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SE Requirements Development Tool

User Guide

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Version 1.0

Los Alamos National Laboratory

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This tool is based on information contained in the
January 2001 Systems Engineering Fundamentals Guide
prepared by the Defense Acquisition University Press, and the
INCOSE Systems Engineering Handbook, v. 3.2, Jan. 2010

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1 Introduction

1.1 Scope and Purpose

The LANL Systems Engineering Requirements Development Tool (SERDT) is a data collection tool created in InfoPath for use with the Los Alamos National Laboratory's (LANL) SharePoint sites. Projects can fail if a clear definition of the final product requirements is not performed. For projects to be successful requirements must be defined early in the project and those requirements must be tracked during execution of the project to ensure the goals of the project are met. Therefore, the focus of this tool is requirements definition. The content of this form is based on International Council on Systems Engineering (INCOSE) and Department of Defense (DoD) process standards and allows for single or collaborative input. The "Scoping" section is where project information is entered by the project team prior to requirements development, and includes definitions and examples to assist the user in completing the forms. The data entered will be used to define the requirements and once the form is filled out, a "Requirements List" is automatically generated and a Word document is created and saved to a SharePoint document library. SharePoint also includes the ability to download the requirements data defined in the InfoPath from into an Excel spreadsheet.

This User Guide will assist you in navigating through the data entry process.

NOTE: *The SERDT is designed to open in a web browser using **Internet Explorer**. Using other browsers will work but may result in errors and loss of functionality.*

1.2 System Overview

The SERDT is accessed via the SharePoint site:

https://ade.lanl.gov/aet/FBDev1/SERequirementsTool_New

However, access to the SharePoint server is restricted. To request access, send an email to Faith Benson at fbenson@lanl.gov.

The SERDT contains three main levels of data collection and also allows for uploading supporting documentation. The three main levels of data collection include:

1. Overall project information: Project Overview – This section focuses on the overarching project need high-level goals.
2. Scoping information: Scoping Section – This section focuses on defining the work scope and deliverables of the project as well as any predefined expectations or constraints. User inputs should focus on "what" the project needs to accomplish.
3. Requirements definition: Requirements Definition section - This section is used to define specific, measurable requirements (how the project needs will be met) as well as any pre-defined specific project constraints or customer expectations.

Once the information is collected and requirements defined, a list of requirements is automatically generated and exported into a Word document, which is then saved to a separate SharePoint document library. This is an automated process. The user is not required to do

anything other than enter the data. The user can also export the defined requirements into and Excel spreadsheet.

1.2.1 Point of Contact

For assistance, contact Faith Benson at 665-7299.

1.3 Acronyms and Abbreviations

DE	Data Entry
DoD	Department of Defense
INCOSE	International Council on Systems Engineering
LANL	Los Alamos National Laboratory
SE	Systems Engineering
SERDT	Systems Engineering Requirements Development Tool


2 Data Collection Forms

2.1 Project Overview

The Project Overview is the first form in the SERDT. Here you will enter top-level information about your project, including:

1. Date
2. Project Name
3. Customer – The organization requesting the work
4. Project Lead and LANL Participants – click the people picker **Help** button for more information on entering Project Lead and LANL participants. The “Assign and Notify” functionality is in development.
5. Non-LANL Participants (does not work with people picker).
6. Location Information
7. Project Summary

System Engineering
Requirements Development
Tool



Project Overview

Data fields in this section are meant to provide a high-level project description and reason the project is being undertaken; identify the key project personnel; and identify project customers (i.e., who is requesting/funding the project).

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prepared by the Defense Acquisition University Press, and the
INCOSE Systems Engineering Handbook, v. 3.2, Jan. 2010

