Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – BLIS

Infotainment Subsystem Part Specific Specification (SPSS)

Version 1.1

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FORD CONFIDENTIAL

Revision History

Date	Version	Notes	
	1.0	Initial Release	
	1.1		Update Blis Filter status & Cta Filter State table

Table of Contents

1 Overview

This documentation includes information of a few different but similar and “complementary” features. They all deal with Side Obstacle Detection (SOD) Sensors and are active at different gear states. The active feature is controlled by the server. The list of features for which documentation and requirements are provided in this SPSS is included below:

BLIS : Blind Spot - When driving forward or while in N, the feature alerts the driver when a vehicle is located in the left hand side or right hand side vehicle blind zone.
CTA : Cross Traffic Alert - When in reverse, alerts the driver of an approaching vehicle coming from the left hand side and right hand side
BTT : BLIS with Trailer Tow – Extends the BLIS blind zone along the length of the trailer.
BTTLITE : BTT LITE is the BTT feature with a different trailer width requirement and different trailer Cluster menu.

2 Architectural Design

2.1 BLIS-CLD-REQ-377750/A-BTT Client

Client provides information that Server sends the user. It also may provide a way to interface back with the feature, such as to enable/disable etc.

2.2 BLIS-CLD-REQ-377756/A-BTT Server

Server control the feature. It takes input from any participating module and decides on what feedback or feature status to provide. It may also accept user's input through the client if feature has such options.

2.3 Logical Signal Mapping

The CAN signals mentioned throughout this document shall refer to the CAN signal's logical name. The logical names shall be mapped to their actual CAN signal names. Please use the table below to perform the mapping. The InfoCAN database file is the master file for the actual CAN signal names. Note: some CAN signals referenced throughout this document may use the logical name while some may use the actual CAN signal name.

Logical Name	CAN Signal Name
IgnSt	Ignition_Status
LSodLeft	SodLeft_D_Stat
LSodRight	SodRight_D_Stat
LSodSnsLeft	SodSnsLeft_D_Stat
LSodSnsRight	SodSnsRight_D_Stat
LCtaLeft	CtaLeft_D_Stat
LCtaRight	CtaRight_D_Stat
LCtaAlrtLeft	CtaAlrtLeft_D_Stat
LCtaAlrtRight	CtaAlrtRight_D_Stat
LBttLeft	BttLeft_D_Stat
LBttRight	BttRight_D_Stat
LCtaBrkLeft	CtaBrkLeftMsgTxt_B_Rq
LCtaBrkRight	CtaBrkRightMsgTxt_B_Rq
LMyKey	IgnKeyType_D_Actl
LCtaRq	Cta_D_Rq
LSodRq	Sod_D_Rq

2.4 BLIS-IIR-REQ-377761/A-BTT Client RX

2.4.1 BLIS-MD-REQ-377972/A-IgnSt

IgnSt: This signal is received by the client. It provides vehicle power state.

Signal Parameter	Parameter Description
0x0	Unknown
0x1	Off
0x2	Accessory
0x4	Run
0x8	Start
0xF	Invalid

2.4.2 BLIS-MD-REQ-377974/A-LSodLeft

LSodLeft: Left Side Bliss state.

Signal Name	Detailed Meaning	State Encoded
LSodLeft		
	Off	0x0
	Trailer_Tow_Off	0x1
	On	0x2
	Disabled	0x3
	Invalid	0x4

2.4.3 BLIS-MD-REQ-377975/A-LSodRight

LSodRight: Right Side BLIS enable/disable/on/off state.

Signal Name	Detailed Meaning	State Encoded
LSodRight		
	Off	0x0
	Trailer_Tow_Off	0x1
	On	0x2
	Disabled	0x3
	Invalid	0x4

2.4.4 BLIS-MD-REQ-377976/A-LSodSnsLeft

LSodSnsLeft: Left Side BLIS sensor data.

Signal Name	Detailed Meaning	State Encoded
LSodSnsLeft		
	Clear	0x0
	Blocked	0x1
	System_Failure	0x2
	Second Warning Audio	0x3

2.4.5 BLIS-MD-REQ-377977/A-LSodSnsRight

LSodSnsRight: Right Side BLIS active/fault/blocked state.

