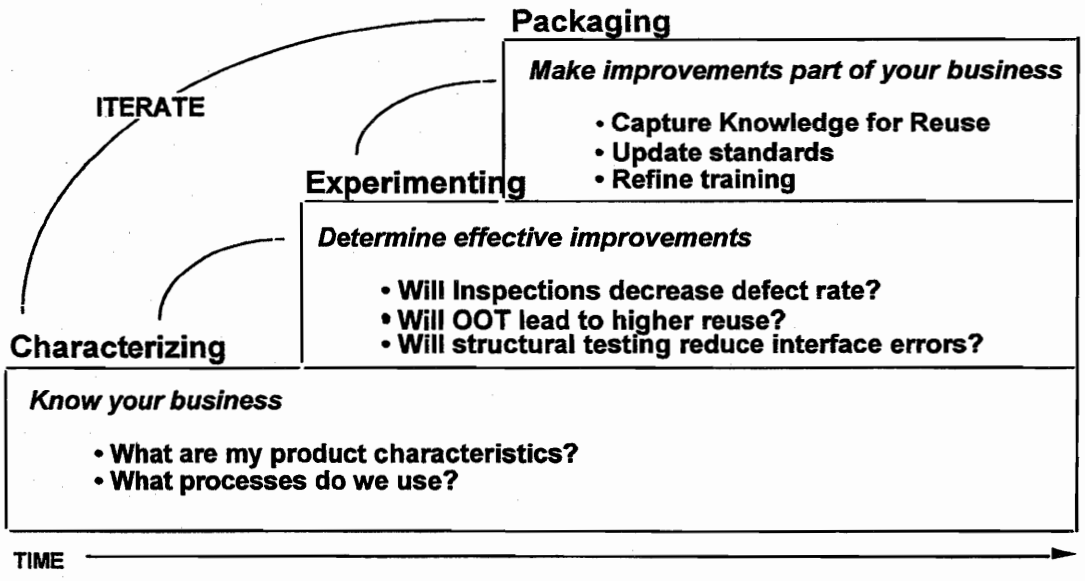
Our Program recognizes that improved processes result in higher quality products and services. Our process improvement efforts are guided by applying the Quality Improvement Paradigm (QIP).

Description

The QIP is comprised of three process improvement steps:

- *Characterize:* Define the current status (baseline) of the organization's products and processes.
- *Experiment:* Establish improvement goals, identify and implement a process change intended to support an improvement goal, and measure the impact of the change.
- *Package:* If the change results in (measurable) product improvement, incorporate it into the organization's standard process. If the change does not result in product improvement, try another change.

Pictorially, the QIP may be represented as



Key Points

- Our Program seeks to learn from the experiences of each TAC. All TACs participate in process improvement by applying the QIP to perform local experiments that evaluate selected process changes for potential benefits.

- The primary goal of all improvement activities is to show measured improvement of the quality of products or services (i.e., customer satisfaction); the goal is not to produce additional processes or to include additional detail in existing processes. Process change must be measurable to determine its effectiveness. Baseline a process and then measure the effect of a change to it.

- PEO is responsible for Program-wide process improvement activities. PEO guides our improvement effort and maintains the USAID PRIME Process Improvement Plan that defines Program goals and describes process improvement activities.

- The CMM and ISO-9001 are tools to measure progress. Compliance with such industry benchmarks is secondary to process and product improvement.

For More Information

- Contact: PEO for Process Improvement-related assistance.

- Consult:

  - The Quality Management System (QMS) Implementation manual, which provides an overview of our process improvement program and the USAID PRIME Process Improvement Plan, which further defines the goals, approach, schedules and concepts of the PRIME process improvement program for the period September 1999 through December 2000 (USAID PRIME Document Library)
  - "Paradigms of Process Improvement," an introductory presentation on the QIP (USAID PRIME PEO Database (ISO-9001 Related Documents/Briefings, Deployment Team Meetings category, presentation #33 DTM [6/29/99]).

Tailoring Guidance for Small TACs

Some "small" TACs (4-8 personnel) use a collaborative, prototyping approach to develop/ maintain/operate small, special-purpose applications. Often in these TACs, a single person may perform functions handled by several people/groups of people in larger TACs. The need for basic TAC processes still exists for these TACs; this topic describes how to streamline the basic set of process documentation for such TACs.

Description

Process Area	Process Documentation Purpose	Applicable Guidance

Planning & Monitoring	Direct TAC planning and monitoring activities	• TAC Planning Guidance (available late March)* and USAID PRIME MIST Database-based PMP preparation guidance
		• PMO-1100, Risk Management (available in late March, as Program replacement for SSDM S&P 1110, Risk Management)*
		• SSDM S&P 1510, Process Assurance Cycle**
		• See also the PODs*** that apply to planning & monitoring, specifically
		  • 2 & 3, Performance Measurement Methodology & Tools
		  • 4 Work Authorization, WBS, Time Charges
		  • 5, Planning Reviews
		  • 6, Baseline Plan Changes
		  • 7, Project Management Plans
		  • 8, Project Cost Estimates
		  • 12, Earned Value Measurement Criteria
		  • 13, Monthly Status Assessments
		  • 21, Managing Tasks with Subcontracted Work

CM	Indicate how the TAC will control its products & internal documentation	• TAC-specific • POD 39, CM and CCBs*** • USAID PRIME Program CM Plan*
Small System Development/ Maintenance/ Operations	Indicate how the TAC will develop/maintain/operate its system(s)	• TAC-specific
Documentation	Provide template and direction on deliverable document format	• PMO-1502, Document Style Guidelines* • SSDM S&P 1502, Document Management** • SSDM S&P 1507, Document Changes and Revisions**
Delivery	Internal TAC sign-off process before delivery to customer for selected deliverables	• PMO-1504, Product Release Approval* • CMO-1602, Delivery Process (late March/April)* • POD 24, Transition of SEAS Center Products***
Audits & corrective action	Evaluate TAC performance from a process & evidence perspective and act on findings	• SSDM S&P 1401, Physical Configuration Audit** • SSDM S&P 1402, Functional Configuration Audit** • SSDM PMO-1121, Corrective and Preventive Action Tracking**
S&P Maintenance	Provide direction on creating/ updating TAC-specific S&Ps	• SSDM S&P 9002, Content of SSDM Standards and Procedures** • PMO-9002-01, Numbering Project Standards, Procedures, Process Instructions, and Work Instructions* • PMO-9005, Changing USAID PRIME Program Documents*

*Program-level S&Ps and guidance documents in USAID PRIME Document Library
**SSDM S&Ps in SEAS Center Core Processes database
***PODs in SEAS Center Core Processes and USAID PRIME Document Library databases.

