Syscience

System Engineering Science

System Validation

Test scenarios

System: G01

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Syscience

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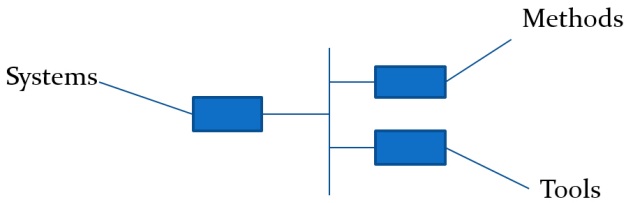

Reference: Syscience R001, V2

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Table of contents

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, MÃ©thode dâ?identification des risques basÃ©e sur les modÃ¨les, 20e congrÃ¨s LambdaMu de maitrise des risques et de sÃ≫retÃ© 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 congrÃ¨s LambdaMu de maitrise des risques et de sÃ≫retÃ© de fonctionnement, Reims, Octobre 2018.
- Sys2020: S. Berthier, P. Krapf, 2020, Understanding the risks caused by global warming using the System Engineering tool "Lâ?Atelier Syscience", 22e congrÃ¨s LambdaMu de maitrise des risques et de sÃ≫retÃ© 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 keed 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.

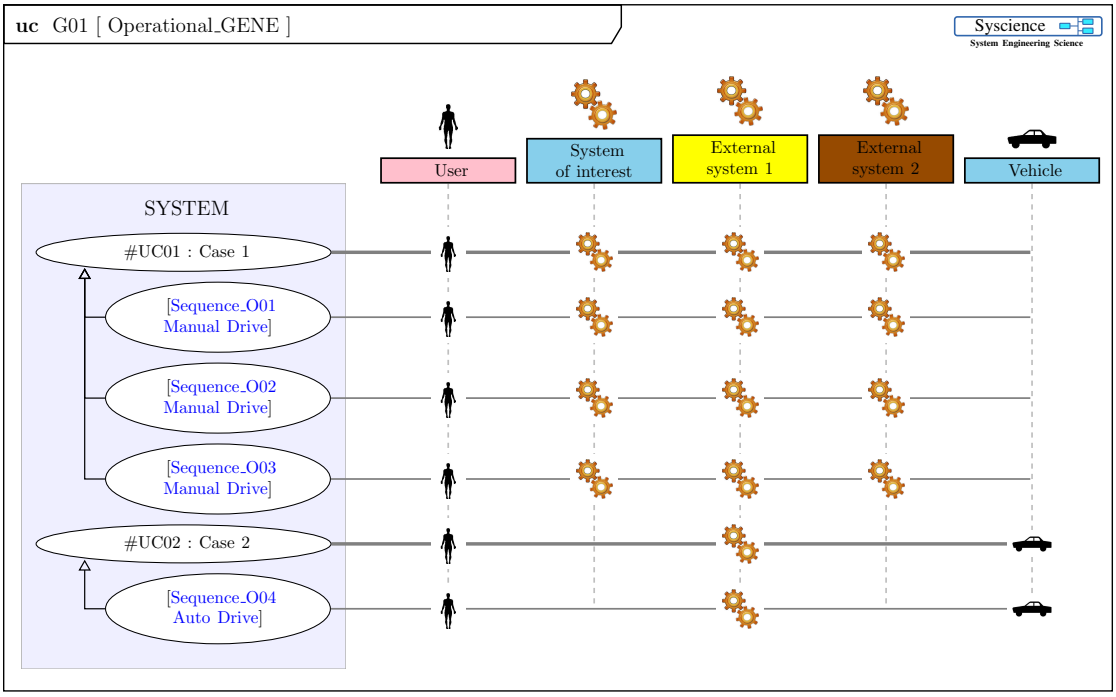

Figure 1: **UseCase_Operational_GENE**

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.

