NSRP

National Shipbuilding Research Program

Software Development Plan

Guidance & Template

Guidance &Template



MISSION

* Manage and focus national shipbuilding and ship repair research and development funding on technologies that will reduce the cost of ships to the U.S. Navy and other national security customers by leveraging best commercial practices and improving the efficiency of the U.S. shipbuilding and ship repair Industry.
* Provide a collaborative framework to improve shipbuilding-related technical and business processes.

# INTRODUCTION

This guide and associated template have been created to assist project teams with developing a robust software development plan and executing their plan throughout the duration of the project.

The following are terms associated with this guide:

* [Technology Investment Agreement (TIA)](https://www.nsrp.org/resource-library/) – award vehicle used to carry out basic, applied, or advanced research projects when the research is to be performed at least in part by for-profit firms, especially as members of consortia. The TIA is signed by the Project Lead and the Program Administrator (ATI).
* [Research Announcement](https://www.nsrp.org/resource-library/) – Research Announcements (RAs) provide a method of contracting for research and development (R&D) based on notices posted on Federal Business Opportunities (FedBizOpps). The RA is general in nature, identifying areas of research interest, indicating criteria for selecting proposals, and soliciting the participation of all offerors capable of satisfying the NSRP's needs. The RA technique is used when meaningful proposals with varying technical/scientific approaches can be reasonably anticipated. RA projects typically run into the millions of dollars, funded with both government monies and industry cost share, and last up to three years.

# SOFTWARE DEVELOPMENT PLAN REQUIREMENT

A software development plan is required when software is proposed for development under a Major (RA) project. The Software Development Plan (SDP), together with the Project Management Plan (PMP) and Technology Transfer Plan (TTP), are to be submitted to the NSRP Program Administrator (ATI) within **75 days** of the date of the fully executed Technology Investment Agreement (TIA).

The attached template is a guide for the preparation of the SDP. The detail and the level of the plan will vary depending upon the scope and complexity of the project; therefore, not all sections are required in all cases. For a small software development effort which will not result in software that is maintained for a long period of time, a very short and brief plan is all that is required. For a large development effort in which several development activities are involved and will result in deliverable software that must be turned over to a maintenance activity or commercial enterprise for sale, a more extensive plan is required. In all cases, the SDP must include:

* Schedule
* Development organization
* Configuration management
* Software delivery media and interfaces
* Test plan (to the level of detail that is commensurate with the scale of the software being developed).

It is the responsibility of the project technical lead and the Program Technical Representative (PTR) to agree on the content of the plan and use the template according to the needs of the particular project.

{TEMPLATE}

National Shipbuilding Research Program

SOFTWARE DEVELOPMENT PLAN

Name of Project

Technology Investment Agreement #: 20XX-123

Project Lead Organization

Project Team Member Organization #1

Project Team Member Organization #2

Project Team Member Organization #3

Date of Submission

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# 1.0 SCOPE

[Provide overview explanation of the software system]

## 1.1 Identification

[Identify the system to which this SDP applies. Identify the specific software that is being developed/modified].

## 1.2 System Overview

[Briefly state the purpose of the system and/or the software to which this SDP applies. Briefly identify the project sponsor, user, developer and support agencies].

## 1.3 Document Overview

[Summarize the purpose and contents of this document (review the paragraphs’ subjects and briefly restate)].

## 1.4 Relationship to Other Plans

[Describe any relationship to related project management plans].

# 2.0 APPLICABLE DOCUMENTS

[List documents by number and title referenced as fundamental to this plan. Documents providing background or tutorial information may be listed in an appendix.]

# 3.0 SOFTWARE DEVELOPMENT MANAGEMENT

## 3.1 Project Organization and Resources

### 3.1.1 Facilities

[Describe the facilities to be used. Highlight the location of project-specific resources such as software engineering environment and software test environments. Supply schedule when facilities will be needed.]

### 3.1.2 Customer-Furnished Equipment, Software and Services

[Describe the customer-furnished equipment, software, services required for this effort. Include schedule when items are needed.]

### 3.1.3 Project Organization

[Provide a chart describing the overall project organizational structure including relationship to customer and management. Identify the authority and responsibilities of each organization. Delineate any subcontractor organizations, people and roles.]

### 3.1.4 Personnel

[Total and list the number of people necessary to complete the project by labor category or skill groupings: project management, software engineering, testing, software quality assurance, configuration management and other functions identified.]

## 3.2 Schedule and Milestones

[Schedule information is generally best combined and presented graphically (e.g., GANTT or PERT charts).]

### 3.2.1 Activities

[Briefly describe each software development activity and associated schedule (based on the total project schedule). Indicate all significant events: reviews, key meetings, demonstrations, audits, etc. For each activity, indicate: start date, complete date (on chart). Note areas of high risk.]