Key Points

- Each TAC, including "small" TACs, develops a process approach to use in guiding its work. This approach results in the TAC's list of S&Ps, which is stored in the TAC's General Info database.

- All TACs need to indicate how they develop/maintain/operate small applications and perform CM. Two options for "small" TACs are
  - Modify existing SSDM S&Ps
  - Record this information in a short (2 to 4 pages) TAC Technical Manual. A suggested outline appears in Appendix G.

For More Information

- Contact: PEO/QAO for process tailoring assistance; the CMO for CM tailoring help.

- Consult:

  - Relevant SSDM material (SEAS Center Core Processes database)
    - SSDM S&P 1510, Process Assurance Cycle, for information associated with Process Approach development
    - The SSDM Guidebook, which describes how to tailor SSDM for system development and maintenance projects.

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APPENDIXES

Appendix A - Core Processes

SEAS Center Core Processes: Tailored for USAID PRIME Program and Performed by All TACs

Process Description	Typical Activities Within Process	Applicable SEAS Center Documentation Guidance	Related Products and Artifacts
Plan project	Ensure common understanding of work requirements w/customer Identify methodologies & processes to perform required work Identify project products (final and intermediate) and related completion/acceptance criteria Develop project WBS, schedule, and cost estimate Establish quality goals and Identify related metrics Address risks	POD 4 – Work Authorization, Work Breakdown Structures, and Time Charges POD 5 – Planning Reviews POD 7 – Project Management Plans POD 8 – Project Cost Estimates POD 21 – Managing Tasks with Subcontracted Work POD 27 – Quality Assurance Notes DB – USAID PRIME MIST Database USAID PRIME Program QMS Manual SSDM Guidebook USAID PRIME Program Subcontractor Policy Handbook SSDM P1102 - Software Development Estimation SSDM P1110 - Risk Management SSDM DID6104 - Project Management Plan	WBS PMS package Project Management Plan Metrics Checklist Work Authorization Documents (WADs) Subcontractor Task Orders (STOs)
Define and deploy project processes	Establish project standards and procedures (S&Ps) Produce master documents list Produce quality records list	POD 1 – Use of SEAS Program Office Directives (PODs) POD 14 - Use of SEAS System Development Methodology (SSDM) POD 41 - Master Documents Lists POD 42 - Quality Records POD 43 - Document Control SSDM Guidebook Preparation Guidance-Master Documents List (Notes DB – USAID PRIME PEO Database) Preparation Guidance-Quality Records List (Notes DB - USAID PRIME PEO Database) SSDM P1510 - Process Assurance Cycle SSDM S9002 - Content of SSDM Standards and Procedures PMO-9002 - Numbering Project Standards, Procedures, and Work Instructions	PAC Tool Development Approach (or list of project S&Ps) project S&Ps Master Documents List Quality Records List PAC Phase Orientation Meeting
Assign project team	Identify required skills and assess project team capabilities Identify deficiencies and coordinate needed training Acquire/"buy" additional personnel, as appropriate Issue work authorizations	POD 4 – Work Authorization, Work Breakdown Structures, and Time Charges POD 36 - Training Program USAID PRIME Training Program Handbook Notes DB - Division-Completed Training (training records) SSDM P1510 - Process Assurance Cycle	Work Order Authorizations (WOAs) Individual Training Plans (ITPs) (as needed) individual training records training schedules (as needed)
Monitor project activities	Conduct management reviews covering activity status/earned value improvement initiatives customer complaints/ outstanding problems corrective/preventive actions	POD 2 – Performance Measurement Methodology POD 3 – Performance Measurement Tools POD 6 – Baseline Plan Changes POD 12 - Earned-Value Measurement Criteria POD 13 - Monthly Status Assessments POD 20 - Senior Management Reviews POD 40 - Corrective and Preventive Action	Modification Form Variance Analysis Report ("red" flags) management review meeting minutes
Control project assets, products, and related requirements	Implement project CM Establish project CCB/CRB Document and track changes in product requirements	POD 6 – Baseline Plan Changes POD 30 - Property Management POD 37 - Property Acquisition POD 39 - Configuration Management and Control Boards POD 43 - Document Control USAID PRIME Program Configuration Management Plan SSDM S1601 - Configuration Item Identification SSDM S1602 - Configuration Review Boards SSDM P1606 - Program Library Maintenance SSDM P1610 - Control of Customer-Supplied Software Products SSDM S4201 - Software Engineering Notebooks SSDM S4202 - Unit Prologs SSDM S4301 - Language-Independent Coding SSDM DID6107 - Configuration Management Plan	project CM plan CCB/CRB meeting minutes document change notices

Process Description	Typical Activities Within Process	Applicable SEAS Center Documentation Guidance	Related Products and Artifacts
Assess effectiveness of project processes	Maintain records of process application/performance Review project S&Ps and revise as needed Coordinate conduct of internal assessments/audits	Notes DB - USAID PRIME MIST Database (TPAC forms) USAID PRIME Program QMS Manual SSDM P1405 - System Development Life-Cycle-Phase Audit (LCPA) SSDM P1406 - In-Progress Process Audit (IPPA) SSDM P1407 - Internal Audits SSDM P1510 - Process Assurance Cycle	TPAC records - USAID PRIME MIST PAC IPPA/LCPA reports PAC action item reports Updated PAC Tool Development Approach (or list of project S&Ps) new/revised project S&Ps internal audit reports
Assess project products throughout preparation	Conduct system/software development reviews Review documents Inspect/test systems and software	POD 43 - Document Control SSDM S1300 - Formal Reviews SSDM P1501 - I&C of Software Products SSDM P1502 - Document Management SSDM S1507 - Document Changes and Revisions SSDM S2101 - Traceability Matrices SSDM S4403 - Software Module Testing SSDM P5101 - Test Certification SSDM P5102 - Performance Testing SSDM DID6504 - Acceptance Criteria Specification SSDM DID6510 - System Test Report SSDM DID6512 - System Integration and Test Plan SSDM DID6517 - Acceptance Test Report SSDM P9005 - SEAS Documents Change Requests	formal review products document review records project document change requests document release records Inspection and Certification Record forms Test Certification Record forms test reports traceability matrices
Verify product integrity before release (delivery)	Resolve product review findings Ensure completeness/accuracy of all products Ensure product and customer requirements met	POD 24 - Transition of SEAS Center Products POD 43 - Document Control SSDM P1401 - Physical Configuration Audit SSDM P1402 - Functional Configuration Audit SSDM P1502 - Document Management SSDM S1503 - Software Transfer Package PMO-1504 - Product Release Approval	Hardware & Software CI PCA Checklists FCA Checklists product transition records software delivery package copies Product Release Records
Measure results of project processes	Collect and analyze related measurements Report measurement activities and results	POD 38 - SEAS Measurement Program Notes DB - USAID PRIME MIST Database USAID PRIME Measurement System Handbook SSDM S1101 - Software Data Collection SSDM S1106 - Software Data Tracking	Metrics Checklist Inspection Data Collection forms measurement forms (e.g., QSF, PCF, QMMF)
Perform corrective/ preventive actions	Record and track problems (e.g., customer complaints, audit findings, management issue) Determine causes of problems Update quality management system elements	POD 40 - Corrective and Preventive Action Notes DB - USAID PRIME CPAS (CAR process) SSDM P1121 - Corrective and Preventive Action PMO-1121 - Corrective and Preventive Action Tracking SSDM P1605 - System Problem Reporting SSDM P1617 - Defect Causal Analysis SSDM P9005 - SEAS Center Documents Change Requests	problem tracking system/ process (& status) reports problem analysis reports Project Action Item database (Lotus Notes)
Improve processes	Plan improvement initiatives Document, analyze, and communicate initiative results Infuse new technologies Revise quality management system processes/procedures as needed	POD 44 - Technology Management Notes DB - USAID PRIME PEO Database (activity reports) USAID PRIME Process Improvement Plan SEAS Center Technology Management Process Handbook SSDM P1405 - System Development Life-Cycle-Phase Audit SSDM P1407 - Internal Audits ("reusable" project assets) SSDM DID6102 - System Development History SSDM P9005 - SEAS Center Documents Change Requests	Notes DB (USAID PRIME PEO Database) records (e.g., improvement initiative, "reusable" asset, new technology assessment) project document change records System Development History reports