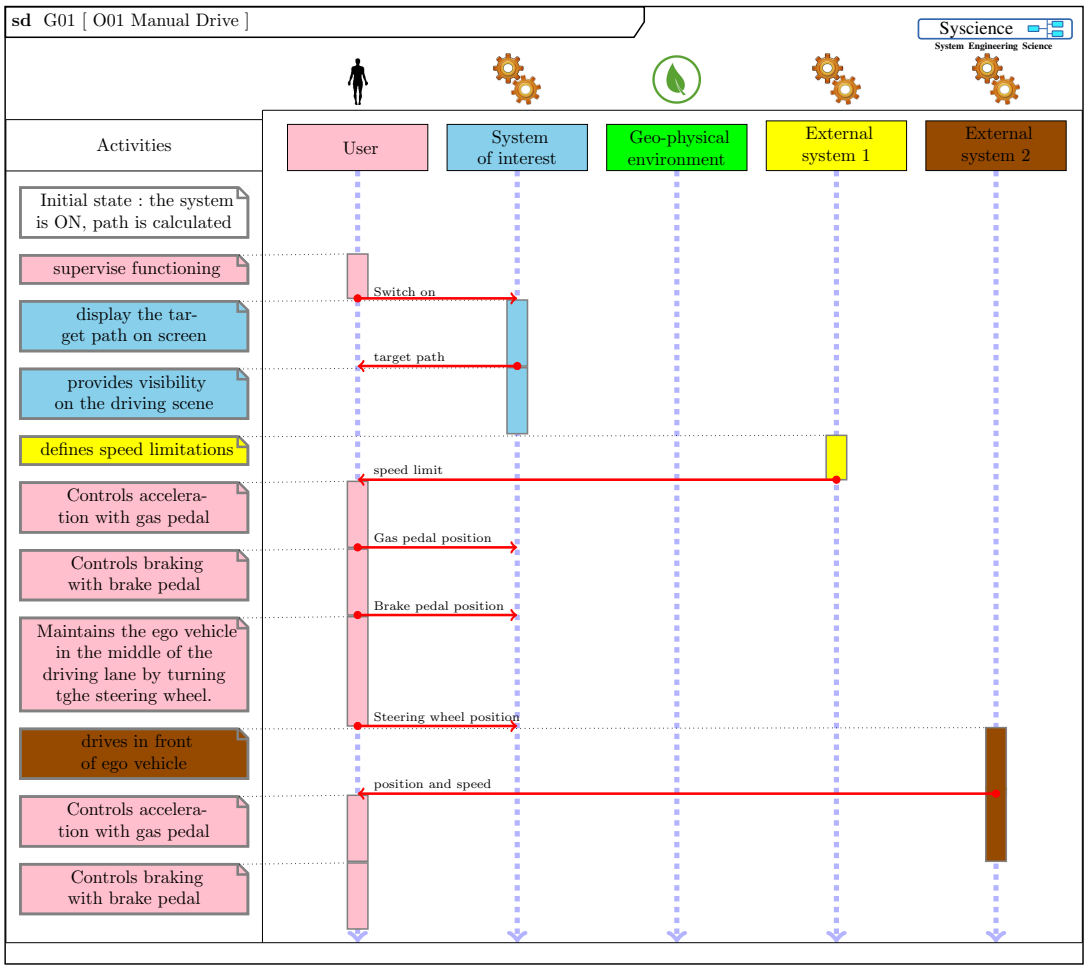

Figure 2: **Sequence_O01 Manual Drive**

This figure was cited in UseCase_Operational_GENE.