### 3.2.2 Activity Network

[Describe the sequential relationship among the activities of the project and identify those activities that impose the greatest time restrictions on project completion.]

### 3.2.3 Source Identification

[Identify the source(s) of the required resources (software, firmware, hardware) and provide a plan for obtaining the resources. Note the “need date” (milestone) and projected availability of each item.]

## 3.3 Risk Management

[Describe procedures for management of risks to successful project completion. Include:

1. known risk areas ranked by severity
2. factors contributing to the potential occurrence of each risk item
3. project procedures for monitoring (e.g., periodic reviews) and reducing risk factors (e.g., prototypes, feasibility studies)
4. contingency procedures for each area of risk.]

## 3.4 Security

[Describe security plans if project contains security requirements.]

## 3.5 Communication with other Contractors

[Describe plans for needed communication among project contractors or groups performing independent testing or validation.]

## 3.6 Subcontractor Management

[Describe plans for managing subcontractors. Describe measures and reporting frequency for tracking subcontractor progress on this project.]

## 3.7 Formal Reviews

[Describe internal preparation for and conducting of formal reviews.]

## 3.8 Software Development Library

[Describe the software development library (SDL) to be used for controlling and retaining the project software and documentation. Include the location, contents, responsible person for establishing and implementing the SDL, and methods for control of data stored in the SDL.]

## 3.9 Corrective Action Process

[Describe the corrective action process to be implemented on the project, including the recording and tracking of problems/actions, the responsible parties and reporting to management.]

## 3.10 Problem/Change Report

[Describe the format to be used for problem/change reports. These reports are used to track problems detected in the software, documentation or the process, and the corrective action needed to resolve the problems.]

## 3.11 Progress Reporting

[Describe the reports, including measures of progress to planned schedules and budgets that are planned for regular delivery to management and the customer. Include report type and frequency in the project software schedule.

## 3.12 Organization and Resources

### 3.12.1 Software Engineering Organization

[Refer to Section 3.1.3 in describing the software engineering organization. Show the relationship with other organizations; e.g., those performing software testing. Identify the authority and responsibilities of each organization. Include the reporting chain of any subcontractors].

### 3.12.2 Software Engineering Personnel

[Describe the number and skill levels of personnel who will perform the software engineering activities. Describe by title and minimum qualifications for each position.]

## 3.13 Software Engineering Environment

### 3.13.1 Software

[Identify the operating system, compilers, CASE tools, and other tools necessary to perform the software engineering activities. Identify any proprietary rights to the software, if appropriate.]

### 3.13.2 Hardware

[Identify the computer hardware, interfacing equipment that will be used in the software engineering environment. Describe the purpose of each item and identify any security issues or proprietary rights to the equipment.]

### 3.13.3 Installation Control and Maintenance

[Identify plans for installing and testing each item of the software engineering environment prior to its use. Describe plans to control and maintain each item, especially if other projects share the resource.]

## 3.14 Software Standards and Procedures

### 3.14.1 Software Development Techniques and Methodologies

[Identify and describe (or reference) the techniques and methodologies that will be used to perform: requirements analysis, design, code and unit testing, integration and system testing.]

### 3.14.2 Software Development Files

[Define plans for creating and maintaining software development files (SDFs). Define the contents of the SDFs and the procedures for maintaining the SDFs.]

### 3.14.3 Design Standards

[Describe or reference the design standards to be used in developing software.]

### 3.14.4 Coding Standards

[Describe or reference the coding standards to be used in developing software.]

## 3.15 Non-developmental Software

[Identify and describe any non-developmental software items (commercially available, reusable or customer-furnished software) to be incorporated into the system. Briefly describe the rationale for the use of each such item.]

# 4.0 TEST PLANNING

## 4.1 Organization - Testing

[Describe the testing organization. Refer to Sections 3.1.3 and/or 3.12.1 for this information.]

## 4.2 Test Approach

[Describe the basic approach for testing the software products].

## 4.3 Software Test Environment

[Identify the software, hardware, interfacing equipment and firmware items required to accomplish testing].

## 4.4 General Test Requirements

[Describe test requirements that apply to all the tests to be performed, for example:

1. Computer program size and execution time shall be measured.
2. Computer program shall be tested using nominal, maximum and erroneous data.
3. Computer program shall be tested for error detection and proper recovery.]

## 4.5 Test Definition

[Briefly describe each test to be performed: informal testing (unit and integration), formal testing (demonstrations, evaluations by non-development group), resources required. Describe any data recording/reduction/analysis to be performed].

## 4.6 Test Schedule

[Provide or reference the test schedule.]