Project ID*	SREQ-150803-133820	Date	8/3/2015								
Project Name*	Sample Project Name	Customer*	ABC Organization								
LANL Project Lead (Principal Investigator)*	<p><small>Note that two of each name appears in the LANL search, pick the first name.</small></p> <p>Benson, Faith Ann; <input type="button" value="Help"/></p> <p>Z#: 111083 Organization: AET-2, Process Modeling and Analysis</p>										
LANL Participants	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Name</th> <th style="width: 40%;">Assign Categories</th> </tr> </thead> <tbody> <tr> <td>Benson, Faith Ann; <input type="button" value="Help"/></td> <td><input type="button" value="Assign and Notify"/></td> </tr> </tbody> </table> <p><input type="checkbox"/> Add a LANL Participant</p>			Name	Assign Categories	Benson, Faith Ann; <input type="button" value="Help"/>	<input type="button" value="Assign and Notify"/>				
Name	Assign Categories										
Benson, Faith Ann; <input type="button" value="Help"/>	<input type="button" value="Assign and Notify"/>										
Non-LANL Participants	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Name</th> <th style="width: 25%;">Organization</th> <th style="width: 25%;">Phone</th> <th style="width: 25%;">Email</th> </tr> </thead> <tbody> <tr> <td>John Doe</td> <td>ABC Organization</td> <td>123-456-7890</td> <td>jdoe@abc.com</td> </tr> </tbody> </table> <p><input type="checkbox"/> Add Non-LANL Participant</p>			Name	Organization	Phone	Email	John Doe	ABC Organization	123-456-7890	jdoe@abc.com
Name	Organization	Phone	Email								
John Doe	ABC Organization	123-456-7890	jdoe@abc.com								
Location Information	<p>Tech Area: 3 Building Number: 215 Room Number(s): 112</p> <p>Other: Outside parking lot.</p>										
Project Summary	<p><i>Provide a concise summary of the project - type or paste your text below.</i></p> <p>This is a sample project summary. The summary should give a brief overview of the project. More detailed information will be provided in other areas of the data collection form.</p>										

Digital Signature(s) "Signature" Approval (to be developed in the future)

Save and Close Form

Figure 1. Project Overview Screen

2.2 Scoping

This section is where the user begins to describe the key activities of the project and their associated products. This section is used to describe “what” the project must accomplish. For example, “provide the ability to test hardware.” This information will be used to guide more specific “hows” in the Define Requirements section. The various sections include Mission Needs/Goals, Constraints/Expectations, Measures of Effectiveness, Operational Scenarios, System Boundaries, Interfaces, Modes of Operation, Technical Performance Measures, Life Cycle Process, Physical Characteristics, and Human Systems Integration.

2.2.1 Section “Home” Pages

Each section has its own “Home” page that contains section description and buttons that open the data entry form, upload related documentation, or close the form. (See Figure 2.) Definitions and explanations as to the type of data to be entered are contained throughout the tool. Some sections include “Help” buttons for further information or instruction.

Figure 2. Example of a Section "Home" Page

2.2.2 Scoping Data Entry Forms

Each main section has at least one data entry form (some sections have more). This is where specific data related to that section is entered. This information is automatically transferred to the

Define Requirements section where it will be displayed and used to define specific requirements. (See Figure 3.)

➔ **NOTE: The “Constraints/Expectations” section has extra layers of data entry forms in both “Scoping” and “Define Requirements” sections, but the navigation clues such as highlighted navigation buttons, section title bars, and explanation/**

Scoping Information | Data Entry

Project ID: SEREQ-150803-133820 Date: 8/3/2015
 Project Name: Sample Project Name
 Project Lead: Benson, Faith Ann

Project Overview **Scoping** Define Requirements Requirements List Documents List

Click on the buttons below to ENTER or EDIT data in each category.

Constraints/Expectations Section

Mission Needs/Goals

Constraints/Expectations

Measures of Effectiveness

Operational Scenarios

System Boundaries

Interfaces

What are Constraints/Expectations?

Constraints/expectations are statements of fact and assumptions that define the constraints/expectations of the system in terms of overarching mission need, mission objectives, environment, and constraints.

Constraints/Expectations - Data Entry Forms

Internal Constraints

Expectations

Upload Documentation

Close Form

Internal Constraints Section

Click the buttons below to enter or edit data in each category.

Mission Needs/Goals

Constraints/Expectations

Measures of Effectiveness

Operational Scenarios

System Boundaries

Interfaces

Modes of Operation

Tech. Perf. Measures

Life Cycle Process

Physical Characteristics

Human Systems Integration

What are Internal Constraints?

