

Goddard Unified Enterprise Services and Technology (GUEST)

Software Engineering Management Plan

NASA Contract Number: NNG10FE01C



NASA GUEST

File Name: *PLAN_SEMP*

Document Owner: *Application Development Group*

Be advised: Adherence to all current versions of contract policies, plans, procedures, and processes is mandatory and the responsibility of all GUEST Staff.

Software Engineering Management Plan

Rev/Change Summary

Revision	Date	Change Summary	Approval
Baseline	02/06/2012	Initial release	Manager, App Dev
1.0	06/20/2012	Added Section 6.3.1 and 6.3.2, LOE and cost estimation process; Section 3.0 SDLC Models, and Section 3.10 Sustaining Engineering; Section 4.9 Training; Appendices A, B, and C for Demand Management; numerous minor changes	Manager, App Dev
2.0	11/18/2013	Updated Section 3.10 to include Emergency Release procedures. Added a new section, Change Management Plan. Updated Appendix A and changed Appendix B through D for Change Request Process Flow.	Manager, App Dev
3.0	1/09/2014	All sections updated to align with ISO standard; removed references to TO-specific SEMP, aligned with current procedures. Merged TO specific SEMP language into document	CCB
4.0	8/25/14	Additional updates throughout to align with Code 750 SOP; formatting.	CCB

1. Background/Purpose:

ASRC Primus provides support to the Goddard Unified Enterprise Solutions and Technology (GUEST) Enterprise Solutions Division (ESD), Code 750. The ESD provides business information services to GSFC scientists, engineers, and administrative personnel.

This Software Engineering Management Plan (SEMP) provides procedural guidance used in the development and maintenance of software for the Goddard Unified Enterprise Solutions and Technology (GUEST) contract, in support of the Information Technology and Communications Directorate (ITCD). It defines our methodology to plan, develop, and maintain software applications to meet customer needs, in compliance with industry standards and Agency requirements, rules and regulations.

2. Scope:

The GUEST contract provides sustaining engineering support of approximately 115 business applications at GSFC. This document and procedures herein apply to all GUEST personnel involved in

the development and maintenance of these applications throughout the life of the contract or until replaced.

3. Definitions:

Acronym	Meaning
AD Group	Refers to Applications Development Task Orders
BCAR	Business Case Analysis Report
BRD	Business Requirements Document
CCR	Configuration Change Request
CM	Configuration Management
COTR	Contracting Officer's Technical Representative
COTS	Commercial Off The Shelf
DBA	Data Base Administrator
DSR	Directorate Status Report
ESD	Enterprise Solutions Division
GSFC	Goddard Space Flight Center
IDA	Interface Definition Agreement
ITCD	Information Technology Communications Directorate
LOE	Level Of Effort
ODC	Other Direct Cost
PAL	Process Access Library
PDL	Project Document Library
PIC	Process Improvement Collaboration
PMP	Project Management Plan
PP	Project Planning
PTO	Project Tracking and Oversight
PTP	Project/Task Plan
QA	Quality Assurance
RM	Requirements Management
RQD	Requirements Document
RTM	Requirements Traceability Matrix
SA	System Administrator
SCM	Software Configuration Management
SDD	System Design Document
SEMP	Software Engineering Management Plan
SLA	Service Level Agreement
SOW	Statement Of Work
SQA	Software Quality Assurance
SRS	System Requirements Specification
STP	Software Test Plan
UAT	User Acceptance Testing
VM	Version Management Tool

Acronym	Meaning
WBS	Work Breakdown Schedule

4. Assumptions, Constraints, and Risks

4.1. Assumptions and Constraints identify the suppositions upon which work is planned, and significant restrictions that are considered when planning work. In Application Development, there are five major constraints or considerations:

- **Budget:** The Application Development Group budgets are determined by ITCD/GSFC. The relation of cost to expected software work is not necessarily balanced. This constraint is mitigated by continually adjusting the workload (as needed) throughout the year, according to available resources and priorities driven by the customer and/or work requirements.
- **Skills:** Applications were built using a wide array of platforms and programming technologies, and supporting these technologies requires specific skill sets. The Applications Development budget does not necessary support the development of these skills.
- **Incident Review:** There is no limit on the number of incidents that can be reported against existing systems. Management of incidents is recorded and handled through Remedy. Monthly government reviews will be held to review and prioritize the list of incidents to ensure that future staffing will be adequate to complete all sustaining engineering requests.
- **Resources:** Availability of resources including staff will be reviewed at weekly government meetings to prioritize change requests within funding constraints.
- **Stakeholder Involvement:** ESD staff is integral to the completion of software projects on the GUEST contract. They are the primary points of contact with the customer and their timely interaction (to address questions and user acceptance testing) is essential to project success.

4.2. Risk Management: Risk analysis, mitigation and reporting is performed in accordance with the [GUEST Risk Management Plan](#).

5. Development/Maintenance Life Cycle

The GUEST **Software Development Life Cycle (SDLC)** approach is an integrated series of steps or processes that provide a model for the development and management of software; and is a means to create and/or maintain high quality, cost-efficient, and effective products. The Application Development Group uses one of three SDLC models in the delivery of services, selected according to customer requirements, timeframe, and other relevant considerations. Each model is described in phases and activities that in general, apply to all SDLC models with variation:

5.1. Waterfall SDLC Model (Figure 1): Frequently used for new projects developed to automate an existing manual process, or for minor enhancements of an application. Phases of the Waterfall model - requirements analysis, project planning, system design, detailed design, coding and unit testing, system integration and testing – do not overlap and are organized in linear order. Linear ordering of activities has some important consequences. First, to clearly identify the end of a phase and beginning of the others, some certification mechanism has to be employed at the end of each phase. The GUEST Application Development Group typically uses milestone reviews as described in NASA Procedural Requirement (NPR) 7120.7, NASA Information Technology and

Institutional Infrastructure Program and Project Management Requirements, such as the Test Readiness Review and Operational Readiness Review.

5.2. Prototyping SDLC Model (Figure 2): The goal of prototyping based development is to counter some of the limitations of the Waterfall Model discussed earlier. Instead of freezing the requirements before design or coding can proceed, a throwaway prototype is built to understand the requirements. This prototype is developed based on the currently known requirements. Development of the prototype undergoes design, coding and testing, but each of these phases is not done formally or thoroughly. By using this prototype, the client can get an "actual feel" of the system, since the interactions with prototype can enable the client to better understand the requirements of the desired system.