Signal Name	Detailed Meaning	State Encoded
LSodSnsRight		
	Clear	0x0
	Blocked	0x1
	System_Failure	0x2
	Second Warning Audio	0x3

2.4.6 BLIS-MD-REQ-377978/A-LCtaLeft

LCtaLeft: Left Side CTA values.

Signal Name	Detailed Meaning	State Encoded
LCTALeft		
	Off	0x0
	Trailer_Tow_Off. CTA is off because of Trailer Tow	0x1
	On	0x2
	Disabled	0x3
	Invalid	0x4
	Not Used	0x5 - 0x7

2.4.7 BLIS-MD-REQ-377979/A-LCtaRight

LCtaRight: Right Side CTA values.

Signal Name	Detailed Meaning	State Encoded
LCTARight		
	Off	0x0
	Trailer_Tow_Off. CTA is off because of Trailer Tow	0x1
	On	0x2
	Disabled	0x3
	Invalid	0x4
	Not Used	0x5 - 0x7

2.4.8 BLIS-MD-REQ-377982/A-LCtaAlrtLeft

LCtaAlrtLeft: This signal provides CTA alert trigger to client.

Signal Name	Detailed Meaning	State Encoded
LCtaAlrtLeft		
	Lamp_Off	0x0
	Lamp_On	0x1

2.4.9 BLIS-MD-REQ-377983/A-LCtaAlrtRight

LCtaAlrtRight: This signal provides right hand side of CTA notification status.

Signal Name	Detailed Meaning	State Encoded
LCtaAlrtRight		
	Lamp_Off	0x0
	Lamp_On	0x1

2.4.10 BLIS-MD-REQ-377984/A-LBttLeft

LBttLeft: This signal provides left side Btt status.

Signal Name	Detailed Meaning	State Encoded
LBttLeft		
	NotDetermined	0x0
	Connected	0x1
	Pending	0x2
	NotConnected	0x3
	OffTemp	0x4
	Off	0x5
	Disable	0x6
	NotUsed	0x7

2.4.11 BLIS-MD-REQ-377985/A-LBttRight

LBttRight: Provides right side Btt signal value.

Signal Name	Detailed Meaning	State Encoded
LBttRight		
	NotDetermined	0x0
	Connected	0x1
	Pending	0x2
	NotConnected	0x3
	OffTemp	0x4
	Off	0x5
	Disable	0x6
	NotUsed	0x7

2.4.12 BLIS-MD-REQ-380552/A-LCtaBrkLeft

LCtaBrkLeft : This signal is received by client and it indicates the Left side status of RBA.

Meaning	State Encoding
Disable	0x0
Enable	0x1

2.4.13 BLIS-MD-REQ-380553/A-LCtaBrkRight

LCtaBrkRight: Signal is received by client and it indicates the status of RBA.

Meaning	State Encoding
Disable	0x0

Enable	0x1

2.4.14 BLIS-MD-REQ-380554/A-LMyKey

LMyKey: This signal indicates the key in ignition cycle.

Encoding Meaning	Signal Encoding
Key_Read_In_Progress	0x0
Key_In_Ign_Standard_Key	0x1
Key_In_Ign_My_Key	0x2
Key_Not_Prgrm_Read_Failure	0x3
Unknown	0xE
Invalid	0xF

2.5 BLIS-IIR-REQ-377934/A-BTT Client Tx

2.5.1 BLIS-MD-REQ-377987/A-LCtaRq

LCtaRq: Cluster command On/Off for Blis.

Signal Name	Description	State Encoded
LCtaRq		
	Off	0x0
	On	0x1
	No Data Exists	0x2
	Unused	0x3

2.5.2 BLIS-MD-REQ-377986/A-LSodRq

LSodRq: This signal is sent by the client to the server to turn the Bliss On or Off.

Signal Name	Detail	State Encoded
LSodRq		
	Off	0x0
	BLIS On Secondary Warning OFF	0x1
	BLIS ON Secondary Warning ON	0x2
	Unknown	0x3

3 General Requirements

3.1 BLIS-REQ-380565/A-Power Mode Operation

The feature should be accessible for interaction to the user while signal IgnSt is 0x4 (Run) and 0x8 (Start).

3.2 BLIS-REQ-380566/A-System Accuracy

Within a 100 msec of receiving a message that results in a change of state the cluster will update the display to the proper status.