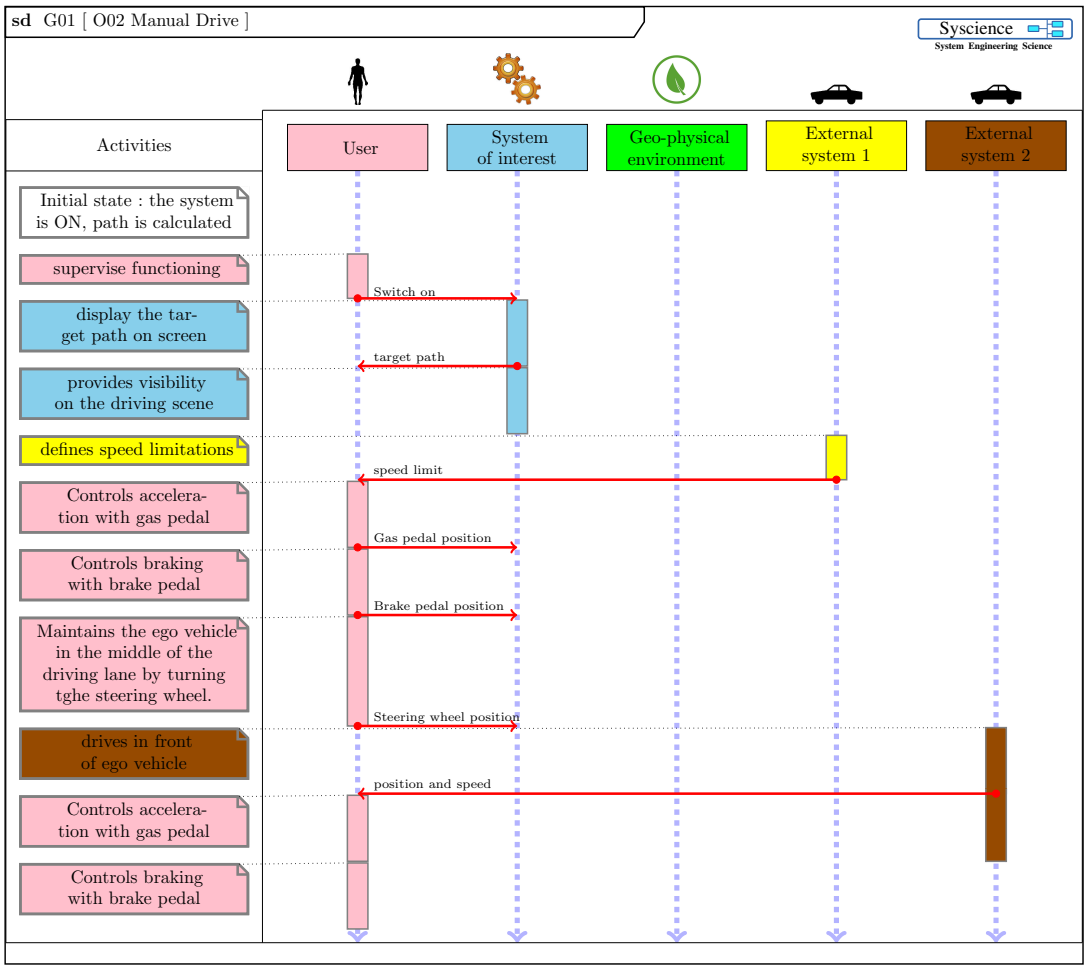

Figure 3: **Sequence_O02 Manual Drive**

This figure was cited in UseCase_Operational_GENE.