Prototyping is an attractive idea for complicated and large systems for which there is no manual process or existing system to help determining the requirements. In such situations letting the client "plan" with the prototype provides invaluable and intangible inputs which helps in determining the requirements for the system. It is also an effective method to demonstrate the feasibility of a certain approach. This might be needed for novel systems where it is not clear what constraints can be met or that algorithms can be developed to implement the requirements.

Prototyping is less commonly used due to the cost involved in this build-it-twice approach. However, there are benefits to prototyping that may reduce the overall development cost. Prototypes are usually not complete systems and many of the details are not built in the prototype. The goal is to provide a system with overall functionality. In addition, the cost of testing and writing detailed documents are reduced. An additional benefit to using this model is the experience of developing the prototype which can result in a more reliable and better designed system.

This model is frequently used for projects when there is no manual process or existing system to help determine requirements or when the users aren't sure of their detailed requirements.

5.3. Iterative/Incremental SDLC Model (Figure 3): The Iterative/Incremental SDLC Model combines the benefits of the Waterfall and Prototyping Models. At each increment of the development, functional capabilities to the system are added until the full system is implemented; and extensions and design modifications may be made. Possible benefits to this model include improved testing, and incremental customer feedback which can be useful in determining final requirements of the system. When using this model, multiple iterations are conducted, and phases are repeated and may overlap over the course of the project. Most of the requirements are gathered at the onset of a project, but subsequent iterations may include the addition of requirements and validation of existing requirements. The same modules may be changed in multiple iterations.

This SDLC may be used when there are several enhancements or modifications to be made to the same set of modules, but the customer prefers delivery of some additions/changes without having to wait for all the work to be completed. This model is frequently used for complicated and large projects when the phase implementation is acceptable to the customer.

Agile Software Development is incorporated into this SDLC as appropriate. Joint Application Design (JAD) sessions may be used to expedite requirements gathering when needed.

Figure 1 – Waterfall SDLC Model



Figure 2 – Prototyping SDLC Model

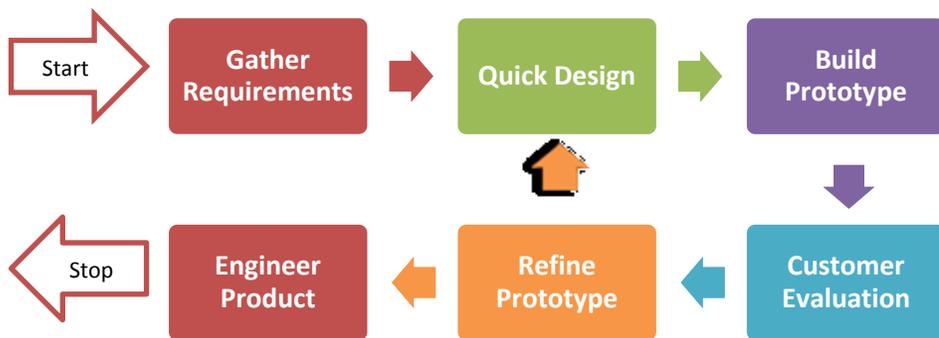
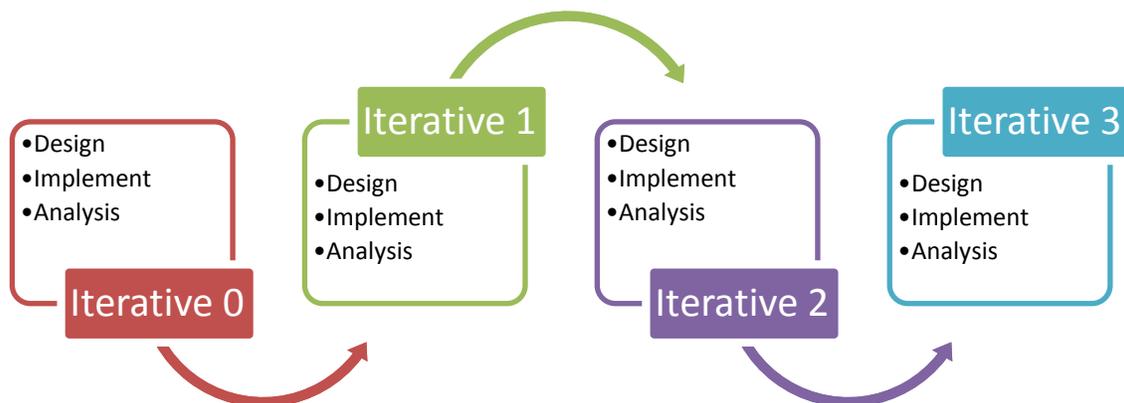


Figure 3 – Iterative/Incremental SDLC Model



6. SDLC Activities

This section defines activities involved in accomplishing Application Development work, as defined in the Statements of Work (SOW) of individual Task Orders. The SOW is converted to specific technical tasks that develop and/or support products. This section also describes the plan for adhering to the work environment as well as infrastructure policies, procedures, and standards as needed.

These activities or phases are not necessarily sequential, and may overlap depending on the SDLC model selected for a development project.

Activity/Phase	Refer to:
Project Planning	Section 6.1
Requirements	Section 6.2
Design	Section 6.3
Development	Section 6.4
Code Review	Section 6.5
Internal Testing	Section 6.6
User Acceptance Testing	Section 6.7
Implementation	Section 6.8
Project Closure	Section 6.9
Sustaining Engineering	Section 6.10

6.1. Project Planning: Defines steps followed to complete preliminary planning of a new application, or a major enhancement of an existing application:

Step	Description of Activity	Responsibility
1	Meet with Government Task Monitor, Business Analyst, and/or customer and users as needed to identify software, clarify requirements in RTM if they exist, and identify other deliverables that must be generated.	Project Manager, Application Development Manager
2	Create Requirements document, Rough Order of Magnitude (ROM) cost estimate, Project/Task Plan, Business Case Analysis Report, and/or schedule, if applicable.	Project Manager, Development Team Lead, Developers
3	Hold Kickoff meeting with all GUEST personnel that will be supporting this development effort when needed. Review the following if available: <ul style="list-style-type: none"> • BRD • Requirements Document (RQD) • Project/Task Plan (PTP) • Business Case Analysis Report (BCAR) • Schedule 	Project Manager

6.2. Requirements Management: Defines steps followed to collect and document system requirements during the requirement analysis phase of the SDLC, according to Section 3.3 Requirements Management of **Code 750 Standard Operating Procedures for Projects, Configuration, and Document/Records Management**.

