GENIVI Alliance

GENIVI Document LBS00001

EnhancedPositionService

Component Specification

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Abstract:
This document provides the Component Specification for the EnhancedPositionService

Keywords:
GENIVI, EnhancedPositionService, GPS, GNSS, Sensors, Dead-Reckoning.

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Revision History

The following table shows the revision history for this document.

Document revision history

Date	Version	Author	Description
2014-09-12	3.0.0	Marco Residori, XS Embedded (now part of Mentor Graphics)	Updated API documentation. This is the first version of this document that uses the new GENIVI component specification template.

Table of Contents

1 Introduction

1.1 System Overview

Boilerplate, to be written, describing the overall GENIVI Software Platform

1.2 Component Overview

Boilerplate, to be written, that describes the specific Component at general level, such as the general responsibilities.

1.3 Document Overview

This paragraph shall summarize the purpose and contents of this document.

E.g.: This document describes My Component and it is structured in the following way ….

2 References

The following standards and specifications contain provisions, which through reference in this document constitute provisions of this specification. All the standards and specifications listed are normative references. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the standards and specifications indicated below.

[1] "GENIVI GNSSService – Component Specification" - http://git.projects.genivi.org/?p=lbs/positioning.git;a=tree;f=gnss-service/doc

[2] "GENIVI SensorsService – Component Specification" – http://git.projects.genivi.org/?p=lbs/positioning.git;a=tree;f=sensors-service/doc

3 Glossary

Acronym	Term	Definition
GNSS	Global Navigation Satellite System	GNSS is a space-based satellite navigation system that provides location and time information
GPS	Global Positioning System	GPS is a space-based satellite navigation system maintained by the United States government
GLONASS	Globalnaya navigatsionnaya sputnikovaya sistema	GLONASS is a space-based satellite navigation system operated by the Russian Aerospace Defence Forces
BDS	BeiDou Navigation Satellite System	BDS is a Chinese satellite navigation system.
Galileo		Galileo is a global navigation satellite system currently being built by the European Union (EU) and European Space Agency (ESA).

Table 1 – Acronym and Term Definitions

4 Requirements

The information in this chapter is provided only for information purpose; this is not a normative part.

The requirements are reported in the following format:

<Requirement ID>	**<Title>**
<Priority>	*<Components tracing to requirement>*
<Description>	
<Rationale>	

The fields in the table are linked to the Requirement model element in EA as per [1].

4.1 Functional Requirements

To be extracted from EA, all requirements for the components described in this document

<Requirement ID>	**<Title>**
<Priority>	*<Components tracing to requirement>*
<Description>	
<Rationale>	

SW-MMMMM-MMMMM-003	**<Title>**
<Priority>	*<Components tracing to requirement>*
<Description>	
<Rationale>	

<Requirement ID>	**<Title>**
<Priority>	*<Components tracing to requirement>*
<Description>	
<Rationale>	

4.2 Non Functional Requirements

To be extracted from EA, all requirements for the components described in this document

5 Constraints and Assumptions

This is a handwritten chapter that summarizes the constraints and assumptions done in the project for the component.

6 Architecture

The information in this chapter is provided only for information purpose; this is not a normative part.

6.1 Architecture Overview

The following component diagram shows how the EnhancedPositionService interacts with other GENIVI components:

