NOAA NESDIS
CENTER for SATELLITE APPLICATIONS
and RESEARCH (STAR)

TASK GUIDELINE

**TG-3
PROJECT PROPOSAL (STEP 3)
TASK GUIDELINES**

Version 3.0

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TITLE: TG-3: PROJECT PROPOSAL (STEP 3) TASK GUIDELINE VERSION 3.0

AUTHORS:

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VERSION HISTORY SUMMARY

Version	Description	Revised Sections	Date
1.0	No version 1		
2.0	No version 2		
3.0	New Task Guideline adapted from CMMI guidelines by Ken Jensen (Raytheon Information Solutions)	New Document	10/01/2009

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LIST OF ACRONYMS

ATBD	Algorithm Theoretical Basis Document
CI	Cooperative Institute
CICS	Cooperative Institute for Climate Studies
CIMSS	Cooperative Institute for Meteorological Satellite Studies
CIOSS	Cooperative Institute for Oceanographic Satellite Studies
CIRA	Cooperative Institute for Research in the Atmosphere
CL	Check List
CLI	Check List Item
CoRP	Cooperative Research Program
CM	Configuration Management
CMMI	Capability Maturity Model Integration
CREST	Cooperative Remote Sensing and Technology Center
DG	Document Guidelines
EPG	Enterprise Process Group
EPL	Enterprise Product Lifecycle
G2RR	Gate 2 Review Report
NESDIS	National Environmental Satellite, Data, and Information Service
NOAA	National Oceanic and Atmospheric Administration
PAR	Process Asset Repository
PG	Process Guidelines
PP	Project Proposal
PRG	Peer Review Guidelines
QA	Quality Assurance
R&D	Research & Development
PP	Project Proposal
SEI	Software Engineering Institute
SG	Stakeholder Guideline
SPSRB	Satellite Products and Services Review Board

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STAR	Center for Satellite Applications and Research
SWA	Software Architecture
TD	Training Document
TG	Task Guideline

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1. INTRODUCTION

The NOAA/NESDIS Center for Satellite Applications and Research (STAR) develops a diverse spectrum of complex, often interrelated, environmental algorithms and software systems. These systems are developed through extensive research programs, and transitioned from research to operations when a sufficient level of maturity and end-user acceptance is achieved. Progress is often iterative, with subsequent deliveries providing additional robustness and functionality. Development and deployment is distributed, involving STAR, the Cooperative Institutes (CICS[1], CIMSS[2], CIOSS[3], CIRA[4], CREST[5]) distributed throughout the US, multiple support contractors, and NESDIS Operations.

NESDIS/STAR is implementing an increased level of process maturity to support the development of these software systems from research to operations. This document is a Task Guideline (TG) for users of this process, which has been designated as the STAR Enterprise Product Lifecycle (EPL).

1.1. Objective

The STAR EPL is designed as a sequence of 11 process steps that take a product from initial conception through delivery to operations. These steps are:

- Step 1 - Basic Research (TG-3)
- Step 2 - Focused R & D (TG-3)
- **Step 3 - Project Proposal (TG-3)**
- Step 4 - Resource Identification (TG-4)
- Step 5 – Development Project Plan (TG-5)
- Step 6 - Project Requirements (TG-6)
- Step 7 - Preliminary Design (TG-7)

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[1] Cooperative Institute for Climate Studies

[2] Cooperative Institute for Meteorological Satellite Studies

[3] Cooperative Institute for Oceanographic Satellite Studies

[4] Cooperative Institute for Research in the Atmosphere

[5] Cooperative Remote Sensing and Technology Center

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- Step 8 - Detailed Design (TG-8)

- Step 9 - Code & Test Data Development (TG-9)

- Step 10 - Code Test And Refinement (TG-10)

- Step 11 - System Integration and Test (TG-11)

The objective of this Task Guideline (TG-3) is to describe how to perform the standard tasks of STAR EPL process step 3, "Project Proposal".

The intended users of this TG are all participants in the STAR EPL process who are involved in performing the standard tasks of step 3. Participants are referred to as STAR EPL stakeholders.

To determine whether or not they should be involved with this step, the readers of this TG should first determine what stakeholder roles apply to their participation in a STAR research-to-operations development project. Generic stakeholder roles are listed in Section 3 of this TG and discussed in Section 3.2 of the EPL Process Guideline (PG-1)[6]. PG-1 and this TG will direct stakeholders to Stakeholder Guidelines (SG) that are pertinent to their roles.

1.2. Version History

This is the first version of TG-3. It is identified as version 3.0 to align it with the release of the version 3.0 STAR EPL Process Asset Repository.

1.3. Overview

This TG contains the following sections:

Section 1.0 - Introduction
Section 2.0 - References
Section 3.0 - Stakeholders
Section 4.0 - Gate 2 Review
Section 5.0 - Project Artifacts
Section 6.0 - Task Descriptions

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[6] It is recommended that potential STAR EPL stakeholders either review PG-1 prior to using this TG or use it as a reference while using this TG.

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2. REFERENCE DOCUMENTS

All of the reference documents for the STAR EPL process are STAR EPL process assets that are accessible in a Process Asset Repository (PAR) on the STAR website.
http://www.star.nesdis.noaa.gov/star/EPL_index.php.

Process assets include:

- Process Guidelines
- Stakeholder Guidelines
- Task Guidelines
- Peer Review Guidelines
- Review Check Lists
- Document Guidelines
- Training Documents

2.1. Process Guidelines

Process Guideline (PG) documents describe STAR's standard set of practices and guidelines for tailoring them to specific projects.

- STAR EPL Process Guidelines (PG-1)
- STAR EPL Process Guidelines Appendix (PG-1.A)

PG-1 and PG-1.A apply generally to each EPL step. Each stakeholder performing tasks during each step can benefit from a familiarity with these documents.

2.2. Stakeholder Guidelines

A Stakeholder Guideline (SG) is a description of how to perform all STAR EPL standard tasks assigned to a given type of stakeholder. It should itemize the actions to be taken. It should contain appropriate standards, conventions, and (where appropriate) examples. It should point to the appropriate references and the required artifacts.

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Stakeholder roles are identified in Section 3 of this TG. For each type of stakeholder, the appropriate SG provides that stakeholder with a complete description of the standard tasks for that stakeholder role, along with references to all appropriate process assets and project artifacts (c.f. Section 5 of this TG). This functions as a complement to the TGs (c.f. Section 2.3 of this TG), which provide a completion description of all stakeholder tasks for a specific process step.

Table 2.2.1 lists the Stakeholder Guidelines that are relevant to this step.

TABLE 2.2.1 – Stakeholder Guidelines for Step 3

ID	Stakeholder
SG-6	STAR QA
SG-7	STAR Managers
SG-8	Research Leads
SG-9	Research Scientists
SG-10	Research Testers
SG-11	Research Programmers

2.3. Task Guidelines

A Task Guideline (TG) is a description of how to perform the tasks of a STAR EPL process step. It should itemize the actions to be taken. It should contain appropriate standards, conventions, and (where appropriate) examples. It should point to the appropriate references and the required artifacts. There is one Task Guideline for each step in the STAR EPL. The relevant TG for this step is TG-3 (this document).

2.4. Peer Review Guidelines

For each review (c.f. Section 4), there is a Peer Review Guideline (PRG) that describes the objectives of the review, the required artifacts, standards for reviewers, requirements for approval, and options other than approval. For step 3, the relevant PRGs are:

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- Gate 2 Review Guidelines (PRG-3)

- Gate 3 Review Guidelines (PRG-5)

2.5. Review Check Lists

For each review (c.f. Section 4), there is a Review Check List (CL) that captures all the objectives for a review as a set of check list items. Each item in the check list should have a "Disposition" column that contains "Pass", "Conditional Pass", "Defer", "Waive", or "N/A" (Not Applicable). Each item will also have columns for Risk Assessment and for Actions generated. For step 3, the relevant CLs are:

- Gate 2 Review Check List (CL-3)

- Gate 3 Review Check List (CL-5)

2.6. Document Guidelines

There is a Document Guideline (DG) for each standard STAR EPL document. Each DG includes a description of the purpose for the document, a standard document outline (table of contents), a brief description of each subsection in the outline, and an Appendix containing an example document.

Table 2.6.1 lists the Document Guidelines that are relevant to this step.

TABLE 2.6.1 – Document Guidelines for Step 3

ID	Document
DG-3.1	Project Proposal (PP)
DG-3.2	Gate 2 Review Report (G2RR)

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3. STAKEHOLDERS

The STAR Enterprise is comprised of a large number of organizations that participate and cooperate in the development and production of environmental satellite data products and services. Individual project teams are customarily composed of personnel from these organizations, supplemented by contractor personnel. These organizations and project teams are referred to as the STAR Enterprise stakeholders.

An overview of the stakeholder roles is provided in the STAR EPL Process Guidelines (PG-1, c.f. Section 2). A more detailed description can be found in the Stakeholder Guidelines (SGs, c.f. Section 2).

Stakeholders who have a role during step 3 include:

- STAR QA (SG-6)
- STAR Manager (SG-7)
- Research Lead (SG-8)
- Research Scientist (SG-9)
- Research Tester (SG-10)
- Research Programmer (SG-11)
- Research Manager (SG-12)

STAR QA is the quality assurance (QA) group for the STAR organization. QA is responsible for ensuring that each project's tailored process meets STAR EPL process standards and ensuring that each project meets its process requirements during its pre-operational development phases. QA works with the STAR Enterprise Process Group (EPG) to ensure effective implementation of the process throughout the organization.

STAR Managers include the STAR Division Chiefs and Branch Chiefs. Management is responsible for management oversight of all STAR projects.

A *Research Lead* is any person located at a research organization who is leading a group of scientists, programmers, and testers that is working on preparing an algorithm for a STAR/SPSRB Project Proposal to develop a product for transition to operations. If the proposal is approved for development, the **Research Lead** will usually lead the development effort in the role of **Development Lead**.

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A *Research Scientist* is a scientist located at a research organization who has been assigned by the **Research Lead** to one or more of the tasks of developing new or improved algorithms, reviewing algorithm development, and preparing STAR/SPSRB project proposals.

A *Research Tester* is any person located at a research organization who has been assigned by the **Research Lead** to one or more of the tasks of identifying test data appropriate to a research algorithm as it is being developed, acquiring and integrating the test data into the research product processing system, creating test plans, executing tests, and analyzing and reporting test results for review.

A *Research Programmer* is a programmer located at a research organization who has been assigned by the **Research Lead** to one or more of the tasks of designing research code, writing research code, and supporting **Research Testers** in testing research code.

A *Research Manager* provides project monitoring and control oversight of research projects, including participation in project management (Gate) reviews. Research projects produce R&D algorithms for consideration as potential development projects.

Stakeholder satisfaction is a critical component of the process. The intention is for the process to be more of a benefit that a burden to stakeholders. If stakeholders are not satisfied that this is the case, the process will require improvement.

Stakeholders are strongly encouraged to provide feedback to the EPG. Comments and suggestions for improvement of the process architecture, assets, artifacts and tools are always welcome. Stakeholders can provide feedback by contacting:

Ken.Jensen@noaa.gov

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4. GATE 2 REVIEW

Gate 2 is a STAR review of a STAR Research Project Proposal. Its purpose is to determine whether the proposal is compatible with the NESDIS mission and strategic plan, and is technically feasible for development into an operational product. Resource issues are not considered at this time. If a project passes Gate 2, a Development Lead is assigned and the Plan phase commences.

Standard Gate 2 Review objectives:

- Review the project proposal and supporting artifacts (algorithm theoretical basis, software architecture, R&D code and R&D test results) to determine whether the algorithm has operational potential.

- Identify a STAR Division and Branch to implement Development

Standard Gate 2 Review entry criteria:

- Entry # 1 - An Algorithm Theoretical Basis Document (ATBD v1r1) has been written.

- Entry # 2 - A Software Architecture Document (SWA v1r1) has been written.

- Entry # 3 – Research code to implement the algorithm has been written.

- Entry # 4 – A Project Proposal (PP) has been submitted to STAR

- Entry # 5 – A User Request has been attached to the PP

Standard Gate 2 Review exit criteria:

- Exit # 1 – Algorithm and ATBD are satisfactory

- Exit # 2 – Software architecture and SWA are satisfactory.

- Exit # 3 – Research test results, documented in the ATBD, demonstrate that the algorithm has operational potential.

- Exit # 4 – Proposed operational products support the NESDIS mission and strategic plan

- Exit # 5 - A STAR Division and Branch has been identified to implement Development

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- Exit # 6 - Project is recommended for Development

Refer to PRG-3 for a more detailed description of the Gate 2 Review. The standard Gate 2 Review Check List Items (CLI) are documented in the process asset CL-3 (c.f. Section 2).

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5. PROJECT ARTIFACTS

Project Artifacts are a set of items that must be produced by the appropriate stakeholders during the product life cycle to support the reviews. They are established and maintained under Configuration Management (CM) by an Enterprise Process Group (EPG) under the direction of a Steering Committee.