Steps for changes to the baseline requirements and/or addition of requirements during the SDLC:

Step	Description of Activity	Responsibility
1	Customer will make a request for change and record in Remedy.	Task Monitor, Business Analyst, Project Manager
2	Create estimate of level of effort, schedule impact, and record estimated hours for development work in Remedy.	Project Manager
3	Receive approval from customer and Government Task Monitor through Remedy.	Project Manager
4	Upon approval, Task Order Mod request will be generated if needed. PTP, RQD, and schedule are updated and/or rebaselined per Task Monitor's discretion.	Project Manager

6.3 Design: Defines procedures used to develop design documentation during the design phase of the SDLC:

Step	Description of Activity	Responsibility
1	Review the RTM to identify requirements that must be satisfied by software design.	Project Manager, Developer
2	Determine Design Approach, to include the following when applicable: <ul style="list-style-type: none"> • Data modeling • Screen prototypes • Use cases • Workflow diagrams • Interfaces 	Developer, Database Administrator
3	Determine Security Level	Developer, Project Manager
4	Obtain Approval of design from customer	Developer, Project Manager, Customer
5	Baseline the Design Documentation when needed	Project Manager, Configuration Manager

6.4 Development: Defines steps followed to convert a system and database design into an application (code and unit testing) and physical database during the development phase of the SDLC:

Step	Description of Activity	Responsibility
1	Review the following with all GUEST personnel that are supporting this development effort, if available: <ul style="list-style-type: none"> • RTM • RQD • Design Documentation • Schedule • Task Assignments • Risks 	Project Manager

Step	Description of Activity	Responsibility
2	Create/maintain development environment: <ul style="list-style-type: none"> Database creation changes Code environment CM repository Data source 	Database Administrator, Developer System Administrator
3	Conduct Development. <ul style="list-style-type: none"> Code the application following project coding standards Use CM/VM tool to manage code Perform unit testing (see Procedure 3.4.1) 	Developer
4	Perform Software Integration	Developer

Unit Testing: Defines steps followed to conduct unit testing:

Step	Description of Activity	Responsibility
1	Conduct unit testing for software and database changes in the development. Environment.	Developer
2	Make adjustments to the code as appropriate.	Developer
3	Retest the unit until it successfully completes the unit tests.	Developer
4	Notify the Project Manager and or other team members, as appropriate, that unit testing has been successfully completed.	Developer

6.5 Code Review: Defines steps followed in optional module and program code reviews:

Step	Description of Activity	Responsibility
1	Plan Code Review: <ul style="list-style-type: none"> Identify code review participants. Ensure that relevant documents are available at the code review, for example: <ul style="list-style-type: none"> Applicable code Coding standards Design documentation Provide Code Review Checklist. 	Developers, Manager Developer
2	Conduct Code Review using Code Review Checklist.	Developers, Manager Developer
3	Review and determine which modifications to incorporate.	Lead Developer, Project Manager
4	Incorporate suggested modifications to the code	Developer, Lead Developer, Project Manager
5	Notify the CM Manager that the code is ready for integration testing	Developer, Configuration Manager

6.6 Internal Testing of Software: Defines steps followed to test applications to verify that system requirements are satisfied. Testing encompasses integration system and regression testing:

Step	Description of Activity	Responsibility
1	Develop test scripts or test plan per Task Monitor's direction.	Project Team, Tester

Step	Description of Activity	Responsibility
2	Prepare Team for Testing: <ul style="list-style-type: none"> Determine appropriate user roles for Testers and work with the DBA to assign these roles if needed Assign Testers to each functional module within the system Assign test scripts to each analyst on the Testing Team 	Test Lead
3	Load baseline testing data.	Developer, Test Lead
4	Conduct testing in the test environment using assigned test scripts. <ul style="list-style-type: none"> Document the results of all internal testing. 	Tester
5	Notify Test Lead. <ul style="list-style-type: none"> Notify the Test Lead once the assigned test scripts and Problem Trouble Report have been completed. 	Tester
6	Resolve testing issues	Developers
7	Create test baseline	CM Manager

Developing Test Scripts: Defines steps followed to develop test scripts used as a basis for internal testing:

Step	Description of Activity	Responsibility
1	Review Relevant Documents. <ul style="list-style-type: none"> Review the following documents to use as guidelines for developing the test scripts: <ul style="list-style-type: none"> RQD RTM 	Developer
2	Develop Test Scripts: <ul style="list-style-type: none"> Identify and prepare baseline data needed to begin testing Develop test scripts outlining the steps necessary to test the requirements of the system, and expected results Validate the test scripts with the Developers to ensure correct interpretation of the design specifications. 	Requirements Manager, Developer
3	Review Test Script: <ul style="list-style-type: none"> Review test scripts and provide feedback to the Requirements Manager and Developers Project Manager has final decision making authority on what changes will be incorporated 	Development Lead, Project Manager
4	Incorporate Changes: <ul style="list-style-type: none"> Modify test scripts based on feedback Baseline Test Scripts 	Developer
5	Incorporate all developed test scripts into the Test Plan.	Development Lead, Project Manager

1.1 Security Testing: Defines the steps followed by the customer to perform the security testing on a new application or a new module of an existing application, per Task Monitor's discretion.