## 4.7 Test Planning Assumptions and Constraints

[Describe any assumptions that were made in test planning and any constraints imposed upon by the customer.]

## 5.0 SOFTWARE PRODUCT AND PROCESS EVALUATIONS

## 5.1 Organization - Software Quality Assurance

[Refer to Sections 3.1.3 and/or 3.12.1 for this information. Describe the SQA organization, responsibilities, relationship to software engineering, testing and software configuration management.]

## 5.2 Software Product Evaluations Procedures and Tools

### 5.2.1 Procedures

[Describe procedures that will be used to evaluate the software and associated documentation.]

### 5.2.2 Tools

[Identify, define the purpose and description of tools to be used in the software product evaluation. To reduce duplication, references may be made to tools that are also used in the software engineering or software test environments].

## 5.3 Subcontractor Products

[Describe plans and procedures for evaluating the adequacy of requirements established for subcontractors, and for evaluating subcontractor products.]

## 5.4 Software Product and Process Evaluation Records

[Describe plans for maintaining records of each product and process evaluation performed. Identify the record formats to be used and the information to be recorded.]

## 5.5 Activity-dependent Product and Process Evaluations

[The following paragraphs address plans for product and process evaluations during each of the software development activities (i.e., requirement analysis, design, code and unit test, integration and test, system test).]

### 5.5.1 Software Products and Process Evaluation - (activity name)

[Identify specific products and the evaluation criteria to be used. Identify tools and procedures to be employed.]

# 6.0 SOFTWARE CONFIGURATION MANAGEMENT

## 6.1 Organization and Resources - Configuration Management

[Refer to Sections 3.1.3 and/or 3.12.1 for this information. Describe SCM functions, responsibilities and skills. Define the members and role of the Configuration Control (or review) Board.]

## 6.2 Configuration Identification

### 6.2.1 Developmental Configuration Identification

[Identify internal software items that will be controlled. Describe the method for establishing the configuration.]

### 6.2.2 Identification Methods

[Describe the naming, marking, numbering of the software files and documentation that will be used to identify the software products. Describe how revisions to these products are identified.]

## 6.3 Configuration Control

### 6.3.1 Flow of Configuration Control

[Provide a graphical description of the process by which software problems and changes are submitted, reviewed and resolved.]

### 6.3.2 Reporting Documentation

[Describe the reporting forms to be used in controlling software problems and changes.]

### 6.3.3 Review Procedures

[Describe the procedures to be followed by the review board.]

### 6.3.4 Storage, Handling and Release of Project Media

[Describe the storage library for the software and documentation, and the archival methods used for retention of project media.]

### 6.3.5 Additional Control

[Identify any additional configuration control activities not discussed above.]

## 6.4 Configuration Status Accounting

[Define the records to be maintained and the reports to be made on the configuration status.]

## 6.5 Controlling Documentation Change

[Describe procedures to prepare for and respond to approval of documentation and specifications. Include: submitting documents to the customer for review; ensuring approved changes have been incorporated; and updating the configuration status accounting reports to reflect approved baseline(s).]

## 6.6 Product Release

[Describe the methods for releasing software products including: verifying incorporated changes, obtaining customer review/approval, handling materials to be stored, and updating status accounting records with approved baseline. Describe any procedures for delivery to the customer.]

## 6.7 Configuration Management Major Milestones

[Identify the major internal and external (customer-involved) milestones related to software configuration management.]

## 6.8 Vendor and Subcontractor Management

[Describe methods used to control and verify subcontractor and vendor products.] A Project Management Plan **is required** for all Research Announcement projects and must be approved by the Project Technical Representative (PTR) upon submission to Advanced Technology International (ATI).

This guide has been created to assist project teams in developing a strong project management plan that reflects both the objectives of the project and the overall mission of the National Shipbuilding Research Program.

This template includes essential elements of a well-composed project management plan, including team structure, activities schedule, milestone schedule, budget, as well as any associated plans --communications plan, risk management plan, software development plan (if applicable), and technology transfer plan **(required).**

Also included are templates for technical and business quarterly reports, which are to be submitted on a quarterly basis to ATI, who is responsible for reporting the status of current projects to the Navy. As noted in Article IX, Section E, Distribution Statement, of the Technology Investment Agreement, it a requirement that all data and reports be marked with a distribution statement to denote the extent of its availability for distribution, release, and disclosure without additional approvals or authorizations. It is important for project teams to become familiar with the Program distribution statements, which are included in the [Technology Transfer & Implementation Guide](https://www.nsrp.org/resource-library/).

In addition, there is a presentation template to be used for technology transfer activities.

# 7.0 NOTES

# APPENDICES

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