Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – Navigation Based Pilot (NPB)

Infotainment Subsystem Part Specific Specification (SPSS)

Version 1.1
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Version Date: Jan 6, 2023

FORD CONFIDENTIAL

<u>Revision History</u>

Date	Version	Notes	
December 23, 2022	**1.0**	**Initial Release**	**Yzhan482**
Jan 6, 2023	**1.1**	1. Delete D-Navigation Based Pilot Setup State 2. Delete Navigation Pilot Audio Setup 3. Add Feature Configuration	**Yzhan482**

Table of Contents

1   Overview

When a user is driving a vehicle with ALC, the user will be indicated by a lane change suggestion if it's determined to be helpful. Following a turn signal initiated by driver, the vehicle will perform a lane change.

Based on ALC, NBP will add the ability for vehicle to provide lane change suggestions according Navigation indication. Currently, NBP scenarios are below:
- Highway Exit
- Y-shaped Road
- Lane End

Depending on the vehicle location relative to lane position and the distance to target road section and objects, this feature will:
- Signal to driver for a lane change suggestion
- Signal to driver for taking over steering control

2   Architectural Design

2.1   A- Navigation Based Pilot Client

Client is the module that provides the interface to the user to enable or disable the feature. Also, the user can be notified ff the feature state.

2.2   A- Navigation Based Pilot Server

The server controls the feature behavior. Upon getting user request to enable/disable the feature it can proceed with the user request and notify the client of the feature state.

3   General Requirements

3.1   D-Auto Lane Change Setup State

For this feature when performing the "Set" or "Query" operation the Feature Number and Configuration Number in the Feature.Rq and Feature.St messages shall be used below.

If Enhanced Memory is supported the Active Personality Profile shall be used for PersIndex. If Enhanced Memory is not supported PersIndex shall be set to Vehicle.

Feature Description	Feature Number	Configuration Number	HMI selection / Configuration Name
Auto Lane Change	0x0882	0x00	OFF / Disabled
		0x01	ON / Enabled

3.2   LPK-REQ-397058/A-User Input

The client shall forward user request to enable the feature like below:

Feature_Rq (Operation = Set, FeatureID =0x0XXX ,Configuration = 0x00 [Enable], PersIndex = 0x0 – 0x4)

The client shall forward user request to disable the feature like below:
Feature_Rq (Operation = Set, FeatureID =0x0XXX, Configuration = 0x01 [Disable], PersIndex = 0x0 – 0x4)

3.3   LPK-REQ-397059/A-Update Feature Status

The client shall update the feature status based on the information that the server sends like below:

When feature is enabled:
Feature_St (Operation = Set, FeatureID = 0x0XXX, Configuration = 0x00 [Enable], PersIndex = 0x0 – 0x4))

When feature is disabled:
Feature_St (Operation = Set, FeatureID = 0x0XXX, Configuration = 0x01 [Disable], PersIndex = 0x0 – 0x4))

3.4   Feature Configuration- Navigation Based Pilot

The Navigation Based Pilot Client should have a configurable parameter to determine "Lane Centering" Chinese Name.
- If the parameter indicates the vehicle supports Navigation Based Pilot ,Chinese Name should display 'ActiveGlide 领航辅助驾驶'
- If the parameter indicates the vehicle does not supports Navigation Based Pilot ,Chinese Name should display '智能辅助驾驶'

3.5 Feature Configuration- Auto Lane Change

The Navigation Based Pilot Client should have a configurable parameter to determine whether vehicle supports Auto Lane Change.

- If the parameter indicates the vehicle supports Auto Lane Change, then Auto Lane Change Button should be supported
- If the parameter indicates the vehicle does not supports Auto Lane Change, then Auto Lane Change Button should not be supported

4   Functional Definition

4.1   A- A- Navigation Based Pilot Strategy

4.1.1   A-Feature Availability
None of the requirements of this feature will be applicable if the feature has been configured as disabled.