Internal constraints are the internally-imposed boundary conditions for the system-of-interest within which the organization must remain when executing the processes during the concept and development stage of a project. Use this form to identify and define constraints impacting design solutions.

Project-specific constraints can include:

- Approved specifications and baselines developed from prior applications of Systems engineering Process,
- costs,
- updated technical and project plans;
- team assignments and structure;
- control mechanisms; and
- required metrics for measuring progress.

Internal constraints can include:

- Management decisions from a preceding technical review,
- enterprise general specifications;
- standards or guidelines;
- policies and procedures;
- domain technologies; and
- physical, financial, and human resource allocations to the project.

Internal Constraints - Data Entry Forms

Policies & Procedures

Cost/Schedule

General Specifications

Upload Documentation

Close Form

Scoping Information | Data Entry

Project ID: SEREQ-150803-133820 Date: 8/3/2015
 Project Name: Sample Project Name
 Project Lead: Benson, Faith Ann

Project Overview **Scoping** Define Requirements Requirements List Documents List

Click on the buttons below to ENTER or EDIT data in each category.

Mission Needs/Goals

Constraints/Expectations

Measures of Effectiveness

Operational Scenarios

System Boundaries

Interfaces

Modes of Operation

Tech. Perf. Measures

Life Cycle Process

Physical Characteristics

Human Systems Integration

Internal Constraints - Data Entry Forms

Policies & Procedures

Cost/Schedule

General Specifications

Upload Documentation

Close Form

Internal Constraints: Cost/Schedule* Help

Return to Data Entry Return to Requirements Definition

Provide an estimate of the cost and schedule for the full-scale development of the system. Include information regarding any known or anticipated **cost risk** (the possibility that available budget will be exceeded). Cost risk exists if the project must devote more resources than planned to achieve technical requirements. If the project must add resources to supported slipped schedules due to any reason, if changes must be made to the number of items to be produced, or if changes occur in the organization or national economy. Cost risk can be predicted at the total project level or for a system element. The collective effects of element-level cost risks can produce cost risk for the total project. Also include information regarding **schedule risk** (the possibility that the project will fail to meet scheduled milestones). Schedule risk exists if there is inadequate allowance for acquisition delays. Schedule risk exists if difficulty is experienced in achieving scheduled technical accomplishments, such as the development of software. Schedule risk can be incurred at the total project level for milestones such as deployment of the first system element. The cascading effects of element-level schedule risks can produce schedule risk for the total project. (INCOSE, 2013)

Cost Estimating

Obtain approximate/actual overhead, general and administrative (G&A) burden rates, and fees that should be applied to hardware and manpower estimates. Usually, this is only necessary for effort within your own organization; suppliers will have already factored it into their cost estimates. Develop cost estimates for each subsystem of each system element for each stage of the program.

*Be sure to provide a detailed description of the source of each requirement (include name of person, organization, or document from which this requirement originated, as well as the date this requirement was defined/added).

Cost/Schedule

Help

Submit Data

In this section, identify any cost or schedule constraints that are applicable to project execution. This may include funding or schedule limits defined by the customer, procurement limitations, resource limitations, facility availability, etc. Examples include; customer funding cannot exceed \$250K/year; all hardware purchases must be in the first half of the fiscal year; inspection facilities will only be available June through August, etc. The Help tab provides more guidance regarding cost and schedule.

Type: Cost

Title: Budgetary Limitations

Basis/Source: ABC Organization

Date Defined: 8/3/2015

Description: This is a description of cost or budgetary limitations. An Excel spreadsheet or other supporting documentation could be uploaded as well.

☒ Add Another Constraint

“Help” button provides additional, form-specific instructions/information.

Figure 3. Example of Multiple Layers of Form Views.

descriptions are the same throughout.

By clicking on the link at the bottom of every data entry form, additional information can be

Scoping Information | Data Entry

Project ID: SEREQ-150803-133820 Date: 8/3/2015
Project Name: Sample Project Name
Project Lead: Benson, Faith Ann

Project Overview **Scoping** Define Requirements Requirements List Documents List

Click on the buttons below to ENTER or EDIT data in each category.