3.3 BLIS-REQ-380567/A-Missing Signal State

If a signal is missing for more than 1600 msec the signal shall be declared missing.

3.4 BLIS-REQ-380568/A-Fault Timer

For filtered status variables a fault state needs to be considered as Faulty if it occurs for 1600 ms consecutively.

3.5 BLIS-REQ-381419/A-MyKey Limitations

If LMyKey has a value of 0x2 (Key_In_Ign_My_Key) the client shall send the signals mentioned below with the below data: LCtaRq (0x3) and LSodRq (0x3).

4 Functional Requirements

4.1 BLIS-FUN-REQ-380605/A-Blis

4.1.1 BLIS-REQ-382076/A-Blis Button Operation

To control the Blis feature state On/Of the client should make use of the signal LSodRq.

To request feature On, the LSodRq should have a value of 0x1 .

To request feature Off, the LSodRq should have a value of 0x0 .

If Blis Filter State is one of the following Trailer Tow Off, Disabled or Off the LSodRq should be sent with a value of 0x0.

The default value of LSodRq upon client bootup, should be 0x3.
0x3 may not be the CAN database default value, however server is expecting to see this value, whenever client can send can messages.

4.1.2 BLIS-REQ-380616/A-Blis Filter Status

The Blis operation is controlled by the signals LSodLeft and LSodRight. This signals control Client behavior. Based on the table below the client shall decide whether to further process and provide user feedback of Bliss Sensor data or, display any warnings or not to display anything at all.

For further information on what to display consult relevant HMI specification.

LSodLeft	LSodRight	**BLIS Filter State (internal variable)**
OFF (0x0)	OFF (0x0)	OFF (0x0)
Trailer_Tow_Off (0x1)	Trailer_Tow_Off (0x1)	TRAILER_TOW_OFF (0x1)
ON (0x2)	ON (0x2)	ON (0x2)
DISABLED (0x3)	DISABLED (0x3)	DISABLED (0x3)
INVALID (0x4)	Don't care	FAULT (0x4)
Don't care	INVALID (0x4)	FAULT (0x4)
Missing	Don't care	FAULT (0x4)
Don't care	Missing	FAULT (0x4)
All Other Cases		FAULT (0x4)

SodLeft_D_Stat Signal	**SodRight_D_Stat Signal**	**Side_Detect_Filt_Sys_State (internal variable)**
OFF (0x0)	OFF (0x0)	OFF (0x0)
Trailer_Tow_Off (0x1)	Trailer_Tow_Off (0x1)	TRAILER_TOW_OFF (0x1)
ON (0x2)	ON (0x2)	ON (0x2)
DISABLED (0x3)	DISABLED (0x3)	DISABLED (0x3)
INVALID (0x4)	Don't care	FAULT (0x4) *Notes Below
Don't care	INVALID (0x4)	FAULT (0x4) *Notes Below
Missing / Invalid as per 1.4	Don't care	FAULT (0x4) *Notes Below
Don't care	Missing / Invalid as per 1.4	FAULT (0x4) *Notes Below
All Other Cases		FAULT (0x4) *Notes Below

Side_Detect_Filt_Sys_State	Display Menu In Center Stack (For reference)	CtrStkFeatNoActl Signal	FeatConfigIpcActl Signal
On (0X2)	☑ Blindspot	0x0920	0x1 (On)
Off (0X0)	☐ Blindspot	0x0920	0x0 (Off)
Trailer_Tow_Off (0x1) Disabled (0x3) FAULT (0x4)	☐ Blindspot	0x0920	0x0 (Off)

4.1.3 BLIS-REQ-380617/A-Blis Sensor Status

Depending on what display element will be given to the user when Bliss sensors get triggered, the table below should be used if a combination of both sensor data is to be used.

LSodSnsLeft	LSodSnsRight	Combo Sensor Output
Clear (0x0)	Clear (0x0)	Sensor_Clear (0x0)
Blocked (0x1)	Clear (0x0)	Sensor_Blocked (0x1)
Clear (0x0)	Blocked (0x1)	Sensor_Blocked (0x1)
Blocked (0x1)	Blocked (0x1)	Sensor_Blocked (0x1)
Missing	Don't care	Sensor_Fault (0x2)
Don't care	Missing	Sensor_Fault (0x2)
All Other Cases		Sensor_Fault (0x2)

This value of this requirement is related to HMI spec, if they decide to implement and display any content related to this content to the user or not. If HMI wont display anything, then Client doesn't need to implement this requirement.