Step	Description of Activity	Responsibility
1	Scan source code for a new application or a new module of an existing application.	Developer
2	Fix the security issues identified as "Critical" and "High".	Developer
3	Repeat Step 1 and 2 until all critical and high risk issues are resolved.	Developer
4	Request CSO to do a penetration and vulnerability test.	Developer, Project Manager
5	CSO request ISSO to perform a penetration and vulnerability test.	CSO, ISSO
6	Fix all security issues categorized as "Critical" and "High" in the security report provided by CSO/ISSO.	Developer, Project Manager
7	Notify Government Task Monitor the completion of security fixes.	Project Manager

1.2 User Acceptance Testing (UAT) of Software: Defines the steps followed by the customer to perform UAT of the application. UAT is the basis for obtaining customer acceptance of the work performed on the system:

Step	Description of Activity	Responsibility
1	Prepare for UAT. <ul style="list-style-type: none"> Identify the appropriate users to test and accept the system. Schedule UAT with user representatives from the appropriate user groups Notify the Project Team of the UAT schedule 	Project Manager, Customer
2	Hold Test Readiness Review: <ul style="list-style-type: none"> Provide test plan Discuss testing process 	Project Manager
3	Perform UAT.	Customer/Tester
4	Review and resolve UAT. <ul style="list-style-type: none"> Track results of UAT Determine which issues need to be corrected before acceptance for production Work with the customer to resolve UAT issues 	Project Manager, Customer
5	Receive signed-off or approval on Test Plan from UAT Participants.	Project Manager

1.3 Software Implementation: Defines steps followed to implement system in a production environment:

Step	Description of Activity	Responsibility
1	Create Implementation Plan.	Project Manager
2	Conduct Operational Readiness Review <ul style="list-style-type: none"> Review UAT status. Review Implementation Plan 	Project Manager, System Administrator, DBA
3	Prepare and submit a task for the creation of the production space for the project, if applicable.	Project Manager, Development Lead
4	Follow Implementation Plan procedures on scheduled date of implementation.	Project Team

1.4 Closeout of a Software Development Project: Defines steps followed to close out a software development project.

Step	Description of Activity	Responsibility
1	Obtain confirmation of user implementation acceptance.	Project Manager
2	Conduct and document Lessons Learned meeting when appropriate.	Project Team

1.5 Sustaining Engineering: Sustaining Engineering for the Application Development Group follows the process outlined in Appendix A. Systems which are currently in the sustaining engineering phase of their lifecycle will be reviewed annually to ensure that all milestones have been properly completed. An incident or change request will be managed and implemented as an Emergency Release when the ESD Task Monitor or customer reports an incident or change request as “Emergency” through emails, phone calls, faxes, or Remedy. The following Emergency Procedures will be followed:

Step	Description of Activity	Responsibility
1	Collect and clarify requirements with customer and/or ESD Task Monitor.	Project Manager
2	Assign resources to work on this incident or change request.	Project Manager
3	Conduct Development. <ul style="list-style-type: none"> • Code the application following project coding standards • Use CM/VM tool to manage code • Perform unit testing (see Procedure 3.4.1) 	Developer
4	Notify customer to perform UAT.	Project Manager
5	Perform UAT.	Customer/Tester
6	Receive approval from customer and/or Task Monitor to implement in production.	Project Manager
7	Prepare the release/implementation instructions.	Project Manager, Developer
8	Follow the release/implementation instructions to implement this release on the designated date and time.	Project Team
9	Confirm with customer and ESD Task Monitor on the completion of the emergency release.	Project Manager

7. Management Approach

The GUEST Program Management approach uses a proven organizational structure and a highly skilled management team that focuses on building collaborative customer relationships, and the effective placement and management of a skilled workforce; it combines the principles and techniques of project management and industry best practices. This approach includes:

- Clearly defined responsibilities for the execution of a project
- Multiple and effective lines of communication
- Flexibility to expand and/or reduce contract staffing to support and meet mission
- Full integration of subcontractors

The Application Development Manager is primarily responsible for the day-to-day execution of Application Development work, and:

- Manages and directs the Application Development Group
- Ensures the completion, currency, and adherence to the SEMP
- Provides technical leadership and guidance
- Ensures projects are successfully accomplished in terms of technical, schedule, and cost performance
- Serves as the primary point of contact to Primus for the customer
- Meets with customers as appropriate, to discuss and assess technical or business issues related to Application Development work

Project Managers are responsible for the oversight of assigned application development and/or maintenance tasks, and:

- Assist the Application Development Manager to obtain planned resources
- Assist in resolving technical or management issues that arise
- Participate in Primus project progress reviews
- Escalate potential issues related to project or task planning, scheduling, or budget

7.1. Project Roles and Responsibilities: Responsibilities are assigned to each project and team, and are documented in the Master Schedule. Roles and responsibilities of staff assigned to software development projects:

Role or Team	Responsibilities	Relevant Tool or Instrument	Assigned Personnel
Program Manager	<ul style="list-style-type: none"> • Provide project oversight • Review labor delivery, technical issues, financial performance • Maintain visibility into project performance. • Review selected deliverables • Ensure adequate training is provided. • Empowered to make Project-Level commitments with the customer 	<ul style="list-style-type: none"> • Program reviews • Deliverable reviews • Status meetings 	<ul style="list-style-type: none"> • Shau Tsai
Project Manager	<ul style="list-style-type: none"> • Provide leadership to project team on daily basis. • Identify and allocate resources • Provide project planning and tracking • Review deliverables • Resolve technical issues 	<ul style="list-style-type: none"> • MS Project • Project schedule • Project Documentation 	<ul style="list-style-type: none"> • Mike Parvis • Rob Swartz

Role or Team	Responsibilities	Relevant Tool or Instrument	Assigned Personnel
	<ul style="list-style-type: none"> • Estimate and Plan Release Schedule • Coordinate with Client on approved changes to software baselines • Work with team to develop the Code Review Checklist if needed • Work with project team to identify, allocate, and monitor work assignments and review work product for the software development team, including: <ul style="list-style-type: none"> ○ Develop code ○ Perform unit testing ○ Conduct peer reviews of source code to ensure compliance with applicable standards • Work with the Test Manager in developing test scripts and the coordination of the system and integration testing. • Work with the Configuration Management (CM) Manager to perform release and version management on the test and production environments 		
Developer	<ul style="list-style-type: none"> • Primary responsibility is to code the system as designed • Support testing as required 	<ul style="list-style-type: none"> • ColdFusion • Java • JavaScript • HTML • C 	<ul style="list-style-type: none"> • Daniel Winger • Xiaofu Xie • Ryan Koo • Zara Jariol • Kalpana Bacon • Stephen Hatton • Scott Mitchell • Viktor Kopit • Leanne Phillips • Tairbek Pazylbekov • Kevin Ma • Chris Johnson • Terri Hairell
Database Administrator (DBA)	<ul style="list-style-type: none"> • Implement and maintain all databases necessary for successful project completion • Work closely with CM Manager to ensure system meets CM requirements 	<ul style="list-style-type: none"> • SQL Server • Oracle 	<ul style="list-style-type: none"> • Wes Barrett • Leanne Phillips • Dan Winger • Ryan Koo • Viktor Kopit • Kevin Ma • Terri Hairell
Requirements Manager (RM)	<ul style="list-style-type: none"> • Review requirements specifications, test plans, test scenarios, and high-level design deliverables for accuracy, completeness, thoroughness, and compliance with applicable standards • Maintain RTM and RQD 	<ul style="list-style-type: none"> • RTM • RQD 	<ul style="list-style-type: none"> • Mike Parvis • Rob Swartz • Sharon Berg

