

Product Life Cycle Management Guideline

EDM-P-211
New Product Planning
A System Engineering Approach
V1.2
August 2026

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The Product Life Cycle Management Guideline

The Product Life Cycle Management (PLCM) Guidelines intend to provide guidelines for the overall management of the life cycle of electronics and of the electronics' aspects of products containing electronics with focus on the design, manufacturing, operation, reliability and end-of-life.

- The recommendations given in the guidelines are intended to help the user in the Product Life Cycle Management of electronics and products with integrated electronics.
- The PLCM guidelines promote the use of scientific methods such as physical modeling, physics-of-failure based accelerated testing, simulation, virtual prototyping, etc. Physical models extend the capability of predicting the designed product's properties and behavior beyond experience. This provides a cutting-edge innovation advantage over an experience and test-based development approach.
- Physical models reduce the development cost and time by reducing product testing and, especially, the number of design iterations.

Product Life Cycle Stages and Phases

The following Product Life Cycle stages and phases are distinguished, see EDM-P-200.

New Product Exploration

1. Problem Research

Evaluation of the product idea by experts and stakeholders on its technological feasibility, its viability of providing a solution to a user problem and its business potential. The output is a first assessment of business problem/opportunity, a preliminary solution concepts, and a in-depth **Product Research plan**.

2. Product Research

In-depth exploration and validation of most viable product options. The output of this phase is **Validated Concept**, demonstrating the desirability, feasibility and viability of the product solution.

New Product Planning

3. Product Specification

Based on the Validated Concept and in-depth understanding of the stakeholder needs and business opportunities, the requirements for the product are created. The output of the Specification phase is a high-level description of the product to be designed: the **Product Requirements Document (PRD)**.

4. Product Planning

The planning phase creates a business, operations and development plan for the product. It contains the main targets and their critical milestones and timing specified in a comprehensive **New Product Introduction (NPI) plan**.

New Product Introduction

5. Architecture

Based on the PRD the product's architecture is defined, the **Detailed Product Specification** and the **detailed NPI project plan** are created.

6. Design

Execution of the detailed design based on the output of the Architecture phase. Specification of the new product including manufacturing instructions for the product prototypes.

7. Prototyping

Design evaluation and product qualification on product prototypes.

8. Industrialization

Preparation of the regular production of the product and hand-over to operations.

Product-to-customer Stage

9. Production

Product manufacturing including quality management throughout the operational lifetime of the product.

10. Distribution

Distribution of products from the production warehouse(s) to the customer(s).

Product-at-customer Stage

11. Installation

Installation and start-up of the product at the customer's site.

12. Product Operation

Product operation including aspects like reliability and maintenance throughout the operational lifetime of the product.

Retirement Stage

13. Decommissioning

Actions taken to end the product's use.

14. The End

Re-use, recycling and/or waste handling of products that have been decommissioned.

Product Life Cycle related and supporting activities

The following related activities are identified:

1. Technology Development (product independent)
2. Component Development (product dependent)

The following supporting activities applicable to a class of products are identified (not limiting):

1. Technology qualification program
2. Design methods and guidelines
3. Product verification, validation and certification
4. Qualified supply chain
5. New Product Introduction Program
6. Product Change Program
7. Quality Control Program
8. Maintenance Program
9. Decommissioning Program
10. Re-use, recycling and waste handling

These activities belong to the Life Cycle Model Management process and Quality Management per ISO/IEC/IEEE 15288, 6.2.1. respectively 6.2.5.

Acknowledgement

Funding organizations

Agentschap Ondernemen is acknowledged for funding the project VIS-traject InProVoL and the ICON-project Compact (Flanders Make) and VLAIO for funding the COOCK-project "Oriënteren en Beslissen in Slimme Product Exploratie", that have provided the basis for this guideline.