Internal Constraints - Cost/Schedule

Mission Needs/Goals
Constraints/Expectations
Measures of Effectiveness
Operational Scenarios
System Boundaries
Interfaces
Modes of Operation
Tech. Perf. Measures
Life Cycle Process
Physical Characteristics
Human Systems Integration

Internal Constraints - Data Entry Forms

Policies & Procedures **Cost/Schedule**
General Specifications Upload Documentation
Close Form

Cost/Schedule Help
Submit Data

In this section, identify any cost or schedule constraints that are applicable to project execution. This may include funding or schedule limits defined by the customer, procurement limitations, resource limitations, facility availability, etc. Examples include; customer funding cannot exceed \$250K/year; all hardware purchases must be in the first half of the fiscal year; inspection facilities will only be available June through August, etc. The Help tab provides more guidance regarding cost and schedule.

Type: Cost
Title: Budgetary Limitations
Basis/Source: ABC Organization
Date Defined: 8/3/2015
Description: This is a description of cost or budgetary limitations. An Excel spreadsheet or other supporting documentation could be uploaded as well.

☒ Add Another Constraint

Figure 4. All Data Entry Forms have the option to add additional information.

added. (See Figure 4.)

2.3 Uploading Documents

The user can upload supporting documentation by clicking on any of the “Upload Documentation” buttons and then clicking on “Click here to attach a file.” Additional documents can be uploaded by clicking “Upload another document.” (See Figure 5.)

The screenshot displays a web form titled "Internal Constraints - Cost/Schedule". At the top, there are tabs for "Scoping", "Define Requirements", "Requirements List", and "Documents List". The "Scoping" tab is active, showing a sub-section "Internal Constraints - Data Entry Forms" with buttons for "Policies & Procedures", "Cost/Schedule", and "General Specifications". The "Cost/Schedule" button is highlighted with a red circle, and a red arrow points to it with the text: "Click on any 'Upload Documentation' button throughout the form."

Below this, the "Scoping Information | Data Entry" section is shown. It includes fields for "Project ID: SEREQ-150803-133820", "Date: 8/3/2015", "Project Name: Sample Project Name", and "Project Lead: Benson, Faith Ann". There are tabs for "Project Overview", "Scoping", "Define Requirements", "Requirements List", and "Documents List". The "Scoping" tab is active, showing a sub-section "Internal Constraints - Document Upload" with a "Return to Internal Constraints Home" button.

The "Document Upload" section has a heading "Documentation (Must be UNCLASSIFIED)" and a note: "Attach information, guidance, or policy documents here, as applicable. Put a title or document description in the left field to identify the document you attach. **Note that if no title or description is included, the document(s) will NOT show up on the documents list.** IMPORTANT: Title/Description and file attachment MUST BE UNCLASSIFIED."

There are two input fields: "Title/Description (UNCLASSIFIED)" and "File Attachment (<2MB)". The "Title/Description" field contains the text "Cost Data Spreadsheet" and has a blue checkmark icon. The "File Attachment" field shows a file named "CostData_Sample.xlsx" (10.12 KB) and a "Click here to attach a file" link. A red circle highlights the "Click here to attach a file" link, and a red arrow points to it with the text: "Click on 'Click here to attach a file.' A title or description MUST be entered or the document won't show up on the Documents List".

Below the input fields, there is a button "Upload another document." which is circled in red. A red arrow points to it with the text: "Multiple documents can be uploaded. Remove documents by clicking on the blue arrow." At the bottom, there are buttons for "Upload Document(s)" and "Close Form".

Figure 5. Uploading Documents

All uploaded documents will be displayed on the Documents List (see). **Note that if a title or description is not entered when the document is uploaded, the document will not display on the Documents List.** All uploaded documents MUST BE UNCLASSIFIED.

Documents List

Project Overview
Scoping
Define Requirements
Requirements List
Documents List

Project ID: SEREQ-150803-133820 **Date:** 8/3/2015

Project Name: Sample Project Name



Project Lead: Benson, Faith Ann

Supporting Documentation List*

Close Form



If nothing shows below, no documents have been uploaded.