4.1.4 Use Cases

4.1.4.1 BLIS-UC-REQ-380618/A-Blis User Notification

Actors	User
Pre-conditions	Blis is active. Vehicle is driving
Scenario Description	A vehicle enters into the Sod sensors range thus triggers them
Post-conditions	Client gets Blocked status from server Client displays proper notification to the user.
List of Exception Use Cases	
Interfaces	Client HMI.

4.1.4.2 BLIS-UC-REQ-381426/A-Blis Activation

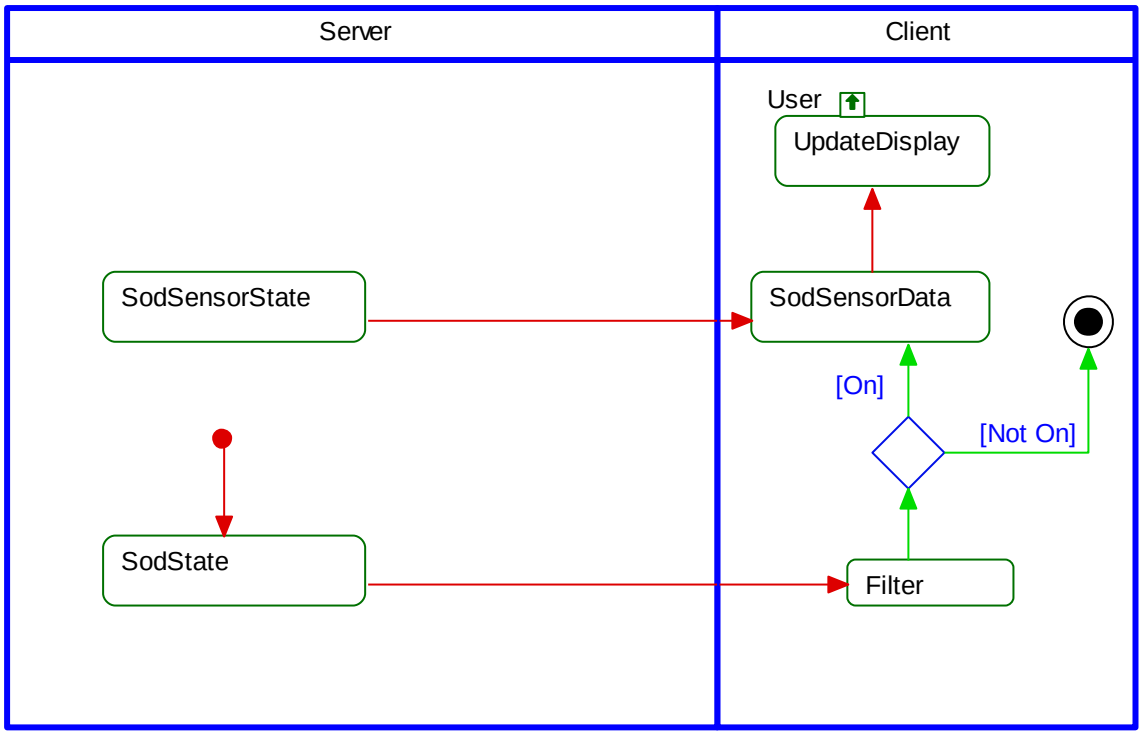
Actors	User
Pre-conditions	Blis is Off.

Scenario Description	User request enabling of Blis On through the client interface
Post-conditions	Server activates Blis feature.
List of Exception Use Cases	
Interfaces	HMI.