Role or Team	Responsibilities	Relevant Tool or Instrument	Assigned Personnel
Configuration Manager	<ul style="list-style-type: none"> Set up and maintain CM procedures Develop and maintain CM Plan and procedures Execute CM Plan and procedures Ensure compliance with CM procedures Collect CM related measurements and report monthly to Project Manager Work with the Project Team to perform release and version management on the test and production environments 	<ul style="list-style-type: none"> CM/VM Tool 	<ul style="list-style-type: none"> Leanne Phillips Terri Hairell Dan Winger
Test Lead	<ul style="list-style-type: none"> Manage and coordinate testing Review test results Develop test reports Review deliverables Implement testing tools, where appropriate Develop and implement integration/system test strategy, test plans, test scenarios, and test scripts Review test strategy, plans, test scenarios, test results, and test reports Work with the Project Team in developing test scripts and the coordination of the system and integration testing Report periodically to Project Manager 	<ul style="list-style-type: none"> RTM RQD Design Documentation Test Plan 	<ul style="list-style-type: none"> Dan Winger Mike Parvis Rob Swartz

7.2. Stakeholder Involvement

Stakeholders are identified for all phases of the project life cycle by identifying the type of people and functions needing representation in the project and describing their relevance and the degree of interaction for specific project activities. For each major activity of the project, this includes the stakeholders who are affected by this activity and those who have expertise that is needed to conduct this activity. The two-dimensional matrix below with stakeholders along one axis and project activities along the other axis is a convenient format for accomplishing this identification.

The two-dimensional Stakeholder Matrix (below) identifies stakeholders and their involvement within the Application Development project process:

Legend: R=Required, O=Optional, N=As Needed, L=Leader

Project Process	Stakeholder					
	Customer	Program Manager	Project Manager, Lead	Project CM	Developer	Sub-contractor
Project Planning	N	N	L		N	
Project Monitoring and Control	O	N	L		N	

Project Process	Stakeholder					
	Customer	Program Manager	Project Manager, Lead	Project CM	Developer	Sub-contractor
Configuration Management			N	L	R	
Requirements Management	R	N	O		O	
Supplier Agreement Management		L				R

7.3. Project Reviews, Communication, Reporting:

For project status updates, communications, and reporting to Code 750 and Code 700 staff, the GUEST Application Development Group follows the communication approach outlined in the [GUEST Communications Plan](#).

Two major Milestone reviews will be held during the life of project and included in the project schedule. The first Milestone Review is Test Readiness Review (TRR) which will be held at the end of development prior to user testing. The second Milestone Review is Operational Readiness Review (ORR) which will be held prior to moving the application to production. Any additional reviews that will be held will be documented in the project schedule.

Once the initial planning for a project is complete and the Task Monitor has given permission to begin work, the Project Manager is responsible for reviewing the project schedule with the entire development team to ensure everyone is aware and agrees to their assignments.

Towards the end of the development phase, a peer code review can be scheduled to examine each module of code. Recommendations of the review team will be written and supplied to the development team so revisions can be made as necessary.

After the software delivery has been placed in production, the Project Manager is responsible for conducting a Lessons Learned review with the entire project team for new applications and major enhancements to existing applications. The purpose of the review is to examine the entire lifecycle of the development effort and to document any lessons learned during the project.

The Project Manager is responsible for ensuring communication across the project team by meeting regularly with all team members if there are more than two developers assigned to the application and more than 40 hours of activity has occurred during the previous calendar month. Depending on the size and scope of the project, some projects require regular meetings with the customers to provide status and review questions regarding requirements. These meetings and any resulting actions will be documented in meeting minutes which are considered Master Records for the project. Team meeting minutes are documented. Minutes record any issues requiring corrective action on the part of the team, the action needed to resolve issues and the status of issues as they are tracked to closure.

Management oversight will be provided within the GUEST management structure. It includes weekly status reporting to senior management of project activities and issues.

Project managers will meet with program manager on a weekly basis after the GUEST Leadership Meeting.

The status of all software development projects is reported to the Task Monitor by submitting the weekly status at the weekly tag-up meeting, to the Division Chief and task monitors at the monthly program review, and to COTR in the Monthly Progress report.

7.4. Acceptance Criteria: The Project Manager uses the acceptance of a product as the basis for recognizing progress; *an activity is complete when the product it creates has been accepted*. This occurs explicitly when a deliverable product is formally submitted to the customer and approved. It is assumed that a deliverable is accepted by the customer if the customer does not comment on the deliverable within 10 working days of the delivery date.

Schedule and acceptance criteria for each deliverable:

Deliverable Title	Acceptance Criteria	Due Date	Reviewed By
Weekly Status	Delivery to Task Monitor	Every Friday	Task Monitor
Weekly Remedy Statistics Report	Delivery to Task Monitor	Every Tuesday	Task Monitor
Weekly Master Schedule Updates	Delivery to Task Monitor	Every Friday	Task Monitor
Monthly SLA Reports	Delivery of document to COTR	10th of month	COTR, Task Monitor
Monthly Status Report	Delivery of document to COTR	10th of month	COTR, Task Monitor

7.5. Project Monitoring, Control/Replanning: The Project Manager is responsible for monitoring the completion of activities according to the project schedule and plan. Status and activities are reported through weekly status reports from developers, and the following meetings:

Project Status Reporting:

Meeting	Frequency	Attendance	Topic	Output
Weekly Team Lead Meeting	Weekly	Project Managers and Application Development Manager	Project schedules and resources	Updated Master Project Schedule
Primus Tag-Up	Weekly	Application Development Manager, Project Managers, Code 750 Task Monitors and Business Analyst	Status reports Master Project Schedule	Meeting Minutes documented by the Code 750 Business Analyst
Primus Leadership Team Meeting	Weekly	Managers of GUEST Groups including Applications Manager, Program Manager, Quality Manager, Business	Senior management update Project status Personnel issues	Meeting Minutes

		Manager		
GUEST Program Review	Monthly	Managers of GUEST Groups including Applications Manager Application Development Manager, Program Manager, Division Chief, Code 750 Task Monitors	Project status and accomplishments Milestones New opportunities Problems Risks Deliverables	Monthly Program Review packet
			10th of month	COTR, Task Monitor

Replanning is performed when the planned schedule or scope of the project changes. GUEST Management will look at what has caused the schedule or the scope of the project to change and make the necessary estimates based on what needs to be done.

The Project Lead, in conjunction with the Project Manager and Application Development Manager, will evaluate scope or schedule changes for the effect on the schedule. For any significant impact, an updated cost, scope, and schedule will be submitted to GUEST Application Development Manager, the task monitor and the customer for approval. Upon approval, the Task Order (TO) will be revised through the Task Order Mod. The TO Mod will then be submitted to GUEST and ITCD management for review. The impact of the change will be clearly documented in the TO Response.

Some team leads, application-specific teams, or project teams may opt to use Outlook Tasks for tracking the status of tasks to be performed. Items tracked can be of several types:

- Action Items – items identified during a meeting (whether related to a project or some other meeting)
- Issues – issues identified to be tracked to closure
- Task Assignments – assignments as part of a project or normal assigned duties

When Outlook Tasks is used, the process is:

- Team lead/project manager creates a task in their own Outlook Tasks tab.
- Team lead/project manager assigns the task to the assignee. This creates a copy in the assignees Outlook Tasks.
- Individual team members can update the Notes section of the task with status information. Status updates should include the date, the initials of the person making the update, and a description of the information – actions taken, problems found, solutions being implemented, etc., as appropriate.
- During team meetings, the team lead/project manager goes through the open tasks assigned to each individual and the current status of it. Any pending updates to the Notes section are made.
- When the task is completed, the team lead or assigned individual marks the task as completed and updates the Notes section with any final update.

Team members are expected to review their open tasks daily and to work on tasks based on priority as marked in the task (High, Normal, or Low) and due date.

Individual team members can add custom fields or sorting to their own Outlook Tasks if the changes add to their productivity and ability to prioritize tasks.

8. Supporting Process Documents

- 8.1. Configuration Management:** Configuration Management (CM) procedures and all required work products are documented in the **Application Development Configuration Management Plan**. The CM Plan includes a list of configuration items that need to be under CM and tracked.
- 8.2. Change Management:** The Application Development Group follows the process described in the Application Development Change Management Procedure.

9. Project Work Schedule and Resource Requirements

- 9.1. Project Schedule:** A high-level project schedule is included in the Project/Task Plan. Detailed project schedules are each maintained as a stand-alone document for each software development effort on the GUEST SharePoint site. Milestones from individual project schedules are incorporated into a Master Schedule that includes resource usage across the entire Application Development Group. The Master Schedule is updated on a weekly basis and stored on the GUEST SharePoint site.
- 9.2. Records:** The matrix below contains a list of software documentation considered Master Records for software development. The actual list of documentation necessary for a given project is defined in the Project/Task Plan and the Task Order Response. Due dates are included in the project schedule.

The matrix below includes each name of record, description, owner, and method of disposal; additionally the following applies to all documents listed and stored on GUEST SharePoint:

- Storage: GUEST SharePoint > [Task Order Collaboration](#)
- Retrieval: Accessible to GUEST SharePoint Members
- Protection: Assigned by SharePoint Administrator according to role/responsibility
- Retention: Duration of contract and in accordance with ASRC Federal Records Retention Schedule

Name of Record	Description	Owner	Disposal Method
Project/Task Plan (PTP)	The PTP provides estimates in hours and cost, required deliverables, and proposed high-level schedule.	Project Manager	Turnover at contract transition
Interface Definition Agreement (IDA)	The Interface Definition Agreement (IDA) presents the interface specifications between organizations or systems if applicable. The content of this agreement forms the baseline from which all proposed changes will be assessed.	Project Manager	Turnover at contract transition
Business Requirements Document (BRD)	The Business Requirements Document provides a high-level description of the requirements. The BRD should provide an overview of what is required but does not contain a detailed breakdown.	Code 750 Task Monitor/ Business Analyst	Upon Code 750 Task Monitor direction
Requirements	The Requirements Traceability Matrix lists a	Code 750 Business	Turnover at

