

System Validation

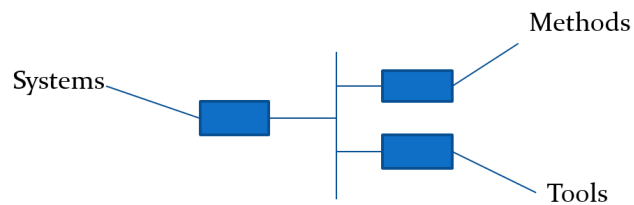
Test scenarios

System: G05

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Syscience

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Reference: Syscience R001, V2

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1 Introduction

1.1 Object of the document

The purpose of this document is to establish the validation test scenarios.

1.2 References

- IEEE1220 (ISO1220): Standard for Application and Management of the Systems Engineering Process
- IEEE15288 (ISO15288): Systems Engineering - System Life Cycle Processes
- IEEE1471 (ISO1471): Recommended Practice for Architectural Description of Software-Intensive Systems
- EIA 632: Processes for engineering a system
- NASA SEH: NASA Systems Engineering Handbook
- Sys2016: P. Krapf, D. Loise, 2016, Méthode d'identification des risques basés sur les modèles, 20e congrès LambdaMu de maîtrise des risques et de sûreté de fonctionnement, Saint-Malo, Octobre 2016.
- Sys2018: P. Krapf, S. Rakotosolofo, S. Berthier, 2018, Use of a system engineering workshop to identify the risks of a connected vehicle, 21e congrès LambdaMu de maîtrise des risques et de sûreté de fonctionnement, Reims, Octobre 2018.
- Sys2020: S. Berthier, P. Krapf, 2020, Understanding the risks caused by global warming using the System Engineering tool "L'Atelier Syscience", 22e congrès LambdaMu de maîtrise des risques et de sûreté de fonctionnement, France, Octobre 2020.

1.3 Terminology

1.3.1 Terms

- Diagram: Graphical representation of a view of a system.
- Durability: capacity of the system to keep its desired properties during time.
- The functional needs: what is awaited from the SOI, for which users, and how it should be used.
- Non-functional needs: technical constraints that the SOI must respect (security criteria, number of users, computing power, etc.).

- Lifecycle: Succession of phases characterizing the system evolution, from the elaboration of its concept until its end of life.
- Lifecycle phase: A phase of the lifecycle of a system.
- Regulation: laws, rules or standards, defined by authorities, whose application is mandatory.
- Requirement: Formalized description of some characteristics of a system.
- Scenario: description of what happens to a system in a defined timespan.
- Sequence diagram: diagram representing actors and the succession of actions, events, messages and state changes. Sequence diagrams are used to represent scenarios.
- Stakeholder: Tangible or intangible entity, including persons, organizations, and company departments, likely to express needs, expectations or constraints about the system of interest [IEEE1220] 6.1.1, 6.1.2, 6.1.3.

1.3.2 Acronyms definitions

- COTS: Commercial Off The Shelf
- HMI: Human Machine Interface
- MBSE: Model Based System Engineering
- ppm: part per million
- RBSE: Requirement Based System Engineering
- SaaS: Software as a Service
- SOI: System Of Interest
- SOP: Start of Production
- TGA: Tooling Go Ahead

2 Operational analysis

2.1 Use case identification

A use case diagram represents utilization targets for the system. The following diagram is generated automatically from the system operational scenarios and contains hypertext links to the corresponding sequence diagrams.