4.1.2   Use Cases

4.1.2.1   A-Feature Enable

Actors	Vehicle driver
Pre-conditions	Feature is disabled
Scenario Description	User enables the feature on Client HMI
Post-conditions	Client sends user request to Server Server enables the feature and notifies the client. Client updates the feature state indicator.
List of Exception Use Cases	
Interfaces	Client HMI

4.1.2.2   A-Feature Disable
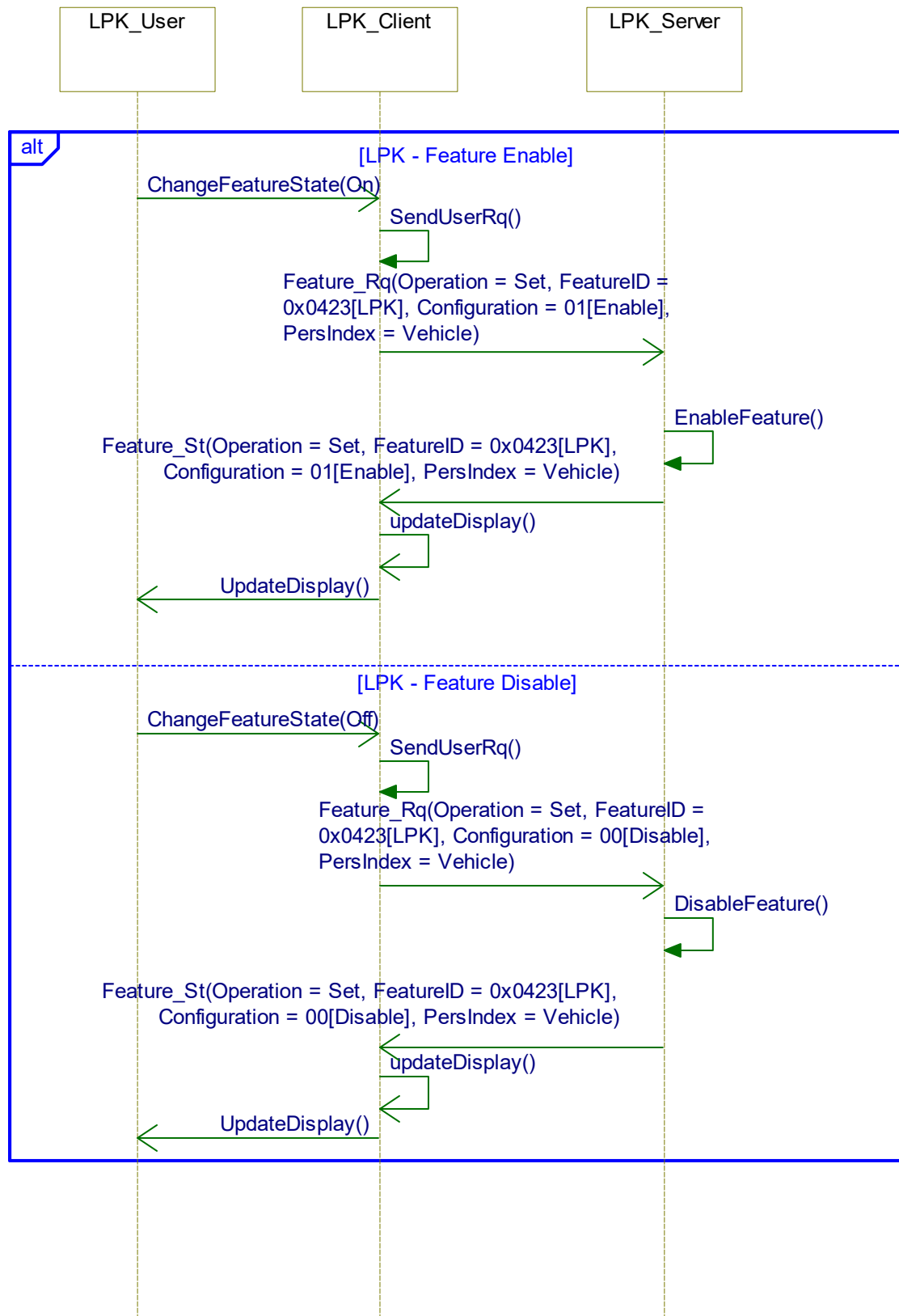
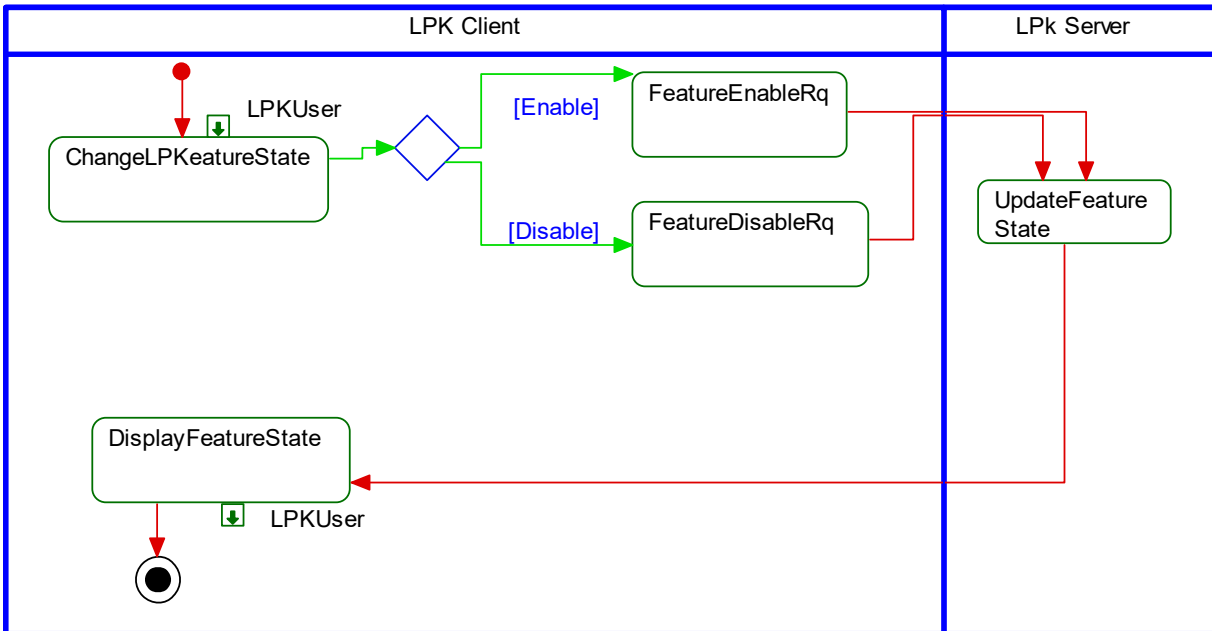| Actors	Vehicle driver
Pre-conditions	Feature is enabled
Scenario Description	User disables the feature on Client HMI
Post-conditions	Client sends user request to Server Server disables the feature and notifies the client. Client updates the feature state indicator.
List of Exception Use Cases	
Interfaces	Client HMI