Internal Constraints Documents

Cost Data Spreadsheet	 CostData_Sample.xlsx Microsoft Excel Worksheet 10.1 KB
This is another test document	 Testing the Form.docx Microsoft Word Document 49.3 KB

Uploaded documents are only located within the InfoPath form but the user can click on the blue paperclip icon that pops up next to the desired document when the user clicks on the document icon and download a copy to their desktop. (See .)

Internal Constraints Documents

Cost Data Spreadsheet	 CostData_Sample.xlsx Microsoft Excel Worksheet 10.1 KB
This is another test document	 Testing the Form.docx Microsoft Word Document 49.3 KB

Click the paperclip next to the document to download a copy to your desktop.

2.4 Define Requirements

This section is where the user will have the opportunity to define specific requirements. The main sections such as Mission Needs/Goals, Constraints/Expectations, Measures of Effectiveness, Operational Scenarios, etc., are duplicated here and the navigation clues are the same as in the “Scoping” section.

In this section, if information was previously entered in the corresponding “Scoping” section, the information will be displayed and the user can define specific requirements based on that information (see). If no information was entered for a specific section, the note “If no data was entered in this section, nothing will show below (see).

Requirements Definition

Project ID: SEREQ-150803-133820 Date: 8/3/2015
 Project Name: Sample Project Name
 Project Lead: Benson, Faith Ann

Project Overview Scoping **Define Requirements** Requirements List Documents List

Click on the buttons below to ENTER or EDIT requirements data in each category.

Internal Constraints - Cost/Schedule

Go To Data Entry Page

Internal Constraints - Requirements Definition Forms

Constraints/Expectations Policies & Procedures Cost/Schedule

Measures of Effectiveness General Specifications Close Form

Operational Scenarios

System Boundaries

Interfaces

Modes of Operation

Tech. Perf. Measures

Life Cycle Process

Physical Characteristics

Human Systems Integration

Cost/Schedule Help

Note: If no data was entered into this section, nothing will show below.

Type: Cost
 Title: Budgetary Limitations
 Basis/Source: ABC Organization
 Date Defined: 2015-08-03

Description:
 This is a description of cost or budgetary limitations. An Excel spreadsheet or other supporting documentation could be uploaded as well.

Derived Requirements:
 Enter individual requirements derived from the "Cost/Schedule" description, above.

Submit Requirement(s)

No.	Requirement Description
1	This is a requirement derived from cost the information displayed above.
2	This is another requirement derived from the cost information displayed above.

Add Another Requirement

Navigation clues are the same as in DE section.

User can return to DE page for editing.

Information entered on the DE page is displayed here.

Be sure to save your work regularly!

User can define numerous requirements based on the Information displayed above.

Figure 6. Example of “Requirements Definition” Page

2.5 View Requirements

At any time throughout the process the user can view the requirements that have been defined by clicking on the “View Requirements” button.

View Requirements

Project Overview

Scoping

Define Requirements

View Requirements

Documents List

Project ID: SEREQ-150803-133820

Date: 8/3/2015

Project Name: Sample Project Name

Project Lead: Benson, Faith Ann

Add Requirement

Save and Keep Form Open

Close Form

Type: Cost

Title: **Budgetary Limitations**

CS-1

This is a requirement derived from cost the information displayed above.

CS-2

This is another requirement derived from the cost information displayed above.

Save and Keep Form Open

Close Form

If you encounter issues not addressed by this user guide, please contact your account manager for additional support.

3 Exporting Data

The purpose of this tool is to provide the user with a means of defining and devolving project requirements and capturing this information in a structured format. This information is also a valuable resource when discussing the project. To further enhance the value of the information input into the tool, two options are provided to export the data. First, An MS Word document is automatically generated for each project. This document is continually updated as information is input into the tool. The Word documents are saved to a separate document library in SharePoint. These Word documents can be downloaded and saved to the user's computer.

Corresponding Word documents are created and stored in the "SE Requirements Docs" library.

Second, the project information can also be exported into Excel from the SharePoint Library and saved to a local computer. When in the form library, click on the "Library" tab. Then click "Export to Excel."

Note that the data from ALL of the documents in the library will be exported into an Excel document (one InfoPath form per line). There is no way at this time to export the data from only one InfoPath form into Excel. However, once downloaded and saved to the user's computer, unnecessary rows can be deleted.