- GNSSService (Library)
- SensorService (Library)
- NavigationCore
- MapViewer

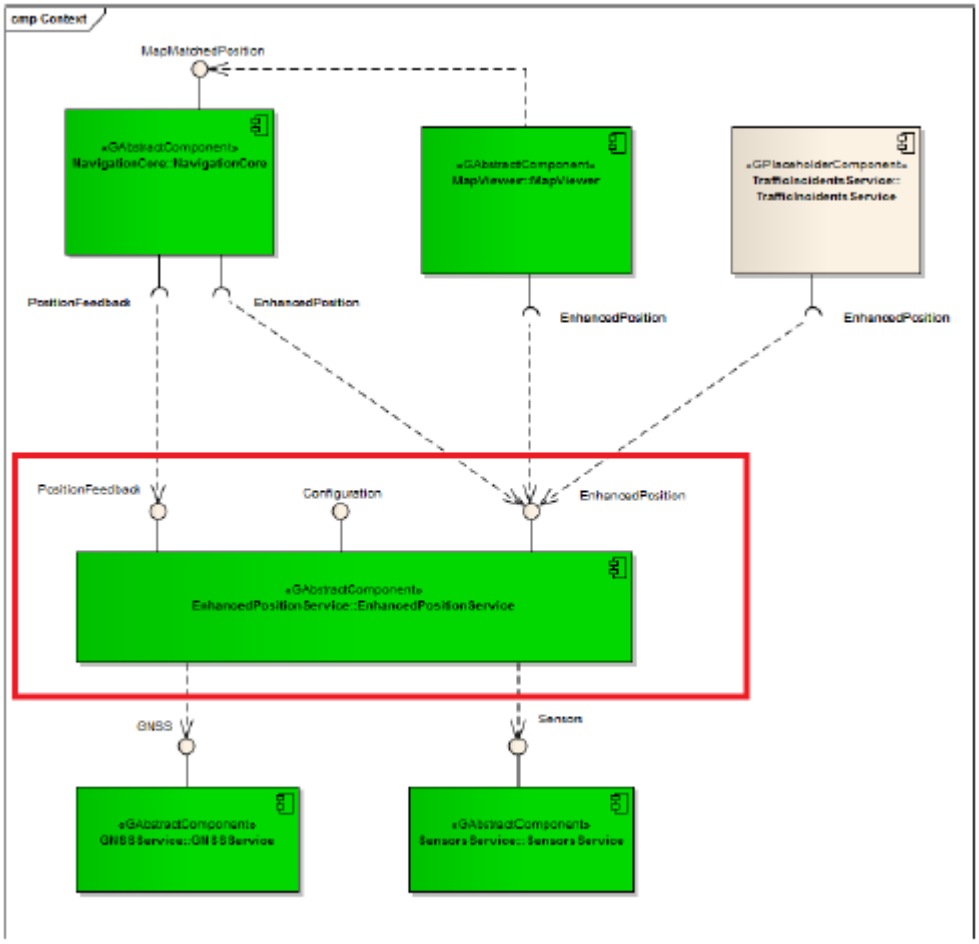


Figure 1: EnhancedPositionService

6.1.1 Component Interfaces

Component Interface diagram(s) from EA, with notes

6.1.2 Component Dependencies

Component Dependencies diagram(s) from EA, with notes

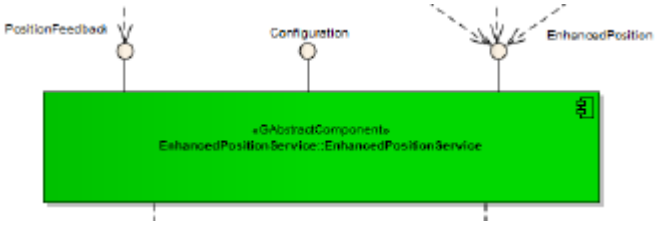
6.1.3 Component Traceability

Component Traceability diagram(s) from EA, with notes

6.1.4 Component Composition

Component Composition diagram(s) from EA, with notes

6.2 EnhancedPositionService



6.2.1 Responsibility and Features

The EnhancedPositionService is a software component that offers positioning information to client applications.

To calculate the current vehicle position, data from a GNSS receiver (e.g. GPS data) and available vehicle sensors (e.g. gyroscope and wheel ticks) are taken into account (dead-reckoning). In this way the EnhancedPositionService can calculate the current position even on roads, where the GNSS signal is too weak (e.g. in a tunnel, or in a parking garage).

The result of the map matching can be provided as feedback to this module by the NavigationCore component. This component is the main client of the GNSSService and of the SensorsService.

The EnhancedPositionService will be typically implemented as a multi-client daemon with a D-Bus interface.

6.2.2 Provided Interfaces

• **EnhancedPosition** : This interface provides a 'filtered' position that takes into account the value coming from the vehicle sensors (dead-reckoning).

• **PositionFeedback** : This interface offers methods that allows the NavigationCore to provide a position feedback to the EnhancedPositionService. The component that implements the Position-Feedback interface requires the data provided by a 'map matcher' (typically the NavigationCore component). The PositionFeedback is an added improvement which does not negatively affect systems that don´t support maps or have a map-matching feature.

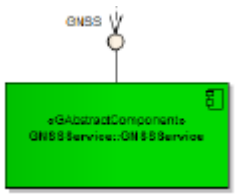
• **Configuration**: This interface allows a client application to manage configuration parameters, like the GNSS type.

6.2.3 Required Interfaces

- **GNSS** : This interface abstracts the access to a GNSS device. Please see [1].

- **Sensors :** This interface abstracts the access to a GNSS device. Please see [2].

6.3 GNSSService



6.3.1 Responsibility and Features

The GNSSService is a component that retrieves positioning data from a GNSS receiver (e.g. NMEA sentences from a GPS receiver) and presents them to its client applications.

The GNSSService will be typically implemented as a single-client library.

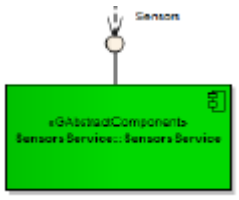
6.3.2 Provided Interfaces

The interfaces provided by this component are described at [1].

6.3.3 Required Interfaces

None.

6.4 SensorsService



6.4.1 Responsibility and Features

The SensorsService is a component that retrieves sensor data from several vehicle sensors (e.g. gyroscope, wheel ticks) and presents them to its client applications.

The SensorsService will be typically implemented as a single-client library.

6.4.2 Provided Interfaces

The interfaces provided by this component are described at [2].

6.4.3 Required Interfaces

None.

7 Collaboration

This is a normative part of the document that shall be mandatory present and detailed. For every path in the use case there must be at least one diagram illustrating that.

7.1 Use case realization 1

Diagram(s) for the 1st use case (extracted from EA)

7.1.1 Description

7.1.2 Sequence Path name

7.2 Use case realization 2

Diagram(s) for the 2st use case (extracted from EA)

7.2.1 Description

7.2.2 Sequence Path name

8 Implementation

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8.1 Available Implementation details

A PoC of the EnhancedPositionServiceis available at: http://git.projects.genivi.org/?p=lbs/positioning.git;a=tree

8.2 Usage examples

Please see: http://git.projects.genivi.org/?p=lbs/positioning.git;a=tree;f=enhanced-position-service/test.

8.3 Test Plan

Please see: http://git.projects.genivi.org/?p=lbs/positioning.git;a=blob;f=enhanced-position-service/doc/testplan.txt

9 Interfaces

The following pages describe the interfaces of the EnhancedPositionService: