

**Mission Assurance Support Tool, Version 2**

**(MAST, v2)**

**LA-UR-16-26931**

**ACKNOWLEDGEMENTS**

Los Alamos National Laboratory gratefully acknowledges the contributions of Naval Postgraduate School students LT Shannon Buckley, LT Ross Eldred, LT Robert Smith, LT Patrick Stone, and LT Jordan White and NPS Systems Engineering Department Chair Dr. Clifford Whitcomb, without whom the Systems Engineering module of the Mission Assurance Support Tool would not exist.

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**Project Planning**

[What is the name of the project?](#Project_Name" \o "Include the project name as well as any identifiers, such as cost code or grant number.)

**Budget**

[Who is the sponsor?](#Sponsor" \o "The Sponsor is the person or entity that has assigned and is paying for the project. This could also be the user but in many cases in the government, the customer is different from the actual user.)

[What is the funding source?](#Funding_Source" \o "R&D funding sources include LDRD, DOE, NNSA, other NNSA/DOE sites, other federal agencies, funds-in agreements, and CRADAs.)

[What is the expected funding amount, over what duration?](#Expected_Funding" \o "Total funding expected should include total funding required and periodic funding requirements (quarterly, annually, etc.).)

**Human Resources**

 [Who is the Principal Investigator (PI)?](#PI" \o "The PI is the technical lead for the project.  List the PI's name, Z#, organization, and contact info.)

[How much time will the PI devote to the project, over what duration?](#PI_Resource_Loading" \o "Address the resource loading for the PI for the duration of the project.)

[Are there co-investigators?](#CoI" \o "List the names, Z#s, organization, and contact info for all co-Is.  If the names are not known initially, list the capabilities that will be needed and update when the co-Is have been identified.)

[How much time will the co-I’s devote to the project, over what duration?](#CoI_Resource_Loading" \o "Address the resource loading for all co-Is for the duration of the project.  If names are not known, estimate FTE levels for the capabilities that will be needed and update when co-Is have been identified.)

**Acquisition Management**

 [Are there non-LANL collaborators?](#NonLANL_Collaborators" \o "Collaborators may be at other national laboratories, DOE sites, universities, or industry partners.)

[How are the services of non-LANL collaborators being acquired and at what cost?](#Collaborator_Acquisition)

[Will there be any major purchases of materials or services? How much will these purchases cost?](#Major_Purchases" \o "Major purchases include those over $25K, those using foreign suppliers or long lead-time items, or those that require involvement of a contracting specialist.)

[Have suppliers been identified?](#Suppliers" \o "Suppliers may include manufacturers, distributors, wholesalers, or other merchants, as well as other laboratories, industry partners, and universities.  List planned suppliers and their contact information.)

**Technical Scope & Schedule**

 [What are the major deliverables and milestones?](#Deliverables_Milestones" \o "A deliverable is any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project.  A milestone is a significant point or event in a project.)

[What is the state of technology (technology readiness level or TRL) at the start of the project?](#TRL_Start" \o "TRLs are a method of estimating technology maturity on a 1 to 9 scale of Critical Technology Elements of a program. They are determined by examining program concepts, technology requirements, and demonstrated technology capabilities. )

[What is the TRL expected to be at the end of the project?](#TRL_End" \o "TRLs are a method of estimating technology maturity on a 1 to 9 scale of Critical Technology Elements of a program. They are determined by examining program concepts, technology requirements, and demonstrated technology capabilities. )

**Management Review and Approval**

 [Who is the Responsible Line Manager (RLM) for the project?](#RLM)

[Has s/he reviewed and approved the project?](#RLM_Approval" \o "Provide the date of approval and a scanned signature.)

[Is there a Project Manager (PM) for the project, separate from the PI?](#PM" \o " The Project Manager is the person assigned by the performing organization to lead the team that is responsible for achieving the project objectives.  List the PM's name, Z#, organization, and contact info.)

[Has s/he reviewed and approved the project?](#PM_Approval" \o "Provide the date of approval and a scanned signature.)

