KRATOS

Lanham, Maryland

PROCEDURE
Engineering, QA/CM

Title: Product Engineering and Verification Date: 10/28/22

APPROVED BY Author, Owning Manager, BMS Management Representative, and Document Controller

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STATUS

This is a spinoff of EN-003 to address the action item to create two procedures: One for products and one for projects. This procedure is for Products.

Rev A updates the Author and BMS Manager.

OVERVIEW

The Product Manager and Product team follow this procedure when engineering Product Components. The procedure applies to developing new products and modifying existing products developed by Kratos.

The purpose of the Product Engineering and Verification phase is to create new or evolve current product components, as necessary, to complete the next development cycle, as defined by either milestones in a Project Plan or when following a regular release cycle for the enhancement of a specific product or products. The Product Engineering and Verification procedure (EN-008) can be performed in parallel with the Project Planning procedure (EN-002); both are described at a higher level in the Design and Development procedure (EN-001). Primary input to this procedure consists of a list of desired features to be contained in the next release cycle. The features list will generally contain a combination of new features and bug fixes. Often times the new features are from customer requirements, but may also come from internal ideas and suggestions.

The Product Engineering and Verification phase ends when a product has been tested within the Product Group, has been found to satisfy all of its requirements and is ready for the validation phase, where additional tests may be conducted in the customer's (internal or external) environment, as appropriate.

A brief summary of the authorities and responsibilities of the various parties involved in Product Engineering and Verification is provided in Table 1.

Table 1. Authorities and Responsibilities for Product Engineering and Verification

FUNCTION	AUTHORITY AND RESPONSIBILITY
Product Manager	Oversee Product Engineering and Verification activities. The Product Manager ensures that each Product Component is verified before releasing it to a Project. The Product Manager has the authority to declare that a product component is a releasable version and ready for the validation phase.
Product Team	Perform and/or coordinate required Product Engineering and Verification activities according to the plans and directions of the Product Manager

PROCESS

The Product Engineering and Verification procedure is illustrated in Figure 1.

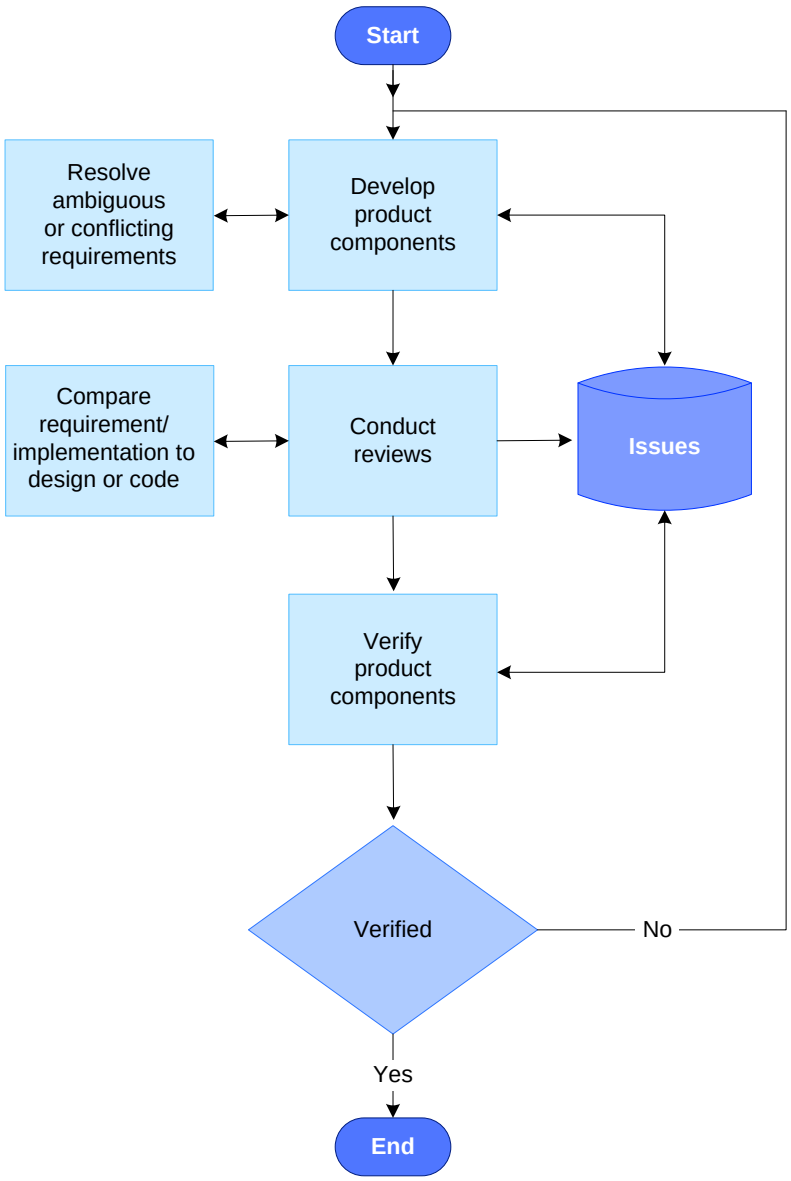

Figure 1. Product Engineering and Verification Process

A. Develop Product Components

The Product Team develops each product component against a set of agreed upon new requirements.