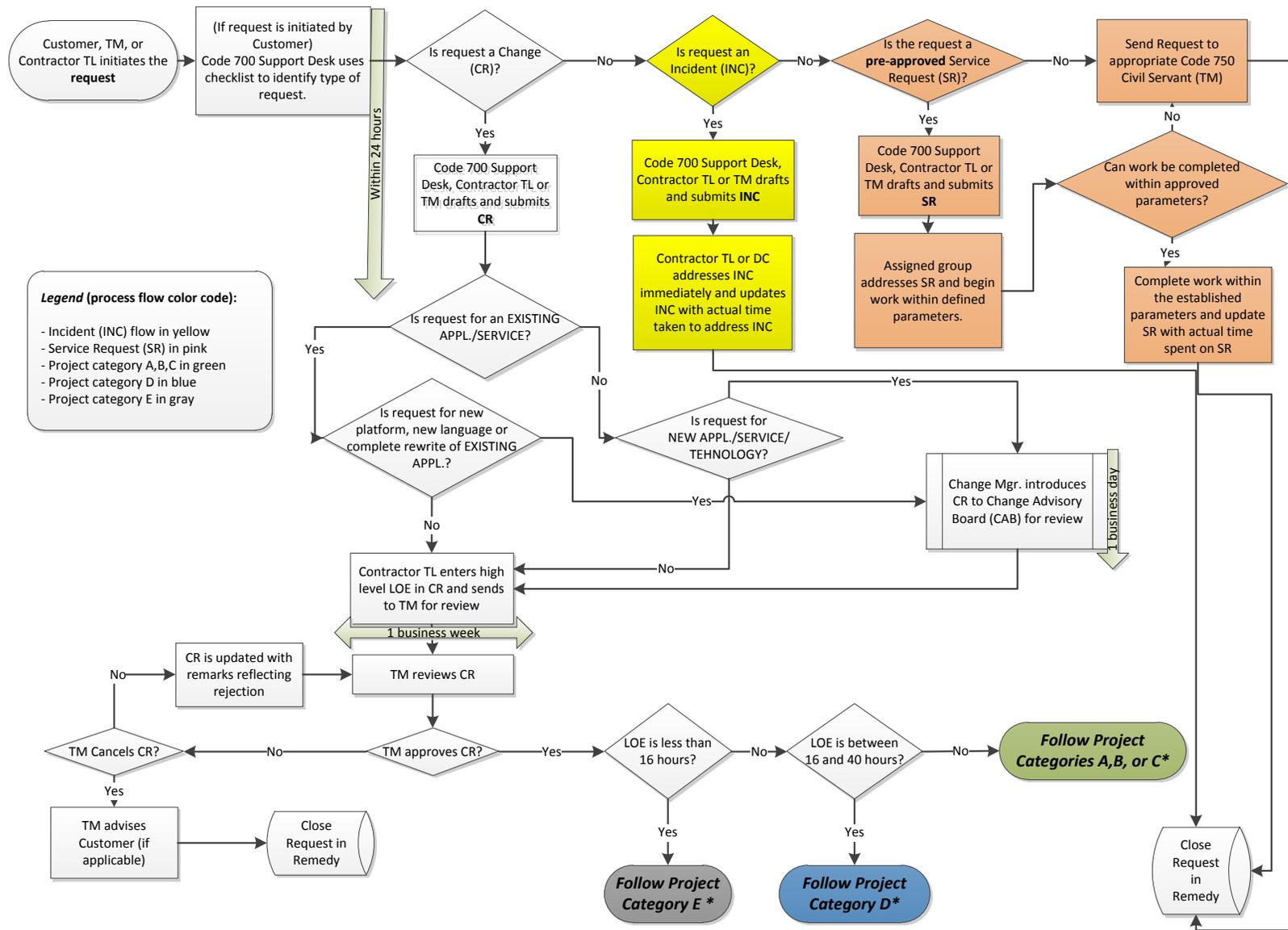
Name of Record	Description	Owner	Disposal Method
Traceability Matrix (RTM)	detailed set of requirements, based on a BRD. The RTM provides additional detailed information such as requirement id, requirement name, requirement description, requirement source, business rule, other applications affected, user groups impacted, and comments.	Analyst for non-MIS applications and Project Manager for MIS applications	contract transition
Requirements Document (RQD)	The Requirements Document is a formal requirements document that describes the scope, detailed requirements, architectural/platform requirements, estimates, and proposed schedule, and is approved by both ESD and customer. It should be detailed enough to ensure that the system being built will meet all of the necessary customer needs. These requirements include the following areas: functional, security, data, database, interface, performance, and installation.	Project Manager	Turnover at contract transition
Test Plan and Procedures	The Test Plan and Procedures document provides functional and technical users with test scripts and documents acceptance of the system.	Project Manager	Turnover at contract transition
Implementation Plan	The Implementation Plan contains a step-by-step process for migrating code and database changes into the production environment.	Project Manager	Turnover at contract transition
User Guide	The User Guide contains all of the information necessary for the user to properly operate the system.	Project Manager	Turnover at contract transition
Meeting Minutes	Discussion and action items documented for each meeting pertaining to the project.	Project Manager	Delete electronic files, shred hardcopy files

9.3. Project Estimation: Defines steps used to estimate the Level of Effort and cost for each project

Step	Description of Activity	Responsibility
1	Either receive completed requirements (BRD or RTM) from customer/Task Monitor, or development team generates RTM based on requirements gathering meetings	Project Manager
2	Estimate task size, complexity, and level of effort using Delphi estimation worksheet.	Project Manager, Developer(s)
3	Meet to review estimates and resolve any discrepancies. Differences in size, complexity, or effort estimates are discussed until all team members are in agreement on the estimate	Project Manager, Developer(s)
4	Submit total hours per person, including time to be spent in requirements gathering, requirements review, design, development, testing, and implementation, to GUEST Business Manager for costing	Project Manager
5	Create cost estimate	GUEST Business Manager
6	Submit total hours and cost estimate to Task Monitor for approval	Project Manager

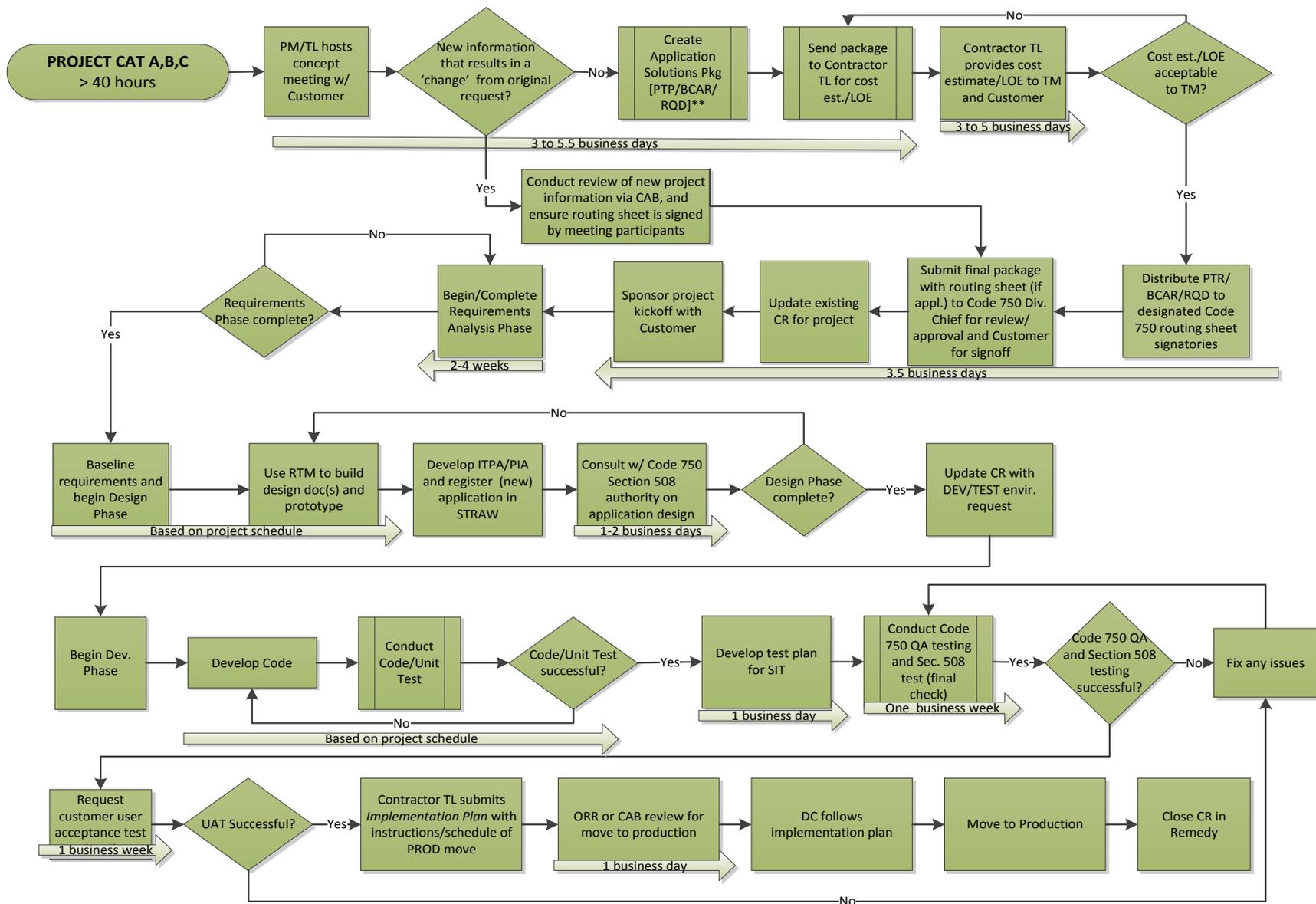
Step	Description of Activity	Responsibility
7	Task Order Monitor requests Task Order Modification through the NASA Task Order Management System (NASATOMS)	Code 750 Task Monitor