4.1.5 Activity Views

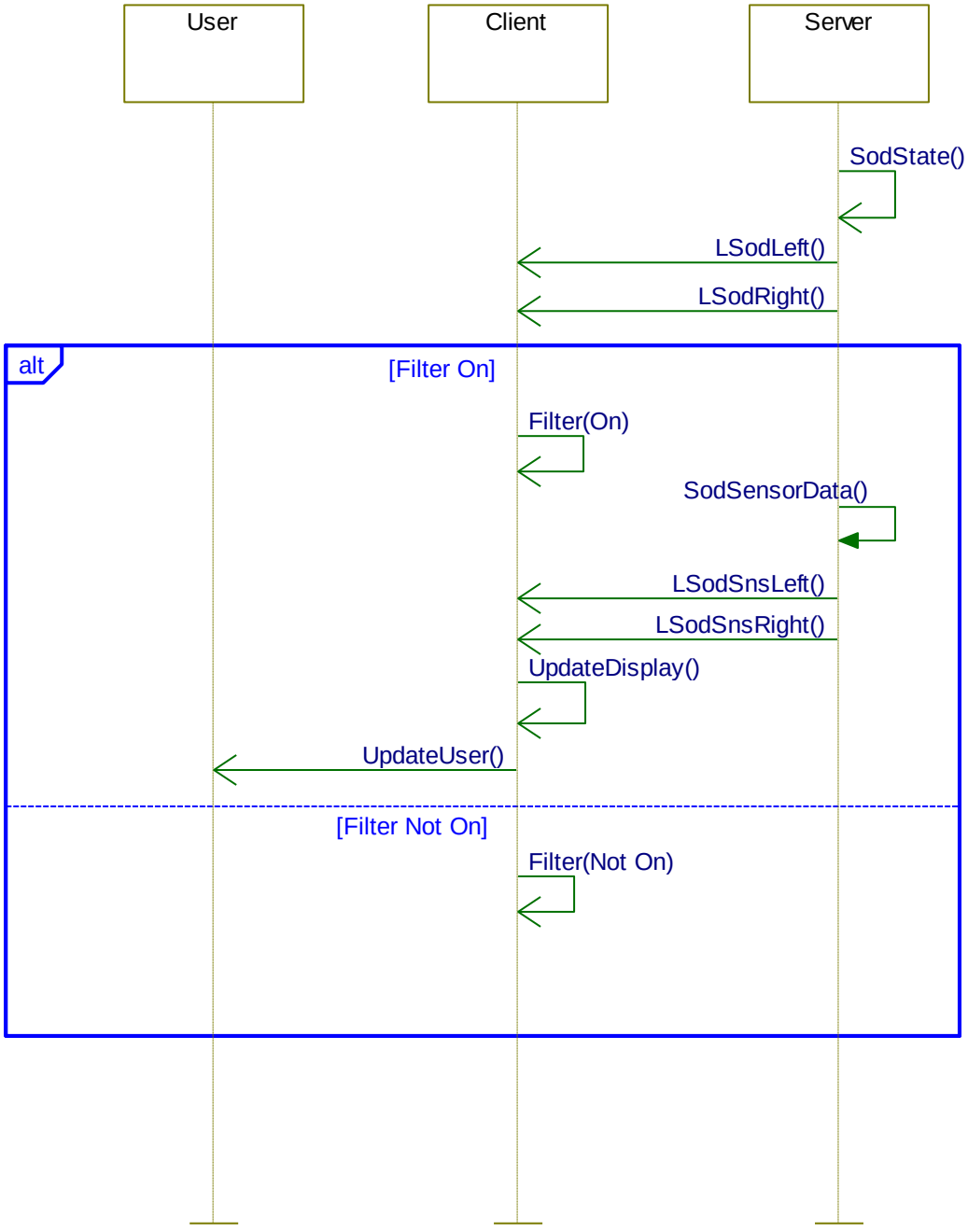
4.1.5.1 Activity Diagrams

4.1.5.1.1 BLIS-ACT-REQ-380583/A-BLIS Operation



4.1.5.2 Sequence Diagrams

4.1.5.2.1 BLIS-SD-REQ-380584/A-BLIS Operation



4.2 BLIS-FUN-REQ-380606/A-Cta

4.2.1 BLIS-REQ-381352/A-Cta Filter State

The state of Cta feature is determined from the two signals LCtaLeft and LCtaRight like in the table below.