Appendix B – "Core" Quality Records -- SEAS Center Projects

Demonstrated Process	Record Purpose/Content	Example Quality Records	SEAS Center Reference	ISO-9001 Reference
Reviewing project quality system	Evidence of project quality system reviews conducted by project. Document results, decisions, and other actions impacting project product quality or processes as well as action items and participants.	QMB, PCRB, staff meeting minutes	POD 20	4.1.3
Identifying project quality records	Evidence of identifying and recording data to support evaluation of work processes that affect quality of project products	Project quality records list	PODs 07, 41, 42 MIST (TMIS) "help" file ISO-9001/CMM Discussion database	4.2.3h
Reviewing design	Evidence of collaborative product design review . Document decisions, action items, and presented materials from, and participants in, design reviews. Include all stages of development (e.g., SRR, PDR, CDR, BDR)	Design review materials presented, attendance list, related review item disposition (RIDs), review meeting minutes	SSDM S&Ps 1300, 13XX	4.4.6
Verifying design	Evidence of verifying that output from each design stage meets its input requirements. Document results from reviews, inspections, or walkthroughs of design artifacts (e.g., block diagrams, control/structure charts, flow diagrams, unit designs, specifications document.)	Inspection and certification record for design artifacts, inspection data collection record, test certification record, walkthrough meeting minutes, document review sign-off sheet	SSDM S&Ps 1501, 1502, 1507, 2101, 4102, 4104, 4105, 4204, 4207	4.4.7
Tracking unsuitable customer-supplied products	Evidence of maintaining accountability for products (hardware and/or software) supplied by customer for use by project. Report unsuitable products that must be used but cannot be changed as well as any lost and/or damaged products for which project has assumed responsibility	Form/format as coordinated with customer	POD 37 SSDM 7.4.2 SSDM S&P 1610	4.7
Tracking products (throughout development)	Evidence of tracking individual products (systems, software, and/or documents) or product components during all stages of production, delivery, and installation	CRB/TRB meeting minutes, CM tool reports, "check-out/check-in" logs, document review sign-off sheets	SSDM 4.1.2 SSDM S&Ps 1502 (documents), 1503 (software), 1601, 1602, 4208, 6107	4.8
Controlling project processes	Evidence of using control process to identify both program and project-specific processes to be followed . List all documents describing processes selected for project performance, approvals of list and any local process descriptions (standards and procedures), and all changes to list	project master document list, PAC Tool development approach, project S&P database, project CCB meeting minutes	PODs 14, 39, 41 SSDM S&Ps 1510, 1602	4.9
Inspecting and testing products	Evidence that project products have been inspected and tested. Document results of inspections as well as integration and acceptance tests of all project products, including pass/fail status at all in-process stages and authority responsible for release of product	Inspection and certification records for code artifacts, review sign-offs (documents), test certification records (software)	PODs 24, 43 SSDM S&Ps 1400 series SSDM S&Ps 1502, 1507 (documents) SSDM S&Ps 1503, 5101 (software)	4.10.5
Calibrating and validating test tools	Evidence of tests and checks performed on simulators, models, testers, or tools used to verify systems, software, or other products	Simulator test runs, simulator acceptance test records		4.11.1

Demonstrated Process	Record Purpose/Content	Example Quality Records	SEAS Center Reference	ISO-9001 Reference
Tracking non-conformance of product	Evidence of tracking non-conformances in products (systems, software, and/or documents) or product components during all stages of production, delivery, and installation. Document project product non-conformances outstanding at time of product release or transfer	Discrepancy report forms or logs showing tracking and resolution of product non-conformances, delivery or transfer notification with listed non-conformances, project action item log/reports	PODs 24, 43 SSDM S&Ps 1300 (RIDs), 1501 (unit products), 1503 (software), 1507 (documents), 1605 (SPRs)	4.13.2
Preventing defects	Evidence of project investigations (e.g., defect causal analyses) into project products or processes, both reactive (analysis of causes of non-conformances) and proactive (product/process improvement initiatives)	Project corrective action requests, action item reports, problem analysis reports, improvement initiative reports, revised project processes/ procedures	POD 40 SSDM S&Ps 1121 (CARs), 1300 (RIDs), 1407 (audits), 1510 (audits, AIs), 1605 (SPRs), 1617 (DCA)	4.14.2b
Verifying effectiveness of corrective actions	Evidence of project activities to verify implementation and effectiveness of corrective actions in response to deficiencies found during quality audits	CPAS CAR form (for program-initiated external/internal audits of project) (program record) project form (for any project-initiated internal audits/ reviews) QAO action item reports (for PAC-based and TPAC audits/ review by QAO)	POD 40 SEAS Center QA Plan SSDM S&Ps 1121 (CARs), 1407 (audits), 1510 (PAC), 1617 (DCA) SEAS CPAS (Notes)	4.17
Assessing project processes	Evidence of participating in and responding to results and findings of internal/external quality audits/assessments/evaluations	PAC-based IPPA & LCPA reports TPAC assessments ISO/CMM internal audit reports (program record)	SEAS Center QA Plan MIST (TMIS) Notes DB SSDM S&P 1510	4.17
Tracking problems and complaints	Evidence of tracking customer complaints and/or reports of project product non-conformities	Project action item lists/logs	PODs 40, 41	4.14.2a
Tracking changes to products and documents	Evidence of tracking changes to controlled documents and/or systems, software, or data	Project CRB/TRB meeting minutes, customer CCB meeting minutes, project CM logs and reports, DCNs, SCNs, completed change request forms	PODs 39, 43 SSDM 5.5, 6.2.3, 6.3.3 PMPs SSDM S&Ps 1507, 1602, 42XX	4.4.9 4.5.3 4.9 4.19
Authorizing delivery of project products	Evidence of authority to release products (software and documents) for use. Document identification of authorization for release and product compliance status	Letters/memos/forms documenting delivery of, or transfer of responsibility for, project products	PODs 24, 43 SSDM S&Ps 1502 (documents), 1503 (systems/software)	4.10.5 4.13 4.15