Appendix A, Code 750 Project Management Process



* The project categorization is based on the estimated complexity, estimated # of hours for development and test tasks, and the project schedule. The LOE is provided by the Contractor TL. Note that all 'project' efforts including Data Center activities and SharePoint services should adhere to this SOP.

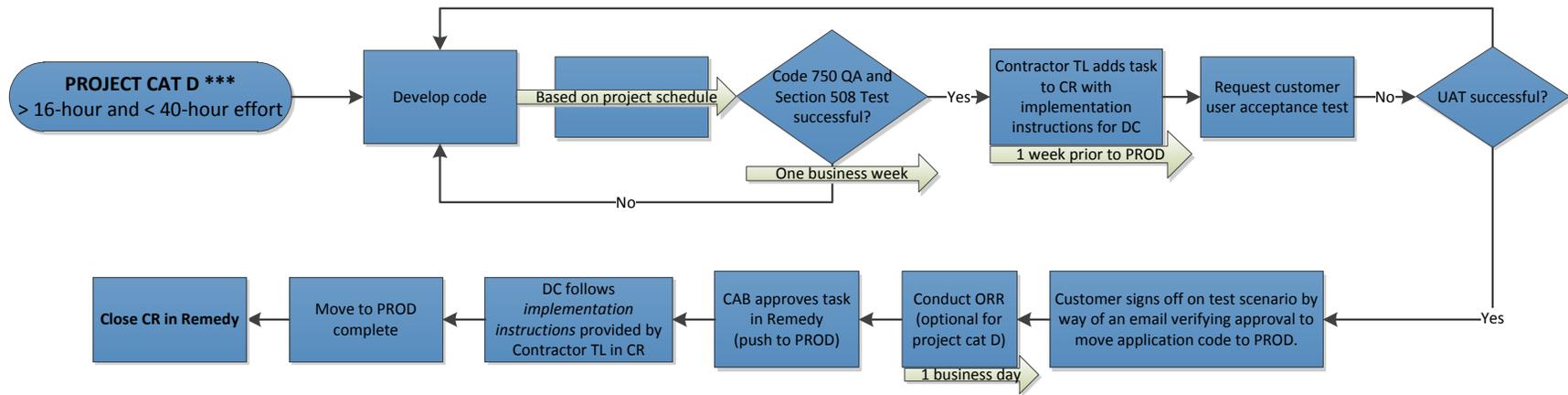
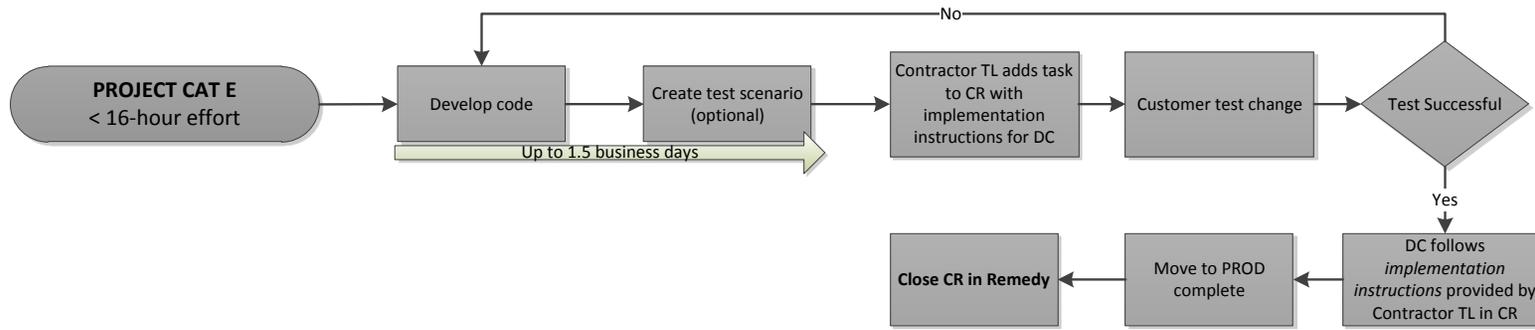
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** It is the responsibility of the Contractor TL to offer for each option in the Application Solution Package technical details that will address any and all potential issues that could impact the NASA environment including new software/platform/language compatibility (to NASA environment) issues; simultaneous user capacity restrictions; accessibility to and availability new software versions without cost or complexity e.g., for COTS solutions; and development resources' knowledge of proposed new technology in order to address implementation and production issues expeditiously and correctly.

** Note: All content in project artifacts, including estimates, are considered preliminary until approved by the Code 750 Division Chief.

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*** Special Note: If the complexity of the project warrants or if new technology, application, service, or product is requested and anticipated to take less than 40 hours to complete, Project Category D will follow the same project life cycle as project categories A,B and C.