LCtaLeft	LCtaRight	CTA Filter
OFF (0x0)	OFF (0x0)	OFF (0x0)

Trailer_Tow_Off (0x1)	Trailer_Tow_Off (0x1)	TRAILER_TOW_OFF (0x1)
ON (0x2)	ON (0x2)	ON (0x2)
DISABLED (0x3)	DISABLED (0x3)	DISABLED (0x3)
INVALID (0x4)	Don't care	FAULT (0x4)
Don't care	INVALID (0x4)	FAULT (0x4)
Missing	Don't care	FAULT (0x4)
Don't care	Missing	FAULT (0x4)
All Other Cases		FAULT (0x4)

CtaLeft_D_Stat Signal	**CtaRight_D_Stat Signal**	**Cross_Traffic_Filt_Sys_State (internal variable)**
OFF (0x0)	OFF (0x0)	OFF (0x0)
Trailer_Tow_Off (0x1)	Trailer_Tow_Off (0x1)	TRAILER_TOW_OFF (0x1)
ON (0x2)	ON (0x2)	ON (0x2)
DISABLED (0x3)	DISABLED (0x3)	DISABLED (0x3)
INVALID (0x4)	Don't care	FAULT (0x4) *Notes Below
Don't care	INVALID (0x4)	FAULT (0x4) *Notes Below
Missing / Invalid as per 1.4	Don't care	FAULT (0x4) *Notes Below
Don't care	Missing / Invalid as per 1.4	FAULT (0x4) *Notes Below
All Other Cases		FAULT (0x4) *Notes Below

Cross_Traffic_Filt_Sys_State	**Display Menu In Center Stack (For reference)**	**CtrStkFeatNoActl Signal**	**FeatConfigIpcActl Signal**
On (0x2)	☑ Cross Traffic Alert	0x0922	0x1 (On)
Off (0x0)	☐ Cross Traffic Alert	0x0922	0x0 (Off)
Trailer_Tow_Off (0x1) Disabled (0x3) FAULT (0x4)	☐ Cross Traffic Alert	0x0922	0x0 (Off)

4.2.2 BLIS-REQ-381353/A-Cta Notifications

Cta gives two types of feedback to the client for further info to be displayed to the user.

LCtaAlrtLeft (0x1) or when LCtaAlrtRight (0x1) means that a vehicle has been detected on the sides of the user's vehicle. Proper notification as defined in HMI specification should be given to the user for as long as any of the signals have a value of 0x1. A value of 0x0 means that there are no objects detected on the side of the user's vehicle.

LCtaBrkLeft (0x1) and LCtaBrkRight (0x1) means that the vehicle breaks have been applied to the user's vehicle. Proper notification as defined in HMI specification should be given to the user for as long as any of the signals have a value of 0x1. A value of 0x0 means that the breaks have not been applied to the user's vehicle.

4.2.3 BLIS-REQ-381354/A-Cta Button Operation

The user has been given the ability to turn the CTA part of the feature On or Off. The client uses the signal LCtaRq to request feature state change. Since only one signal is being used its parameters will depend on the current state of the feature, like in the table below.

CTA Filter	CTA Button State (LCtaRq parameters)
OFF (0x0)	On (0x1)
TRAILER_TOW_OFF (0x1)	Do Nothing. Don't request state change.
ON (0x2)	Off (0x1)
DISABLED (0x3)	Do Nothing. Don't request state change.
FAULT (0x4)	On (0x1)

Default value of LCtaRq upon client wakeup should be 0x3.
0x3 may not be the CAN database default value, however server is expecting to see this value, whenever client can send can messages.

4.2.4 Use Cases

4.2.4.1 BLIS-UC-REQ-381416/A-Cta Turn On

Actors	User
Pre-conditions	Vehicle has Cta turned Off
Scenario Description	User turns on Cta. Client notifies the server of the user's request.
Post-conditions	Cta is turned On. Any vehicle or obstacles on the rear of the vehicle while the vehicle is in Reverse gear will trigger a notification to user.
List of Exception Use Cases	
Interfaces	HMI