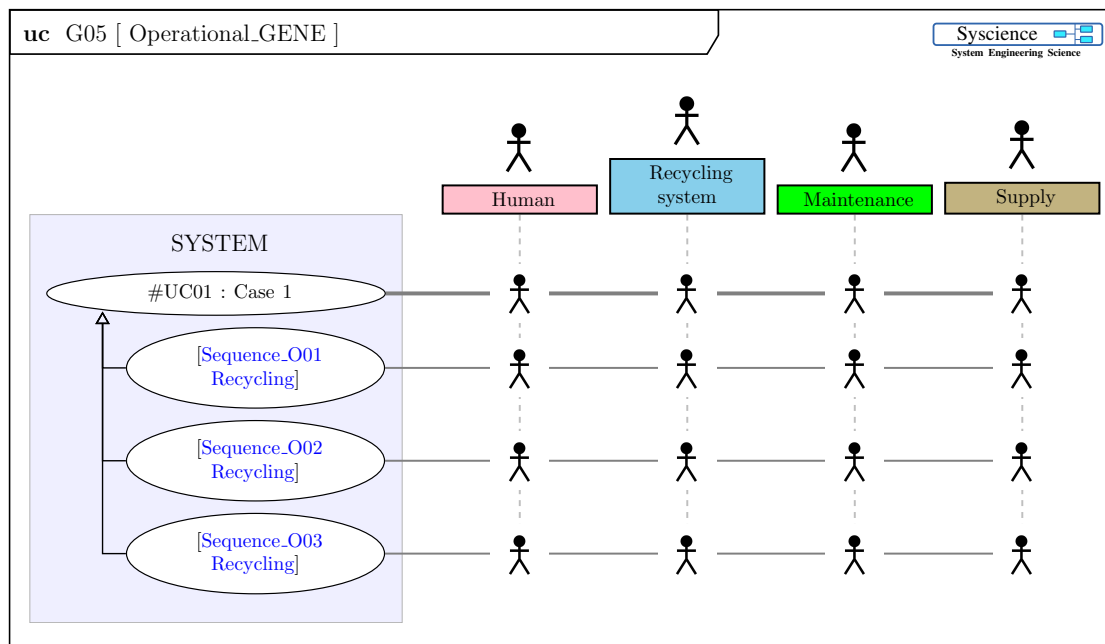


Figure 1: UseCase_Operational_GENE

2.2 Scenarios

An operational scenario is a description of the succession of activities done by the system and external actors exchanging messages between each other. They are described by sequence diagrams.

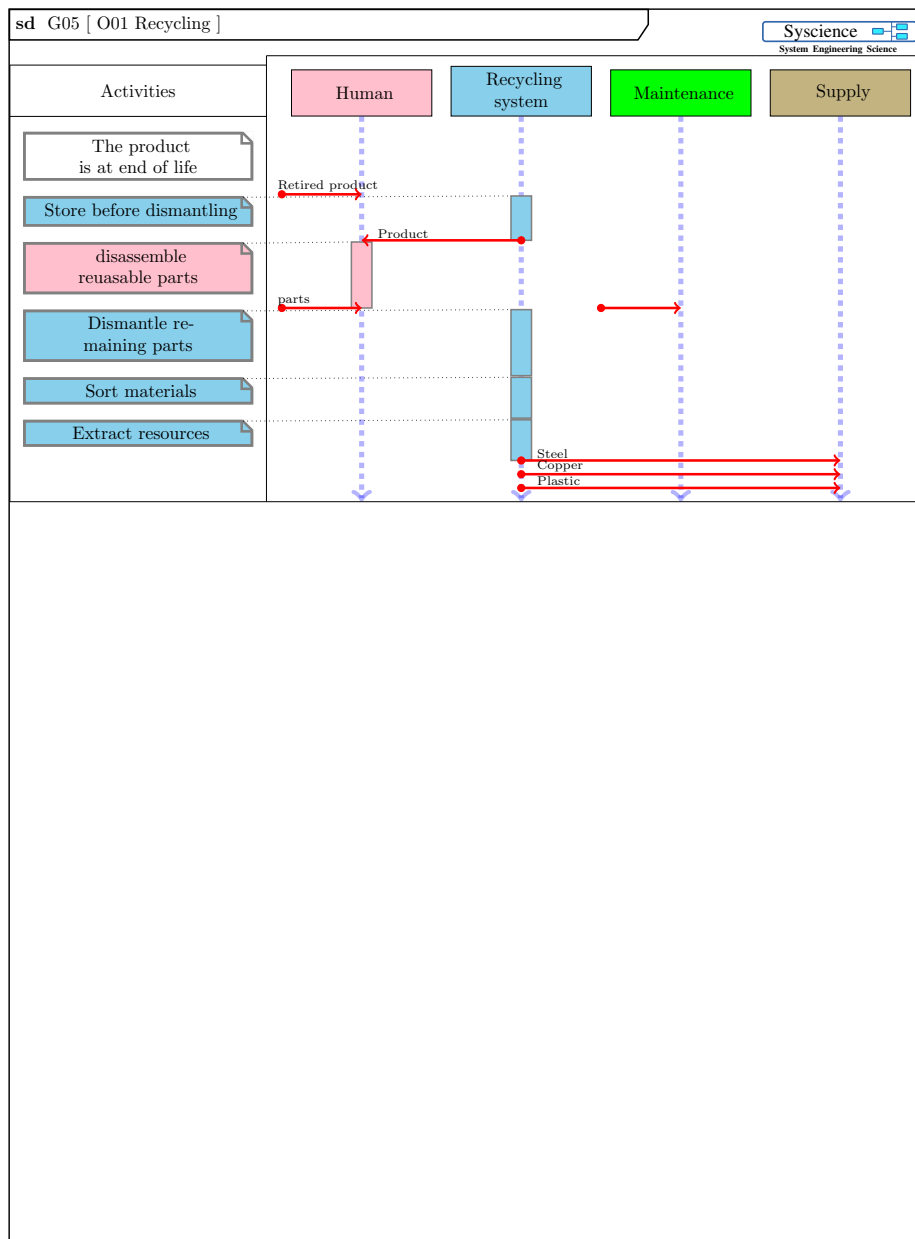


Figure 2: Sequence_O01 Recycling

This figure was cited in [UseCase_Operational_GENE](#).