Column Definitions
DEMONSTRATED PROCESS - generic description of quality process that the record(s) documents
RECORD PURPOSE/CONTENT - intent and content of record
EXAMPLE RECORDS - example of typical SEAS Center project-level quality record
SEAS CENTER REFERENCE - SEAS Center documents which establish record requirement or provide record preparation guidance (e.g., POD, SSDM, SSDM S&P)
ISO-9001 REFERENCE - paragraph number within section 4 of ISO-9001 standard which requires record or forms basis of SEAS Center requirement for record

(date list approved

USAID PRIME Program Quality Records List

(Project ID: _____ Manager: _____)

Record Description/ Title	Project Reference	ISO-9001 Reference	Record "Owner"	Media	Storage Location	Index Method	Accessible By	Retention Period	Disposal Method

Quality Records List Field Definitions

RECORD DESCRIPTION/TITLE - specific description of record within organizational element responsible for storing/maintaining/controlling it

DOCUMENT REFERENCE – identification of SSDM, program or project process or procedure for which performance produces record

ISO-9001 REFERENCE – paragraph number within section 4 of ISO-9001 standard that contains requirement for record [e.g., 4.4.7, 4.6.2 c)]

"OWNER" – manager/leader within project who "owns" process that generates record and/or has responsibility for maintaining/storing the record and controlling access to it (use functional title vice name of person)

MEDIA – form of record: paper or electronic (if electronic, may identify record format or application program which produces record)

STORAGE LOCATION – specific location of all occurrences of record in sufficient detail to enable immediate access (e.g., hardcopy - building/room/file cabinet, electronic - database ID if accessible project-wide)

INDEX METHOD – basis for filing each occurrence of record within above storage location (e.g., date, chronological, alphabetic, system name, release ID, version #, or combination of such)

ACCESSIBLE BY – identification of group(s) or individuals who can access records (use functional titles/references rather than personal names)

RETENTION PERIOD – calendar or time period (e.g., number of months/years, end of next CSC or government fiscal year, or project completion) for which records are retained in above storage location

DISPOSAL METHOD – disposition of records following retention period (e.g., trash, controlled destruction, file deletion, return to customer, etc.)

Appendix C - Lotus Notes Databases

Database Titles	Contents
USAID PRIME Document Library (Program standards, policies, procedures, and related controlled documents)	*Program plans:* Quality Management System (QMS) Implementation document, CM Plan, Process Improvement Plan, Quality Assurance (QA) Plan *Program:* Program Office Directives (POD)s, S/Ps & Forms, Handbooks, Guidebooks, Master Document List (MDL), Quality Records List (QRL) *SEAS Center* (Document links to SEAS Core Processes): PODs, Methodology (SEAS System Development Methodology [SSDM]), S&Ps and Forms, SSDM Guidebook, Handbooks & Guidebooks
USAID PRIME MIST Database (TAC SOWs, plans, and status; Program reviews)	*TAC:* Statements of Work (SOWs)/Mods Project Management Plans (PMPs) (& supporting documentation such as WOAs) Status (i.e., Quick-Cost reports) Tools & user guides (PMP, Project Progress Assessment Form [PPAF]) *Program:* Configuration Management Board (CCB) Meeting Minutes (see SOW section of TAC 98-00), Senior Management Review (SMR) Meeting Minutes (see Project Status section of TAC 98-01)
USAID PRIME PEO Database (Process-related reference documents [not CCB- controlled], briefings, and general information)	Process Deployment Meeting presentations Industry Benchmarks (ISO and Software Engineering Institute (SEI) Software (SW) Capability Maturity Model [CMM] 1.1 & related SEI documents)
USAID PRIME Measurement System	Data Collection forms, status, and analysis Tools (Progress Tracking Trend Chart Tool [PTTC], SLIM, SSMS automated support & code counting tools) Help information
USAID PRIME CPAS	Corrective Action Requests (CARs) (Action-item processing for Program and TAC corrective and preventive actions)
USAID PRIME QA General Info DB	Audit Information: Forms, guidance, TAC information, schedule, reports TAC: Development Approach reports Tool documentation (SEAS Center QAO Activity Schedule System Tool [ACT], SEAS Center QAO Process Assurance Cycle [PAC] Tool)
CMO General Info Database	Program baseline documents CM overview presentations CM tool selection information
CRB Action Items and Meetings	Program CRB actions and meeting minutes
Tech. Intchg. Action Items and Meetings	Program Technical Interchange meeting generated actions and meeting minutes
USAID PRIME Training DB	Training plans and schedules Presentations (Document links to some presentations) Individual records (Document links to other training databases) Training program status information (attendance, analysis, and evaluation) Training Committee meeting minutes
USAID PRIME Local S&Ps DB	TAC: S&Ps (TAC-specific)
<TAC Identifier> General Info Database	TAC: MDL TAC: QRL
<TAC Identifier> Action Items & Meetings DB	TAC-specific action items and meeting records

Appendix D. Minimum S&P and Quality Records Lists

"Minimum" SSDM & USAID PRIME Program Standards and Procedures for USAID PRIME TACs (11/17/99)

(TAC-specific S&P may be substituted if intent of SSDM/USAID PRIME Program S&P met)