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Table of Contents

The Product Life Cycle Management Guideline.....	2
Acknowledgement.....	3
1. Applicable Documents	5
2. Applicability of the PLCM Guideline EDM-P-211	5
3. The Electronics Product Life Cycle: an overview.....	6
3.1. Definitions	6
3.2. Top-view on Product Innovation Stages	6
3.3. New Product Exploration Stage in a nutshell	8
4. Product Life Cycle Processes in the NPP stage.....	9
4.1. Alignment with ISO/IEC/IEEE System Engineering standards	9
4.2. Needs versus Requirements per ISO/IEC/IEEE 15288.....	10
4.3. System Requirements Definition per ISO/IEC/IEEE 15288.....	11
4.4. Planning Process per ISO/IEC/IEEE 15288.....	12
4.5. Architecture Definition per ISO/IEC/IEEE 15288.....	13
4.6. Project Technical Management preparation	14
4.7. Technical and Agreement Process preparation	15
5. Electronics in the NPP stage.....	17
5.1. Electronics as system elements	17
5.2. Electronics as the system-of-interest	18
8. Use of System Engineering standards by SME.....	20
Revisions	21

1. Applicable Documents

This Product Life Cycle Management Guideline refers the most recent version of the following documents:

ISO/IEC/IEEE 15288	Systems and Software engineering – System life cycle processes
ISO/IEC/IEEE 24748-1	Systems and Software engineering – Life cycle management – Part 1: Guidelines for life cycle management.
ISO/IEC/IEEE 29148	Systems and software engineering – Life cycle processes - Requirements Engineering
ISO/IEC/IEEE 42010	Systems and Software engineering – Life Cycle Processes – Architecture Description
ISO/IEC/IEEE 16326	Systems and Software engineering – Life Cycle Processes – Project management.
ISO/IEC/IEEE 16085	Systems and Software engineering – Life Cycle Processes – Risk Management
ISO 31000	Risk Management –Guidelines
ISO 10007	Quality Management – Guidelines for Configuration Management
IEEE Std 828	Configuration Management in Systems and Software engineering
ISO/IEC/IEEE 15939	Systems and Software engineering – Life Cycle Processes – Measurement Process
ISO/IEC TR29110-1	Systems and Software Engineering – Lifecycle profiles for Very Small Entities (VSEs) – Part 1: Overview
INCOSE	System Engineering Handbook: A guide for system life cycle processes and activities, 4 th Edition, Wiley, 2015.
EDM-P-200	Predictive Product Life Cycle Management of Electronics
EDM-P-210	New Product Exploration: A System Engineering Approach
EDM-Q-200	Electronic Assembly Technology Qualification: “A White Box approach”

2. Applicability of the PLCM Guideline EDM-P-211

- 2.1. EDM-P-211 describes a methodology to define the new product requirements and specifications, as well as to plan the New Product Introduction (NPI) stage. The method is based on the system life cycle processes and life cycle management framework provided by ISO/IEC/IEEE 15288 respectively ISO/IEC/IEEE 24748-1.
- 2.2. This guideline covers the New Product Planning stage that uses the Validated Concept delivered by the New Product Exploration (NPE) stage and defined in EDM-P-210, as a starting point. The Validated Concept includes Business Requirement Specifications (BRS), Stakeholder Requirements Specification (StRS), preliminary System Requirements and a set of exploration and validation deliverables addressing the problem and solution space comprehensively. The NPP stage delivers a Product Requirement Document that contains the System Requirements Specification (SyRS). Additionally, a product, operation, and business development plan is created for the New Product Introduction stage, see Fig. 1 and EDM-P-200 for background.
- 2.3. EDM-P-211 can be used as source document for the establishment of the Life Cycle Model Management organizational project-enabling process per ISO/IEC/IEEE 15288, section 6.2.1., specifically for the System Requirement Definition and the Project Planning processes related to the NPP stage.
- 2.4. The level of formality in applying the New Product Planning guidelines depend on:
 - 2.4.1. The need for communication between the NPE/NPI-project actors.
 - 2.4.2. The degree of complexity.
 - 2.4.3. The risks and their consequences.