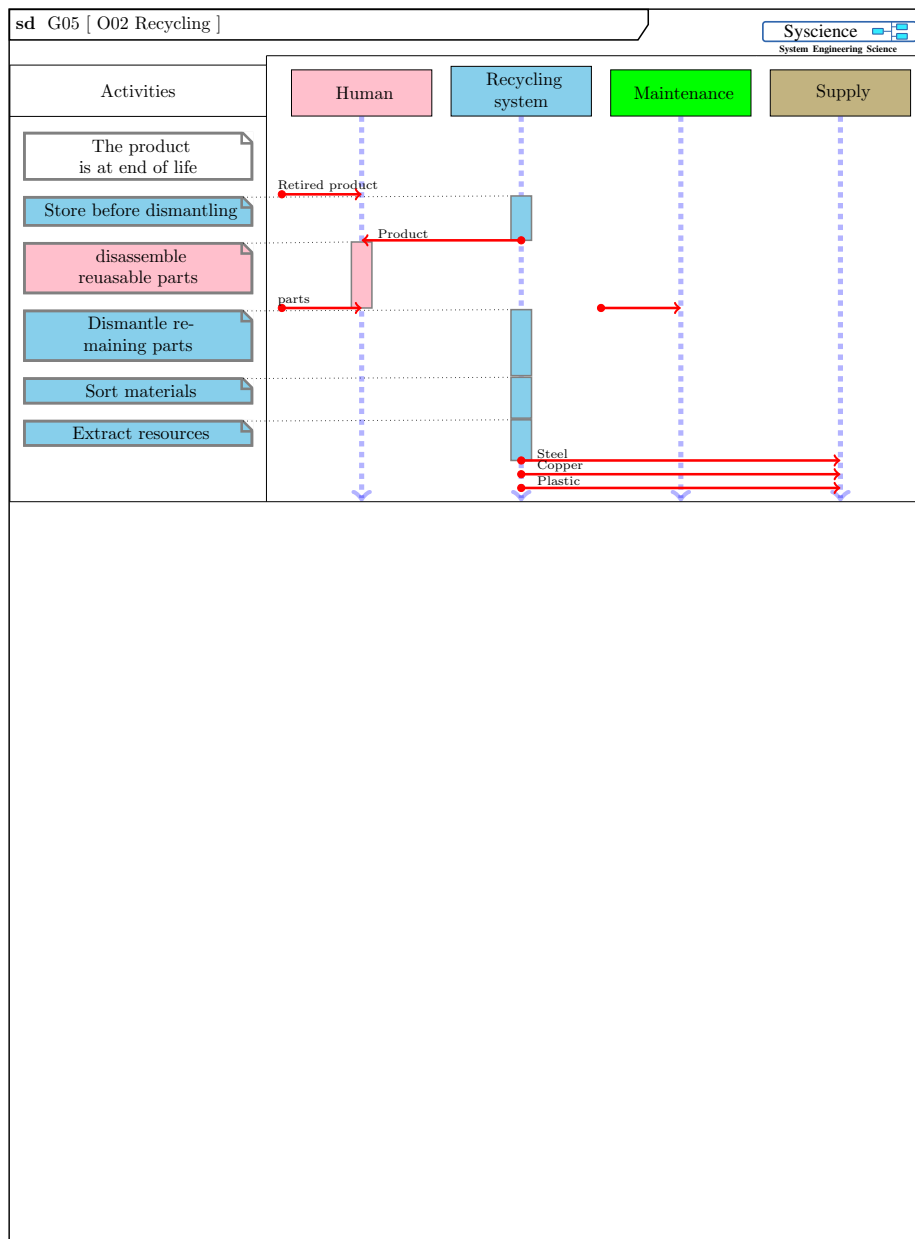


Figure 3: Sequence_O02 Recycling

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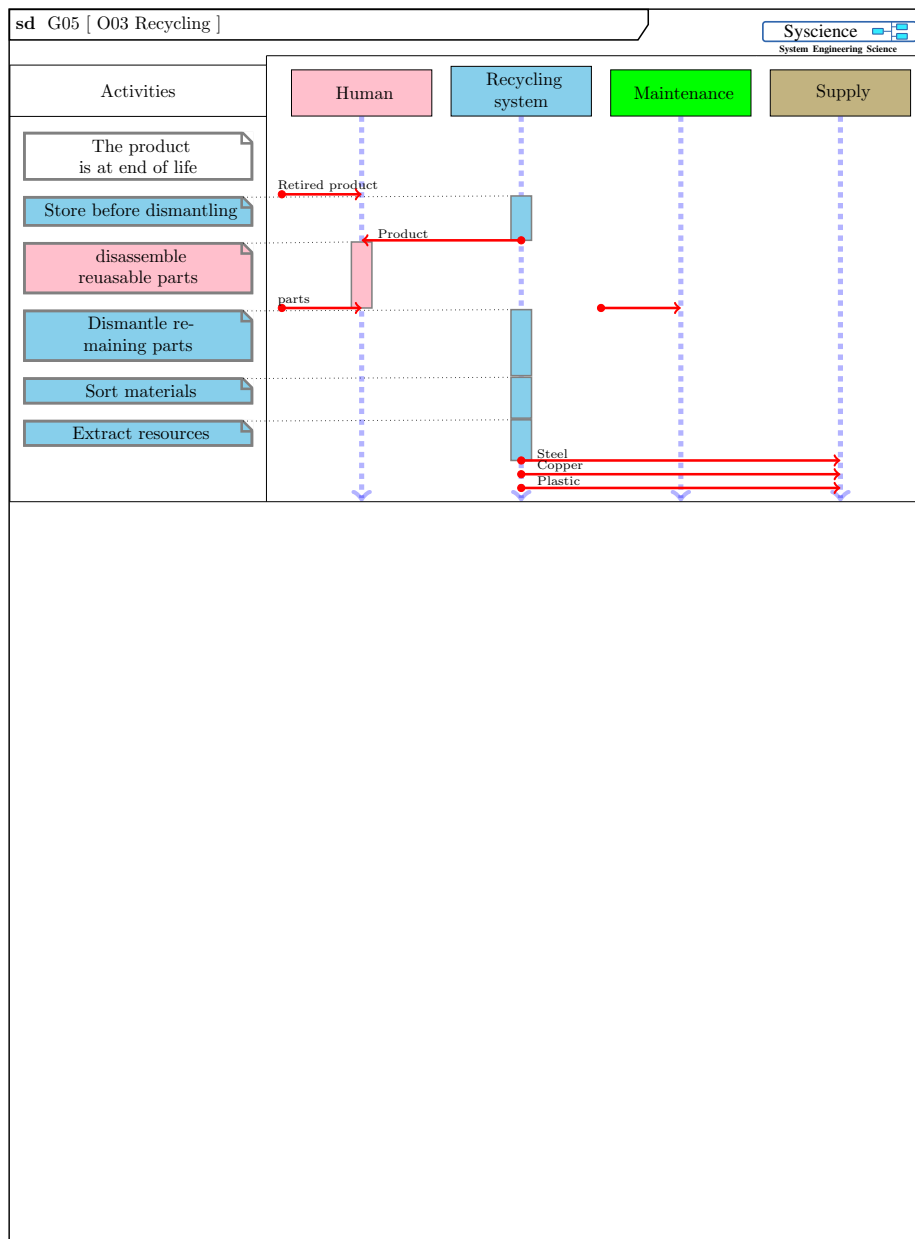


Figure 4: Sequence_O03 Recycling

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