SSDM S1101 - Software Data Collection*
SSDM P1102 - Software Development Estimation*
SSDM S1106 - Software Data Tracking*
SSDM P1110 - Risk Management
SSDM S1300 - Formal Reviews**
SSDM P1401 - Physical Configuration Audit*
SSDM P1402 - Functional Configuration Audit*
SSDM P1501 - Inspection and Certification of Software Products*
SSDM P1502 - Document Management
SSDM S1503 - Software Transfer Package*
SSDM S1507 - Document Changes and Revisions
SSDM P1510 - Process Assurance Cycle
SSDM S1601 - Configuration Item Identification**
SSDM S1602 - Configuration Review Boards
SSDM P1605 - System Problem Reporting
SSDM P1606 - Program Library Maintenance*
SSDM P1610 - Control of Customer-Supplied Software Products**
SSDM P1617 - Defect Causal Analysis
SSDM S2101 - Traceability Matrices**
SSDM S4201 - Software Engineering Notebooks*
SSDM S4202 - Unit Prologs*
SSDM S4301 - Language-Independent Coding*
SSDM S4403 - Software Module Testing*
SSDM P5101 - Test Certification**
SSDM P5102 - Performance Testing*
SSDM DID6102 - System Development History**
SSDM DID6107 - Configuration Management Plan*
SSDM DID6504 - Acceptance Criteria Specification*
SSDM DID6510 - System Test Report**
SSDM DID6512 - System Integration and Test Plan**
SSDM S9002 - Content of SSDM Standards and Procedures
SSDM P9005 - SEAS Center Documents Change Requests

CMO-1601-01 - Configuration Item Identification Schema*
PEO-1701 - Measurement Data Identification
PEO-1702 - Measurement Data Collection and Analysis
PMO-1121 - Corrective and Preventive Action Tracking
PMO-1502 - Document Style Guidelines
PMO-1504 - Product Release Approval
PMO-1603 - Deviation/Waiver Requests
PMO-9002-01 - Numbering Project Standards, Procedures, Process Instructions, and Work Instructions
PMO-9005 - Changing USAID PRIME Program Documents

Projects also need procedures for all other processes used to perform required work activities, including

- quality record control/processing
- design/coding/testing**
- management/control of project documents (internal & external)
- configuration management/control
- control of test equipment**

* - applicable to projects that develop/maintain systems/software
** - applicable to projects that develop/maintain/use hardware and/or software

"Minimum" Quality Records for USAID PRIME Projects (1/14/99)

1. Action item databases/logs/status reports (including audit findings resolution)
2. CM reports/logs*
3. CRB (and/or selected staff) meeting minutes (including attendees, action items)
4. Design review materials, attendance list, action items, meeting minutes
5. Document review records/"sign-off" forms
6. Improvement initiative reports
7. Inspection and certification records** (unit design, test)
8. Test/certification records**
9. Lost/damaged/unsuitable customer-supplied products
10. Master documents list
11. Quality records list
12. PAC process approach or list identifying project processes, standards, procedures to be followed by project team
13. Internal audit reports/findings
14. Completed change/discrepancy/problem reports (e.g., CRs, DRs, PRs) for project-controlled products (software, hardware, documents)
15. Problem analysis reports (DCA)
16. Product delivery/transfer letters/memos/forms/records
17. Product release records
18. Project/local S&Ps (including changes)
19. Training records
20. Calibration/test records for test tools/"simulators" used by project

Projects also need to identify and maintain—as quality records—any other records related to project work processes that evidence (1) fulfillment of quality requirements, or (2) effectiveness of quality management system; i.e., organizational structure, processes, procedures and resources (including personnel) needed to implement quality management)

* - applicable only to projects that develop/maintain systems/software
** - applicable only to projects that develop/maintain/use hardware and/or software

Appendix E. POD Requirements for Projects

SEAS Center POD Requirements for USAID PRIME Projects (10/20/99)

POD #	POD Title	Summary Impact of POD on Each Project
01	Use of SEAS Program Office Directives (PODs)	Comply with all PODs; obtain Program Manager approval of any deviations/waivers
02	Performance Measurement Methodology	Apply identified performance measurement concepts to establish baseline staffing and spending plan; assess/report status against plan monthly; define corrective actions as needed
03	Performance Measurement Tools	Use PMS Tool and MIST to plan, monitor, and control all project work
04	Work Authorization, WBS, Time Charges	Plan project work using generic WBS; issue WOAs to, and ensure use by, all personnel charging to project
05	Planning Reviews	Prepare baseline plan addressing/containing specified items (including Project Management Plan) and obtain formal review and approval by senior management
06	Baseline Plan Changes	Document all changes to project baseline plans (operating plans, revisions, amendments, modifications, re-plans) and, as specified, obtain senior management approval
07	Project Management Plans	Prepare PMP using MIST template; obtain senior management approval of PMP and submit to customer; update PMP annually and as required for changes in requirements and/or processes
08	Project Cost Estimates	Provide described inputs to PCO for preparation of cost estimates; present completed cost estimate to customer
12	Earned Value Measurement Criteria	Use most appropriate of available earned-value methods to plan each work package
13	Monthly Status Assessments	Review project progress monthly based on update of PMS-based plan; prepare/provide specified materials for, and participate in, monthly status reviews, including identification/analysis of any significant variances and development of corrective action plan(s)
14	Use of SSDM	Identify and use appropriate set of documented engineering, development, operations, and/or maintenance procedures for project performance (tailored from SSDM—or other source—or developed by project but fully compliant with PODs, CMM, and ISO-9001 and approved by senior management); ensure set available to and known by all project personnel
20	Senior Mgmt. Reviews	Prepare for, and participate in, reviews conducted by senior management
21	Managing Tasks with Subcontracted Work	Assign subcontractor work using STOs in MIST; monitor subcontractor performance and interface between subcontractor and customer; inform senior management of any significant problems and recommend appropriate corrective action; document periodic review of subcontractor performance
24	Transition of SEAS Center Products	Establish applicable inspection and test requirements and procedures covering all product transitions (internal or external); ensure independent reviewers ("peers") apply these to verify necessary conditions/criteria met; specifically authorize product release prior to transfer; and maintain transition records as specified
27	Quality Assurance	Ensure stated SEAS Center quality objectives met
30	Property Mgmt.	Comply with direction from SEAS Center Property Management Office
36	Training Program	Define training needs in project plans and, as needed, in individual training plans; staff program Training Committee; help ensure training goals are met
37	Property Acquisition	Comply with all specified guidance
38	SEAS Measurement Program	Define, collect, archive, analyze, and report metrics consistent with PRIME Quality Management System (QMS) Implementation document and as appropriate to meet goals of PRIME Process Improvement Plan
39	CM and CCBs	Provide for project CM and obtain senior management approval of project approach to CM which must define responsibilities for CM activities and identify products to be controlled, methods to control changes, and means to inform affected personnel of product status
40	Corrective and Preventive Action	Track to closure (1) customer complaints, (2) findings of internal/external quality audits, (3) actions from senior management reviews, (4) major product /service non-conformities, and (5) other issues identified by project manager; define, approve, and implement corrective action for schedule or budget variances that exceed predefined thresholds
41	Master Document List	Establish project master document list (MDL) that includes all documents which define work requirements and processes and which impact ability to meet customer needs; ensure MDL is complete, accurate, and controlled; notify project members of MDL and all changes
42	Quality Records	Establish project Quality Records List (QRL) that includes all records which evidence that key processes impacting product quality have been completed), define mechanism to control/process such records, and ensure records readily accessible by and known to project personnel