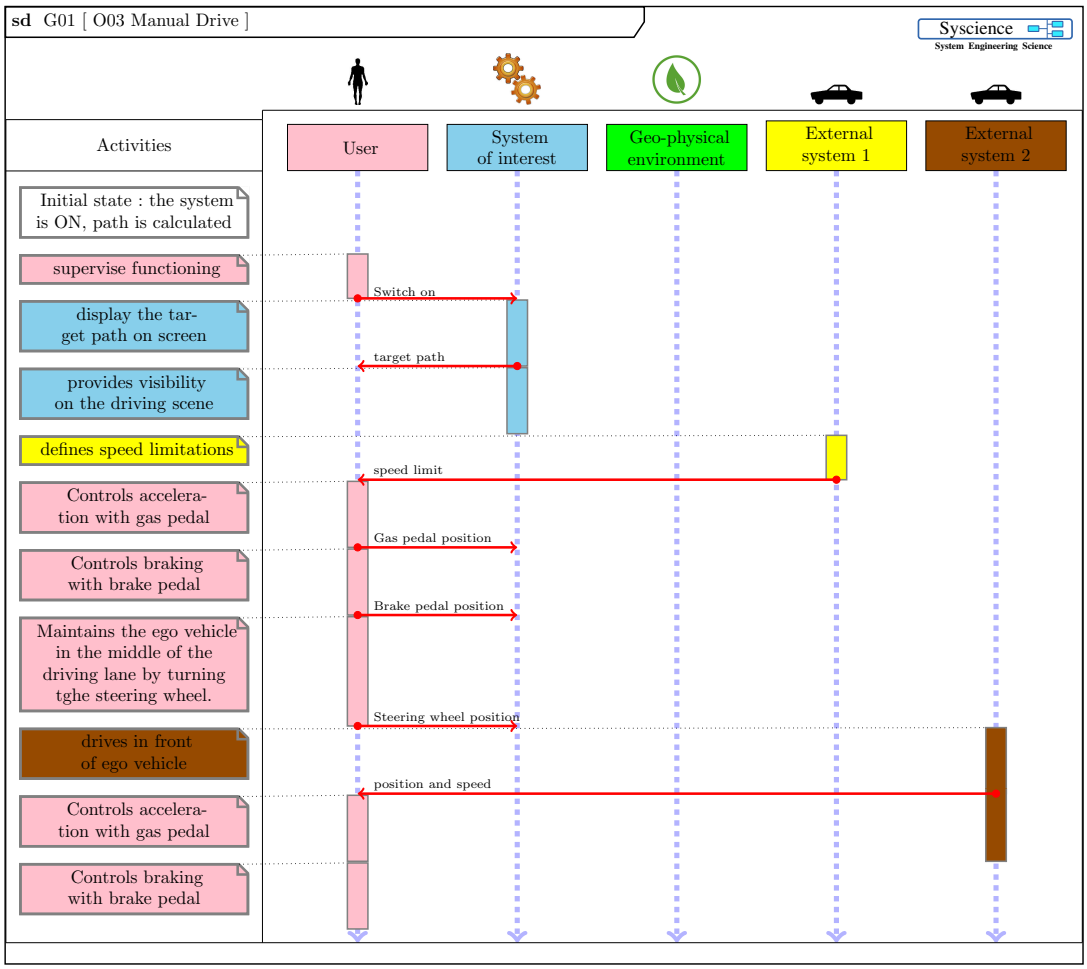

Figure 4: **Sequence_O03 Manual Drive**

This figure was cited in UseCase_Operational_GENE.

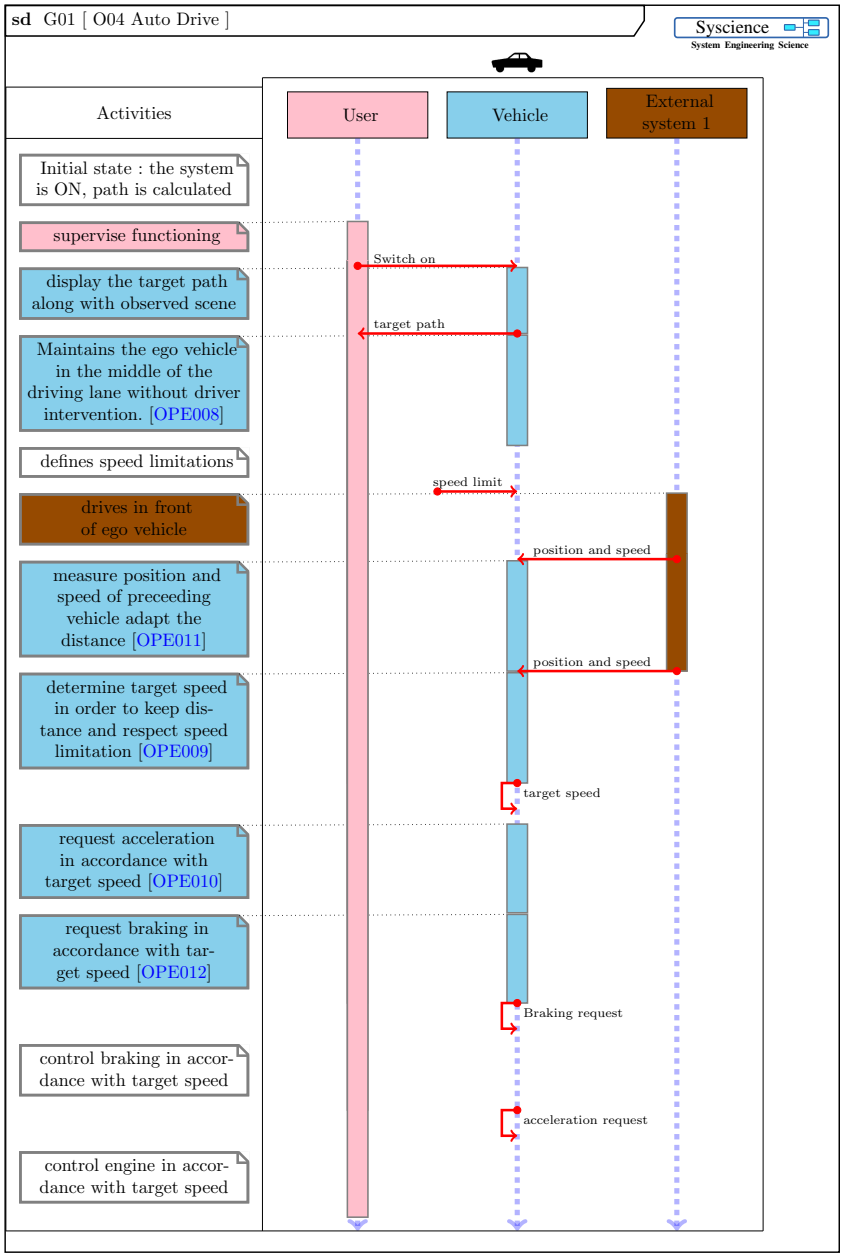

Figure 5: **Sequence_O04 Auto Drive**

This figure was cited in Sequence_F04 Auto Drive, UseCase_Operational_GENE.