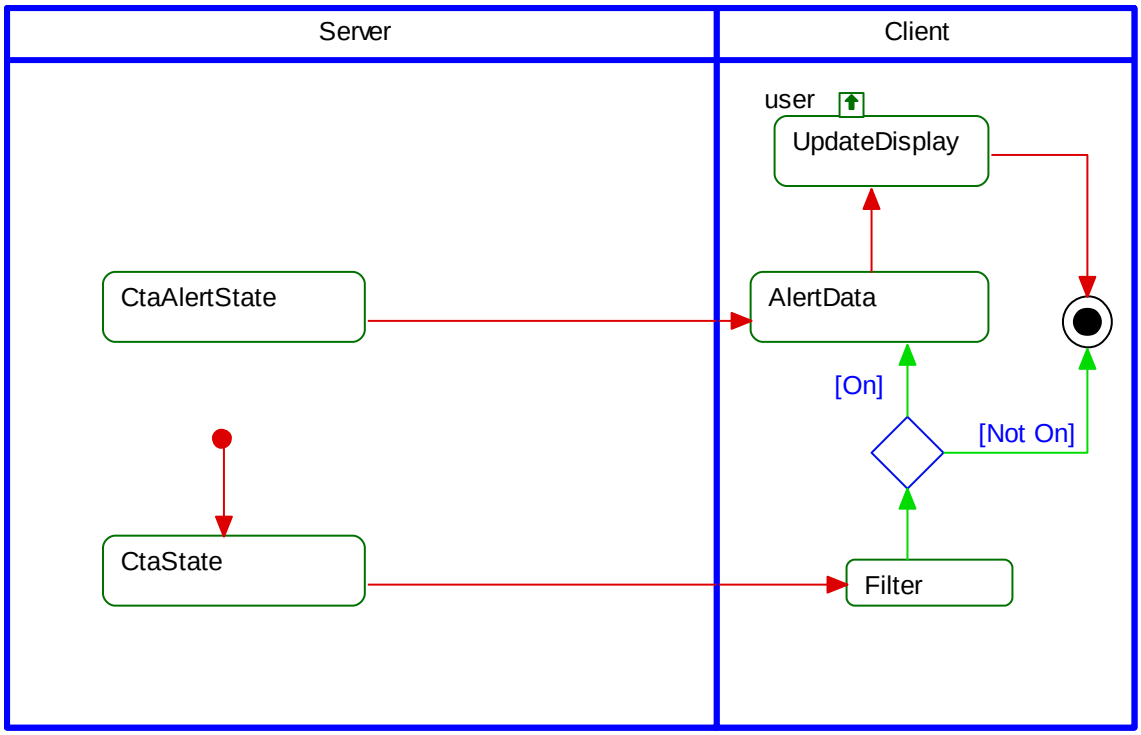
4.2.4.2 BLIS-UC-REQ-381417/A-Cta Alert Activation

Actors	User
Pre-conditions	Cta is active Vehicle engine is running and gear is in reverse.
Scenario Description	A vehicle comes close to the rear of the user's vehicle.
Post-conditions	Cta gives notification to the user that an object is detected (and the side it has been detected).
List of Exception Use Cases	
Interfaces	HMI