SEAS Center POD Requirements for USAID PRIME Projects (10/20/99) (continued)

43	Document Control	Identify documents controlled at project level and establish mechanism to control and access them; ensure (1) controlled documents undergo peer reviews and are approved, (2) proposed changes to controlled documents are reviewed and approved, (3) project personnel know how to access latest approved version of each document, including applicable externally generated documents, and (4) project personnel are notified when updates are available
44	Technology Management	Participate in technology management process in accordance with defined implementation approach

PRIME Program POD Requirements for USAID PRIME Projects (10/20/99)

POD #	POD Title	Summary Impact of POD on Each Project
14	Use of Processes	Use appropriate set of documented engineering, development, operations, and/or maintenance procedures for project performance; ensure set complies with (1) SEAS Center and PRIME Program PODs, (2) ISO-9001 and, as applicable, SE-CMM and/or SA-CMM, and (3) CSC CIV policies and directives; ensure set addresses all "core processes;" ensure set is controlled and is known by all project personnel

Appendix F. Industry Benchmarks – CMM KPAs & ISO Elements

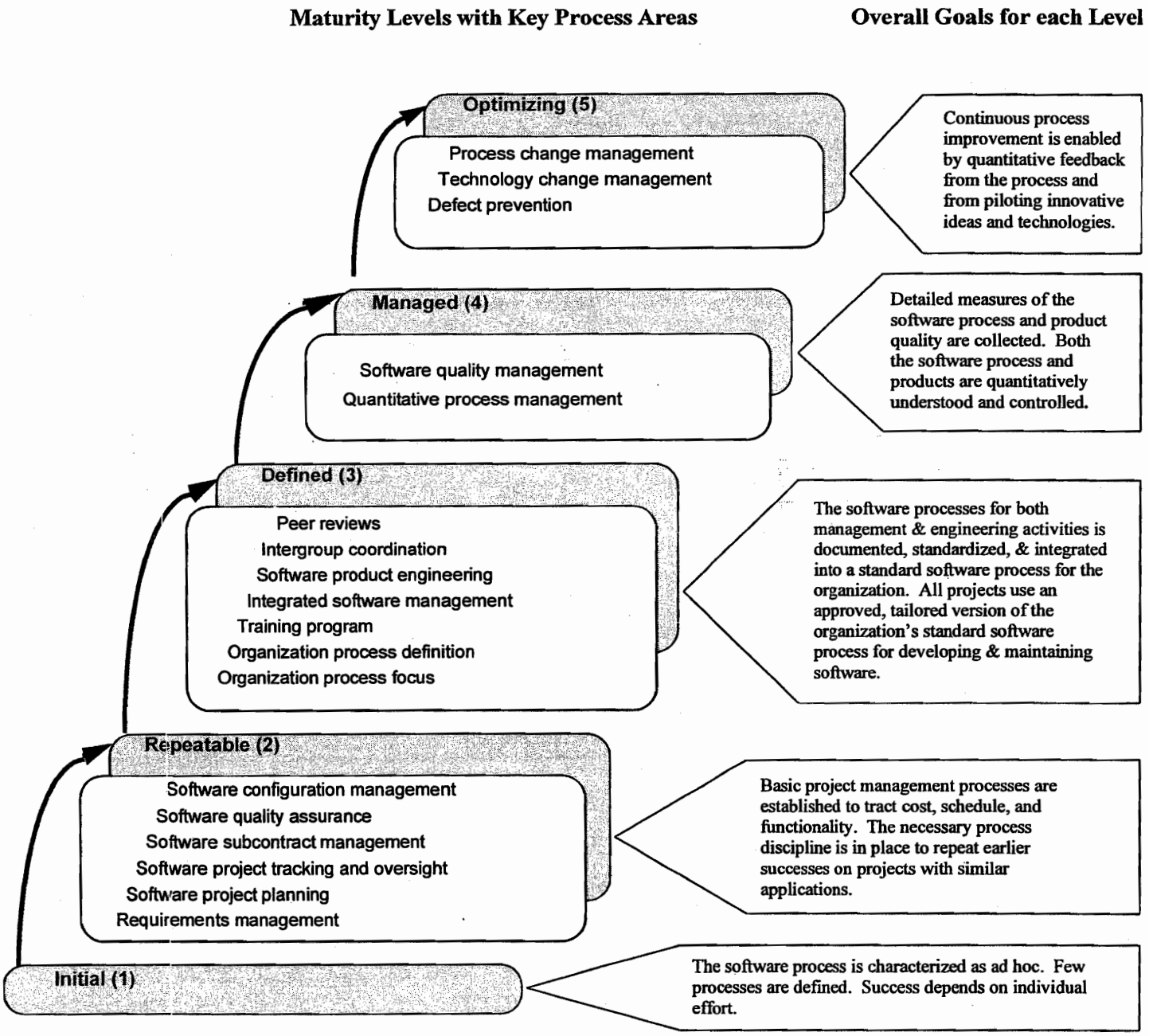
Software Acquisition Capability Maturity Model (SA-CMM)

The Software Acquisition Capability Maturity Model, SA-CMM, is used to benchmark and improve the software acquisition process. The model contains five maturity levels, each of which indicates an acquistion process capability and has several Key Process Areas. The Key Process Areas contain organizational (e.g., the USAID PRIME Program) goals and organizational practices compliance with which will demonstrate satisfaction of the those goals. Compliance across the Key Process Areas of a level signifies compliance at that level. The levels, the focus of each level, and the associated Key Process Areas are listed in the following table.

Level	Focus	Key Process Areas
5 - Optimizing	Continuous process improvement	• Acquisition Innovation Management • Continuous Process Improvement
4 - Quantitative	Quantitative management	• Quantitative Acquisition Management • Quantitative Process Management
3 - Defined	Process standardization	• Training Program • Acquisition Risk Management Contract Performance Management • Project Performance Management • Process Definition and Maintenance
2 - Repeatable	Basic project management	• Transition To Support • Evaluation • Contract Tracking and Oversight • Project Management • Requirements Development and Maintenance • Solicitation • Software Acquisition Planning
1 - Initial	Competent people and heroics	-

Capability Maturity Model for Software (SW-CMM)

The Capability Maturity Model for Software, SW-CMM, is used to judge the maturity of software processes of an organization and to identify the key practices needed to improve the maturity of these processes. The SW-CMM preceded the SA-CMM; both use the same basic architecture. The following graphic lists the five maturity levels, the associated key process areas, and the overall goals of each level.



ISO-9001

The core of the ISO-9001 Quality Standard lies in its 20 "elements," which constitute the requirements against which a program is judged for ISO compliance. The following table lists the elements, defines the key points of each element, and indicates the USAID PRIME Program activities and actions that we do to produce our contractual products and services for USAID and that also demonstrate satisfaction of each element.

ISO Elements	Key Element Points	Program Activities and Actions
4.1 Management Responsibility	1. Allocate resources 2. Establish Quality Policy 3. Review Quality Management System (QMS) 4. Define responsibility and authority for quality	1. Assign resources (labor and materials) 2. Produce, maintain, and publicize a Quality Policy 3. Conduct regular review of QMS 4. Define responsibilities in QMS Manual
4.2 Quality System	1. Document policies, procedures, processes (and work instructions) 2. Implement all elements of ISO 3. Produce a Quality Manual 4. Produce a Quality Plan	1. Update PODs & S&Ps 1.1 SSDM, Handbooks, in place 1.2 Work instructions in SSDM and S&P 1.3 Write procedures for all organizational element 2. Appoint Implementation Team and Assessment Planning Team to carry out all ISO requirements 3. Produce, deploy, and maintain a QMS Manual 4. Implement the USAID PRIME Process Improvement Plan 4.1 Ensure each project has quality and improvement goals in the Project Management Plan (PMP) -- POD 7
4.3 Contract Review	1. Have documented procedures for reviewing all contracts 2. Identify how changes are Processed 3. Ensure capability to meet contract requirements	1. Establish requirements for contract review POD 4 and QMS Manual (2.1.4) 1.1 Contracts = TACs 2. Define the change process in POD 6 3. Require contract review records as PRIME quality records--POD 20
4.4 Design Control	1. Identify work processes for entire project life cycle 2. Call out designs with schedules in project plan 3. Plan and conduct design reviews	1. Use SSDM (or other approved methodology) for full life cycle 2. Define schedules, review process, and processes to be used in PMP 3. Generate and retain design review records
4.5 Document and Data Control	1. Place all key documents and data under CM (approval procedure, change procedure, records) 2. Generate a master list of all controlled documents 3. Discard or properly mark all outdated or obsolete documents	1. Place controlled documents (from master documents list) under documented CM 2. Require projects to have master document lists 3. Discard or mark obsolete versions of documents that appear on master documents lists
4.6 Purchasing	1. Document procedures for purchasing 2. Have list of acceptable subcontractors 3. Define controls over subcontractors	1. Document the PRIME purchasing process and procedures -- POD 37 2. Maintain list of acceptable subcontractors--POD 21 3. Prepare and maintain *Subcontractor Policy Handbook*

ISO Requirement	Key ISO Points	PRIME Activities and Actions
4.7 Control of Customer-Supplied Product	1. Have procedures for control of products provided by customer 2. Have records of all products that were damaged, lost, stolen, defective	1. Define how products from USAID are controlled 2. Maintain a list of USAID-supplied items and any associated problems
4.8 Product Identification and Traceability	1. Document procedures for identifying and tracking each product (reports, systems) as it evolves 2. Have records of each product identification	1. Ensure each product version is uniquely identified 2. Apply SSDM Standard 2101 or equivalent
4.9 Process Control	1. Document all key processes (e.g., test, design, CM) 2. Identify all processes that may be used 3. Ensure that everyone has immediate access to needed procedures	1. Include list of processes and procedures in the master documents list 2. Identify procedures to be used in PMP and PAC
4.10 Inspection and Testing	1. Document procedures for testing products 2. Describe tests 3. Require incoming, in-process, completion inspections and/ or tests 4. Keep records that state whether products passed or failed tests	1. Have written test procedures 2. Identify the tests with schedules in PMP or test plan 3. Must have a written procedure for inspecting final deliverables 4. Keep test and inspection records by project
4.11 Control of Inspection, Measuring, and Test Equipment	1. Document procedures for control of test equipment (e.g., test software) 2. Ensure test equipment is tested/recalibrated	1. Use controlled processes for developing test software (including simulators) 2. .Develop and maintain test software with the same process (SSDM) as other software
4.12 Inspection and Test Status	1. Maintain product inspection and test status throughout development, installation, and servicing	1. Have records of inspections and of all intermediate and final tests that show which products or components passed, and which are defective
4.13 Control of Non-Conforming Product	1. Document procedure for ensuring that defective products are not used 2. Identify authority for reviewing and resolving nonconformances 3. Record all nonconformances	1. Use SSDM Procedure 1605 2. Identify project authority for reviewing and resolving nonconformances 3. Keep written list of nonconforming products
4.14 Corrective and Preventive Action	1. Have procedure for fixing problems 2. Have procedure for handling customer complaint 3. Have procedures for adjusting processes based on resolution of problems	1. Use SSDM Procedure 1121 (Problems include customer complaints, internal and external audit findings, and product non-conformities) 2. Establish PRIME procedure 3. Maintain lists of problems and track status through closure
4.15 Handling, Storage, Packaging, Preservation and Delivery	1. Establish documented procedure for handling, storage 2. Arrange for protection of quality throughout delivery process	1. Have procedures for preparing every deliverable product (Use SSDM 15xx series) 2. Ensure delivery of appropriate version of product in delivery process (SSDM calls out steps)
4.16 Control of Quality Records	1. Identify quality records 2. Have procedures for handling and processing quality records	1. Define quality records in master lists of quality records and ensure compliance with POD 42 See p. 20 of this HB 2. Follow the *QMS Manual* guidance

ISO Requirement	Key ISO Points	PRIME Activities and Actions
4.17 Internal Quality Audits	1. Document audit procedures 2. Schedule and conduct internal audits 3. Record audit results	1. Conduct audits using SSDM Procedure 1407 2. Produce audit plan and schedules 3. Produce audit reports
4.18 Training	1. Document procedures for identifying training needs 2. Provide appropriate training 3. Maintain training records	1. Use procedures in the *Training Program Handbook* 2. Define project training strategy in PMP 3. Maintain personnel training records on CSC Lotus Notes database
4.19 Servicing	1. Document maintenance procedures	1. USAID PRIME servicing = S/W Maintenance
4.20 Statistical Techniques	1. Document procedures for performing appropriate statistical techniques	1. The USAID PRIME has measurement program and improvement activity--POD 38 2. Products are sampled for quality (eg desktop systems checked using sampling techniques)

Appendix G. Suggested Small TAC Technical Manual Format

Section 1. Small applications development & maintenance. Describe this topic by covering the content of a bare-bones SW Engineering Notebook (SEN), which will be required for selected applications. Include:

- Requirements documentation: Require that the developer list the requirements of the application

- Inspection: Include an inspection signoff (could be e-mail) on the code. For the signoff, indicate the day, the application, the inspector, and the inspector's approval. For the inspection, use one inspector who uses simple code reading.