4.1.3   White Box Views

4.1.3.1   Sequence Diagram

4.1.3.1.1   LPK-SD-REQ-397061/A-Feature Operation *Example*

LPK_User   LPK_Client   LPK_Server

alt   [LPK - Feature Enable]

ChangeFeatureState(On)

SendUserRq()

Feature_Rq(Operation = Set, FeatureID = 0x0423[LPK], Configuration = 01[Enable], PersIndex = Vehicle)

EnableFeature()

Feature_St(Operation = Set, FeatureID = 0x0423[LPK], Configuration = 01[Enable], PersIndex = Vehicle)

updateDisplay()

UpdateDisplay()

[LPK - Feature Disable]

ChangeFeatureState(Off)

SendUserRq()

Feature_Rq(Operation = Set, FeatureID = 0x0423[LPK], Configuration = 00[Disable], PersIndex = Vehicle)

DisableFeature()

Feature_St(Operation = Set, FeatureID = 0x0423[LPK], Configuration = 00[Disable], PersIndex = Vehicle)

updateDisplay()

UpdateDisplay()

4.1.3.2 Activity Diagram

4.1.3.2.1 LPK-ACT-REQ-397062/A-Feature Operation

5 Appendix: Reference Documents

Reference #	Document Title
1	FBMP APIM SPSS v1.3
2	Settings In Infotainment CenterStack SPSS v1.14
3	
4	
5	
6	
7	
8	