A Technical Interface Documentation is developed as necessary to define the boundary (i.e., interface) between the product being developed and another product or project.

Products may have a Product Specification. The Product Specification describes what the product is required to perform. The complete set of Product documentation, including User Manuals, may be considered the Product Specification. The Product Specification can be derived from current and new customer documents, such as the statement of work, and design specifications. It can also be derived from RFPs submitted by Kratos, along with internal ideas and suggestions. As needed, Kratos may derive additional requirements necessary for the product's intended use. Design and development input includes:

a. Functional and performance requirements as identified by the list of desired features.

b. Applicable information derived from previous designs.

c. Any other requirements essential for design and development.

Ambiguous or conflicting requirements will be resolved.

B. Conduct Reviews

Depending on the scope/nature of the new/modified component, reviews may be held to ensure the products being developed meet the requirements. Reviews may be formal or informal. For formal reviews, normally held for new products or substantial product enhancements, the results and changes will be recorded and approved as appropriate (e.g., issues, minutes, or report). Formal reviews may be conducted with the customer and/or with appropriate members of the Project Team. Relevant parties will be notified of changes that occur throughout the development phase. Refer to the Configuration Management Procedure (EN-005) for change control details. While peer reviews are usually conducted informally, they identify technical issues, concerns, errors, and defects at the earliest possible stage of software development so that they can be resolved with the least impact. These reviews involve only technical staff, and may occur at both scheduled and appropriate intervals and are generally needed when developing complicated new/modified components. Follow-up reviews are conducted, as appropriate, to cover required issues. The Product Manager or a designate, such as a Technical Lead, has overall responsibility for conducting and facilitating all reviews. Reviews and any resulting actions including specific notes about design along with participants should be documented using the product issues database or applicable repository.

C. Verify Product Components

The Product Team verifies that the product components meet the design input requirements as documented in the Product Specification and/or other project requirements. This verification is performed according to the Product Test Plan. The Product Test Plan may contain product acceptance criteria. The types of inspections and tests performed to verify the product should be identified in the test plans. Test plans can include product regression testing, satellite-specific regression testing, and issue validation testing. The precise testing performed is chosen based on the breadth of product changes for a release. However, often times the verification of a product component may only be able to be determined by the project team that has requested the component. Product issues describe findings from the tests and reviews. If defects are found, the Product Manager and Product Team record the required changes in the product issues database or applicable CM repository. The Product Manager must approve design, development and verification output documents before they are released to the customer and/or project team.

D. Approve Product Components

If the Product Components are approved for use in the validation phase, the Product Manager generates Product Verification Records. These Product Verification Records may include Test Readiness Review Records, Test Reports, and other relevant records relating to product verification. These records are examined by the PM in order to determine Pass/Fail of the candidate release. If the product passes, the PM creates the Product Approval record authorizing the release of the product to the validation phase. If there are any technical interfaces with external products, the Product Manager transmits the verified Technical Interface Documentation to the affected parties.

RECORDS

Table 2 lists the output records associated with this procedure.

Table 2. Records

NAME	LOCATION	RESPONSIBILITY	MINIMUM BACKUP FREQ.	MINIMUM RETENTION PERIOD
All Review Results including peer and test results	Resp. Product/Electronic Records Area/Issues Databases	Product Manager	Weekly	3 Years
Product Test Plan and Test Report	Resp. Product/Electronic Records Area/Issues Databases	Product Manager	Weekly	3 Years
Design Output Document Approval	Resp. Product/Electronic Records Area/Issues Databases	Product Manager	Weekly	3 Years
Product Specification or Users Manuals / Release Notes	Resp. Product/Electronic Records Area/Issues Databases	Product Manager	Weekly	3 Years
Product Verification (release) Approval	Resp. Product/Electronic Records Area/Issues Databases	Product Manager	Weekly	3 Years

Table 3. Revision History

REVISION LETTER	DATE	DESCRIPTION
Original	07/09/21	Very minor grammatical edits. No new revision letter. Just updated the dates.
Rev A	10/28/22	Updated the Author and BMS Manager.

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