- Testing: Document as sparsely as possible test cases and data to use to check that the application satisfies the requirements. Evaluate the documentation by determining if another programmer could recreate the tests from it. Use a simple test results format (could be e-mail) that the tester uses to summarize the results and indicate test completion.

Section 2. Small applications CM. Cover the four functions of CM:

- Configuration Identification: Require the creation of a TAC applications baseline - a matrix that indicates for each TAC application: its name, version, language(s), location(s) (e.g., someone's PC), supporting documentation (if any), and who/how changes it. Introduce a simple TAC application naming and version identifying (could be calendar date) convention.

- Change control. Indicate who controls what and how changes are to be introduced into the TAC baselines. As the customer changes requirements, very briefly record the changes for each version in the Requirements documentation of the application SEN.

  State how you plan to baseline the Technical Manual itself and update it: Indicate that you will distribute it to the TAC members, incorporate comments received, and then approve it during a usual staff meeting with the TAC members. For the part of the staff meeting associated with the Technical Manual as well as the other TAC S&Ps, the meeting becomes a meeting of the TAC Configuration Review Board (CRB). Indicate that all TAC members are on the TAC's Configuration Review Board, which is chaired by the TAC Manager.

- Configuration audit: Indicate that as part of deliveries of selected applications, you will check that the testing has been successfully completed (a simplistic Functional Configuration Audit) and that all the parts are there (a simplistic Physical Configuration Audit).

- Configuration status accounting: Indicate that you will provide the TAC applications baseline to the customer and will update it as the baseline changes.

Appendix H – SEAS Center

The SEAS Center consists of the USAID PRIME Program along with the NASA Space and Earth Technology Systems [SETS] Program and the U.S. Immigration and Naturalization Service [INS] STARS Program. These programs share a common process baseline that includes policies, methodology and standards/procedures. SEAS Center policies are defined in Program Office Directives (PODs); the reference methodology is the SEAS System Development Methodology (SSDM); the reference standards/procedures are the SSDM S&Ps. Together, these make up the SEAS Center Quality Management System (QMS) documentation.

The SEAS Center QMS does not fully address all USAID PRIME Program work. Certain PRIME-specific policies and processes have been written to supplement the SEAS Center QMS processes, approved by the PRIME Configuration Control Board (CCB), and posted in the USAID PRIME Document Library database. Likewise, the defined SEAS Center and PRIME processes may not fully address all work being done by a TAC. Accordingly, TAC Managers may adjust PRIME's reference processes to address their specific needs, while ensuring the TAC processes are still compliant with all applicable elements of the QMS.

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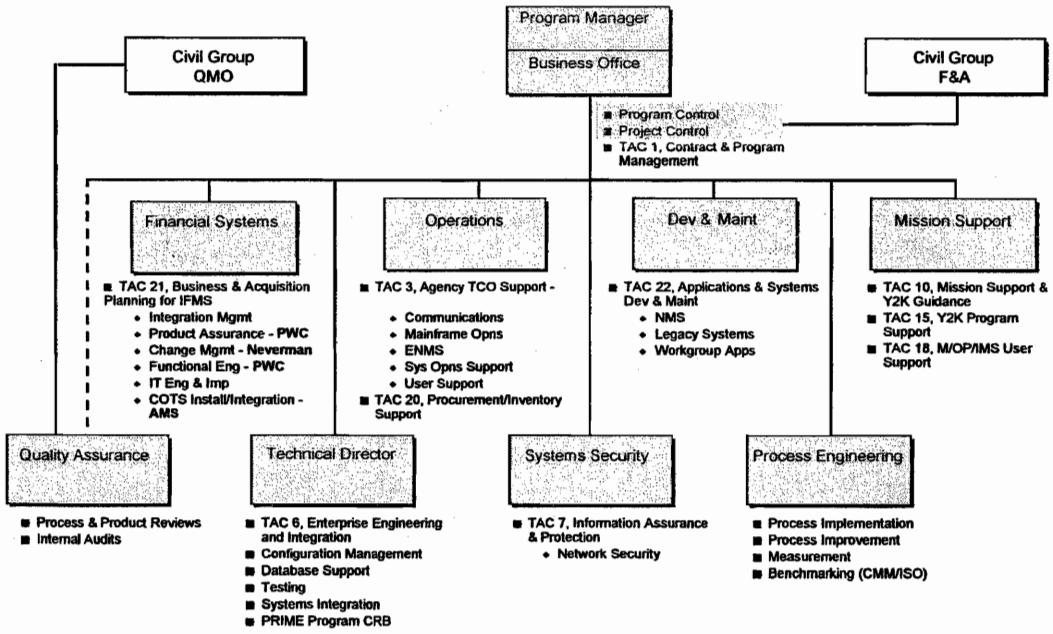
Appendix I. USAID PRIME Program Management Structure

The USAID PRIME Program uses the management structure depicted in the following drawing and described in the subsequent text.

USAID PRIME Program Organization



The Program management structure components are:

- The **Program Manager (PM)**, who has overall management authority regarding the entire Program.

- The **Program Management Office (PMO)** (not explicitly depicted), which is headed by the Deputy PM, who manages the business aspects of the Program. The PMO consists of the Business Office, the QAO, and the PEO.

- The **Business Office**, which encompasses three groups:

    - The **Project Control Office (PCO)** has overall responsibility for contract review processes. The PCO document the TAC Manager's PMP and budget for each TAC and measures and reports on progress throughout the project's lifetime.

    - The **Program Control Office** provides Program management with financial information necessary to monitor and control contract financial data.

    - The **Subcontract Technical Management Office** function (not explicitly depicted but headed by the Business Manager, the manager of the Business Office) works with subcontract task monitors who select and monitor the performance of all subcontractors on the USAID PRIME Program.

- The **Quality Assurance Office (QAO),** which is an independent organization that reports directly to the CSC Civil Group Quality Management Office. The QAO provides quality assurance support to the Program and helps TAC managers meet the quality expectations of their customers in the products and services they provide. The Director of the QAO assigns QAO staff members to support each TAC, including any software or software services acquisition.

- The **Process Engineering Office (PEO),** which is responsible for promulgating Program processes, for carrying out the process improvement program, and managing Program measurement activities.

- **Task Assignment and Controls (TACs),** which are Program projects. A TAC is assigned to one of the line elements of the Program organization as pictured. For each TAC, the PM appoints a manager to manage its planning and execution TAC organizations perform the TAC's planning, resource control, service quality control, engineering development, maintenance, and operations activities.

- **Technical Director.** In addition to managing the Enterprise Engineering and Integration TAC, the Technical Director provides overall technical guidance across the Program and manages the cross-Program technical functions of Configuration Management, Database Support, Testing, and Systems Integration.