4.2.5 Activity Views

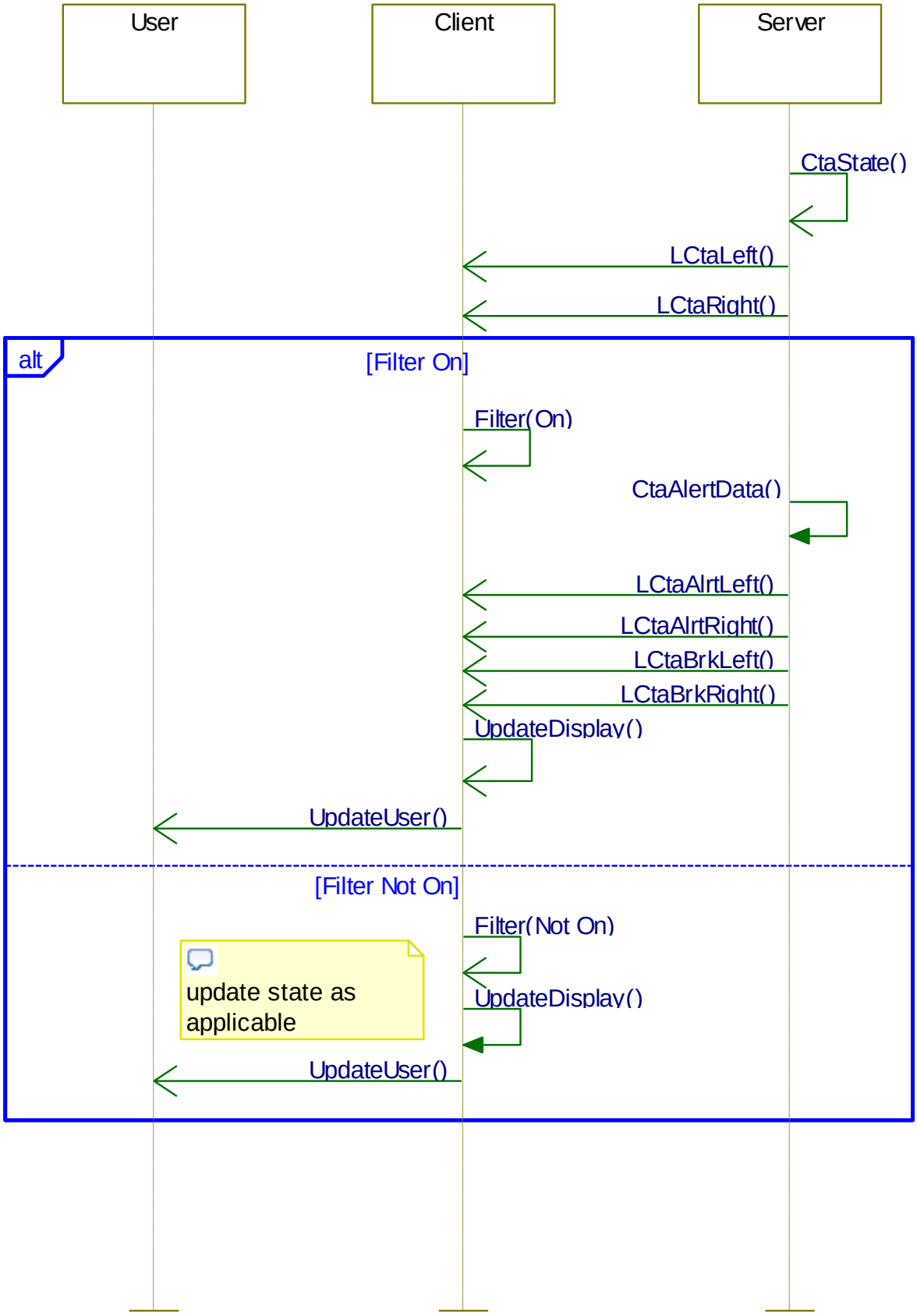
4.2.5.1 Activity Diagrams

4.2.5.1.1 BLIS-ACT-REQ-380585/A-CTA Operation



4.2.5.2 Sequence Diagrams

4.2.5.2.1 BLIS-SD-REQ-380586/A-CTA Operation


User
Client
Server
CtaState()
LCtaLeft()
LCtaRight()
alt
[Filter On]
Filter(On)
CtaAlertData()
LCtaAlrtLeft()
LCtaAlrtRight()
LCtaBrkLeft()
LCtaBrkRight()
UpdateDisplay()
UpdateUser()
[Filter Not On]
Filter(Not On)
update state as applicable
UpdateDisplay()
UpdateUser()

4.3 BLIS-FUN-REQ-380607/A-Btt

4.3.1 BLIS-REQ-381425/A-Btt Filter

The status of Btt is found by combined input of the signals. Table below gives further details.

LBttLeft	LBttRight	BTT Filter
NotDetermined (0x0)	NotDetermined (0x0)	ON (0x1)
Connected (0x1)	Connected (0x1)	ON (0x1)
Pending (0x2)	Pending (0x2)	ON (0x1)
NotConnected (0x3)	NotConnected (0x3)	ON (0x1)
OffTemp (0x4)	OffTemp (0x4)	ON (0x1)
Off (0x5)	Off (0x5)	OFF (0x0)
Disable (0x6)	Disable (0x6)	DISABLED (0x2)
NotUsed (0x7)	NotUsed (0x7)	OFF (0x0)
Missing	Don't care	FAULT (0x3)
Don't care	Missing / Invalid	FAULT (0x3)
All Other Cases		FAULT (0x3)

This value of this requirement is related to HMI spec, if they decide to implement and display any content related to this content to the user or not. If HMI wont display anything, then Client doesn't need to implement this requirement.

5 Appendix: Reference Documents

Blind Spot Monitor with Cross Traffic Alert-CGEA1.3