The project artifacts are maintained in a project artifact repository. This is a complete set of configuration-managed artifacts developed by each project in accordance with STAR standards. When a project artifact has been approved at a Technical Review or Gate Review, it is placed in the project artifact repository under CM. Project artifacts that are recommended for development during step 3 are listed in Table 5.1.

TABLE 4.1 – Step 3 Artifacts

Artifact	Type	Review	Baseline Build
Project Proposal	Document	Gate 2	1.0
Gate 2 Review Report	Report	Gate 3	1.0

Project Proposal: The Project Proposal (PP) is produced for the Gate 2 Review. SPSRB and STAR will review the project proposal to determine whether the project should be approved for transition from research to operations. SPSRB requires a User Request to initiate this review. STAR standards call for the project proposal to include this User Request, and describe the supporting artifacts (research code and test data, ATBD, SWA). The PP should provide the information needed for a Technical Assessment and Cost Assessment. Refer to DG-3.1 for detailed PP guidelines.

Gate 2 Review Report: The Gate 2 Review Report (G2RR) is produced for each project approved for development. It reports the results from the STAR review of the project proposal. It should identify the STAR Branch that will be responsible for development, identify a Development Lead, optionally identify other Development personnel, and identify requested funding for the development project. It should include an initial assessment of project risks, and a preliminary identification of risk mitigation actions. Refer to DG-3.2 for detailed G2RR guidelines.

Note that these artifacts are typically included in the first STAR Baseline Build (BB 1.0). BB 1.0 provides the artifacts for the Gate 3 Review. In determining the step 3 artifacts to be developed, and consequently the step 3 activities to authorize, Research Managers should

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consider how the step 3 activities and artifacts support the STAR EPL objectives for the Gate 3 Review. Refer to PRG-5 for Gate 3 Review objectives.

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6.   TASK DESCRIPTION

6.1 Project Proposal Process Flow
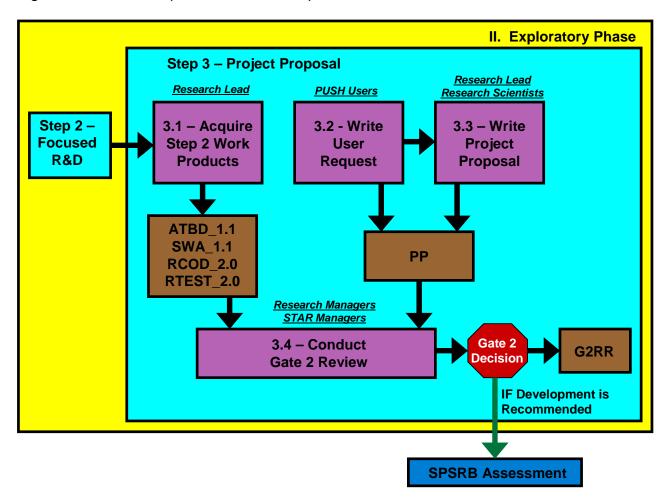
Figure 6.1 shows the process flow for step 3.

Figure 6.1 – STEP 3 Process Flow

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6.2 Expected BEGIN State

- The research algorithm has been matured and documented in ATBD v1r1

- A software architecture has been matured and documented in SWA v1r1

- R&D code has been written that implements the algorithm well enough to produce proxy data products to support a Project Proposal (PP) to STAR.

- R&D code has been run with research test data to produce the proxy data products

- R&D code test results, documented in ATBD v1r1, demonstrate whether or not the algorithm's operational potential warrants the submission of a PP.

6.2.1 Task Inputs

Algorithm Theoretical Basis Document v1.1: The Algorithm Theoretical Basis Document (ATBD) provides a theoretical description (scientific and mathematical) of the algorithm that is used to create a product that meets user requirements. The ATBD is typically updated from the v1.0 version, as R&D provides additional maturity. At this step, the algorithm's operational potential has been demonstrated to the satisfaction of the Research organization and is now being further developed to support a research to operations development proposal. The purpose of ATBD v1.1 is to demonstrate that the algorithm should be developed for transition to operations. Refer to DG-1.1 for detailed ATBD guidelines.

Software Architecture Document v1.1: The Software Architecture Document (SWA) complements the ATBD by providing the software architecture for the processing code that will implement the algorithm. The SWA may be updated from the v1.0 version, if the additional algorithm maturity warrants additional and/or more detailed software architecture. Refer to DG-1.2 for detailed SWA guidelines.

R&D Code: Research & Development (R&D) Code (RCOD v2) is research code that implements the algorithm. It should use input data and produce output data that is described in the ATBD and SWA. It should include the processing functionality described in the ATBD and SWA. R&D code is expected to be an upgrade over Basic Research code. Code may include additional functionality to reflect upgraded software architecture and may be revised to comply with SPSRB coding standards. If the project is approved for development, this version of the code will be built into the initial project baseline. It is therefore expected that SPSRB coding standards will begin to be applied to the code.

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Currently, coding standards exist for Fortran, C, and C++ code, and general programming standards exist for all code. These standards are found on the SPSRB web site at
http://projects.osd.noaa.gov/spsrb/standards_prog.htm

R&D Test Data: R&D Test Data (RTEST v2) are the data files used to test the R&D code, including the input data and output data identified in the ATBD and SWA. They may be upgraded from the Basic Research Test Data, if the upgraded R&D code requires this.

Note that these artifacts are typically included in the first STAR Baseline Build (BB 1.0). BB 1.0 provides the artifacts for the Gate 3 Review. In determining the step 2 artifacts to be developed, and consequently the step 2 activities to authorize, Research Managers should consider how the step 2 activities and artifacts support the STAR EPL objectives for the Gate 3 Review. Refer to PRG-5 for Gate 3 Review objectives.

Gate 1 Review Report: Gate 1 Review Report (G1RR) is the report of the Gate 1 Reviewers. The G1RR should consist of an assessment of the Gate 1 Review artifacts and a yes/no decision on proceeding to the next phase of the EPL. Refer to DG-1.3 for G1RR document guidelines.

6.2.2 Corrective Actions

The G1RR will document any actions that are needed to reduce risk during step 3. Usually, these actions should be closed before a Project Proposal is submitted for a Gate 2 Review.

6.3 Desired END State

- A Project Proposal (PP) has been submitted to STAR.

- A User Request has been attached to the PP.

- A Gate 2 Review of the PP has been conducted.

- A Gate 2 Review Report (G2RR) has been written.

- If the project has been recommended for Development, a STAR Division and Branch has been selected to implement Development, and a Development Lead has been identified. This information is included in the G2RR.

- The PP and G2RR have been submitted to the SPSRB for its assessment.

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6.3.1 Task Outputs

- Project Proposal
- User Request
- Gate 2 Review Report

6.4 Project Proposal Activities

Research Lead takes control of the step 2 work products (ATBD, SWA, R&D code, R&D test data).

Research Lead and **Research Scientists** prepare a Project Proposal (PP), using the step 2 artifacts as references and DG-3.1 for guidance.

PUSH Users, who may be the **Research Scientists,** prepare a User request, using SPSRB standards for guidance. The User Request is attached to the PP.

Research Lead informs **STAR Managers** that a proposal is ready for a Gate 2 Review.

STAR Managers decide which Branch of which Division will lead the Gate 2 Review. This Branch will usually continue to oversee the project's development during subsequent phases. **STAR Managers** will select a Gate 2 Review team, including a **Review Lead**. The **Review Lead** is nominally the Branch Chief, but an alternative lead can be selected by the Branch Chief in consultation with the Division Chief. PRG-3 should be consulted to ensure that the review team is qualified to assess the PP. It is expected that one or more **Research Managers** will participate. Reviewers should be familiar with the Gate 2 Review guidelines (PRG-3) and checklist (CL-3).

Gate 2 Reviewers will determine whether the PP demonstrates that the project is compatible with the NESDIS mission and strategic plan, and is technically feasible for development into an operational product. If so, the project is recommended to the SPSRB for Development. If not, the project is either terminated or returned to the research organization with recommendations for improvement and re-submittal. **STAR QA** verifies that the Gate 2 Review was conducted in accordance with STAR EPL standards.

This step culminates with the Gate 2 Review Report. This artifact is written by the **Review Lead** with assistance from the **Gate 2 Reviewers**. Guidelines for this report will be found in DG-3.2. The PP and G2RR are submitted to the SPSRB for its assessment.

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Each stakeholder who performed activities during step 3 is encouraged to document an assessment of the experience in a personal record. This assessment should include: what was good, what was bad, what worked, what did not work, what can be improved, how it can be improved.

The **Research Lead** should remind the stakeholders to do this. At the conclusion of Development (step 11), the **Development Lead** will collect the final edited personal stakeholder records and incorporate them into a Development Project Report (DPR).

END OF DOCUMENT