**Systems Engineering**

**Concept Exploration**

[What is the sponsor asking for?](#Asking_For" \o "This should be recorded as the exact problem statement provided by the sponsor. If no problem statement was provided, interview the sponsor and generate a problem statement. The problem statement should include the capability or product gap being filled.)

[Who are the users?](#Users)

[Who are the maintainers?](#Maintainers)

[Who else cares about this product?](#Other_Stakeholders)

[Is a solution feasible?](#Feasibility)

[WRITE PROBLEM STATEMENT](#Problem_Statement)

Tool Tip: This should be the project team's version of the problem statement after reviewing the problem statement from the sponsor. This should be approved or agreed upon by the sponsor if there are significant differences.

**Concept of Operations**

[Where will the product be used?](#Where)

[What does the product interact with?](#What_interactions" \o "List any and all non-person actors (things) that will interact with the product. This can include: networks, input/output systems, the environment, other similar products, etc. )

[Who interacts with the products?](#Who_interactions" \o "List all users and possible maintainers, users of other similar or previous products, repair personnel, and bystanders who may view the product.)

[How will it be used?](#How_used" \o "Describe the way(s) in which the primary and secondary users of the product will use the product. )

[When will it be used?](#How_used" \o "Describe the specific time(s) of day in which the product will operate.)

[Provide a description of the use case or concept of operations](#Vis_Description" \o "Through any appropriate method, be it photograph or computer generated graphic or narrative, present or describe a representation of what the product will be and how it will interact as stated in the answers to the questions above.).

**Requirements Development**

[What are the constraints?](#Constraints)

[Are there standards or guidelines that need to be followed in design based on the product itself or interfaces?](#Standards_Guidelines)

[What are the product requirements?](#Product_Requirements" \o "Ensure the customer's requirements, as determined during the interview process, are listed explicitly. Requirements should be SMART (Specific, Measurable, Attainable, Realistic, and Timebound).  A requirements hierarchy or matrix may be inserted here.)

[What are the Measures of Performance (MOPs)?](#Measures_of_Performance)

[Upon a thorough review of the problem statement, can you match the requirements to the corresponding aspect of the problem statement ensuring all parts of the problem statement have been addressed?](#Requirements_to_problem_statement" \o "This can typically be done in a matrix format. This is done to ensure the requirements you have created address all areas of the problem statement. This is to guarantee traceability exists between the requirements and the sponsor’s needs.)

[More Tips](#Requirements_to_problem_statement_two" \o "Additionally, this will help determine if unnecessary constraints were imposed on the problem or if too few constraints were created to ensure a satisfactory product delivery.)

**Project Design**

[What functions must be performed to solve the problem and in what sequence?](#Functional_Flow)

[What is the physical architecture?](#Physical_Architecture" \o "The physical architecture is the set of physical components (HW and SW) needed to perform the functions. Please include the location of a file (or paste the file below) that documents the physical architecture.)

[Were any hardware diagrams or schematics created in the product development?](#Hardware_diagrams_schematics" \o "This section is used to help provide details in the design that would provide a view into how to replicate the design in the future.  Please include the location of a file (or paste the file below) for these documents.)

[Was any software developed for this system?](#Software_location" \o "This section is to prevent the need to redo any work that had already been accomplished. By saving and storing developed software it may be used on future projects as potential subroutines or as a way to replicate this project in the future.)

[Were any non-standard tools or devices used to create this system?](#Non_standard_tools" \o "In the event that the project required any type of tool or software developed during this project, document the tool/software here with pictures, schematics, and its specific use as to what part of the completed project it was  essential for.)

**Test Plan**

[What tests will be accomplished in order to evaluate all measures of performance?](#T_E)

[What is the testing plan/resources necessary to accomplish them?](#Testing_Plan" \o "Includes what people, equipment, facilities, tools, etc, are needed to ensure that the tests can be conducted. Include a schedule of testing events.)

[What were the results of the tests conducted?](#Results)