Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – Multi Contoured Seats Client V2

Infotainment Subsystem Part Specific Specification (SPSS)

Version 1.6

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Version Date: October 7, 2021

FORD CONFIDENTIAL

Revision History

Date	Version	Notes	
December 1, 2016	**1.0**	**Initial Release**	
February 20, 2017	**1.1**		
	STR-407596/B-Architectural Design	MBORREL4: Added REQ-250012/A-Multi Contoured Seat Remote Client2	
	MCSv2-SV-REQ-237612/B-IBD_MultiContouredSeatSystem	MBORREL4: Replaced draft IBD with higher level diagram	
	MCS-DOC-417814/B-Physical Mapping of Classes	MBORREL4: Added MultiContouredSeatRemoteClient2	
	MCS-CLD-REQ-250012/A-Multi Contoured Seat Remote Client2	MBORREL4: New class description for the 5way controller	
	MCS-CLD-REQ-239811/B-Multi Contoured Seat Server	MBORREL4: Updated to include execution from RemoteClient2	
	STR-417487/B-Functional Requirements	MBORREL4: Added REQ-250020, REQ-250536	
	MCS-SR-REQ-239812/B-Request to display MCS Screen via MultiContouredSeatRemoteClient	MBORREL4: Updated title to reflect that this is only for Shortcut Key. Updated content for clarity	
	MCS-SR-REQ-250020/A-Request to display MCS Screen via MultiContouredSeatRemoteClient2	MBORREL4: New req. to define 5way controller button input	
	MCS-SR-REQ-239444/B-Inactivity of any user input to MultiContoured Seats	MBORREL4: Updated to convey timer reset on user input and timer initialization on release of input. Updated to include 5way controller signals/behavior	
	MCS-TMR-REQ-239445/B-T_MCS_Input	MBORREL4: Updated to include 5way controller	
	MCS-TMR-REQ-239813/B-T_MCS_Screen	MBORREL4: Updated to include 5way controller	
	MCS-SR-REQ-250536/A-Selecting a Massage Pattern from the touch screen	MBORREL4: New req. to capture selecting a massage pattern from HMI	
	MCSv2-IIR-REQ-237614/B-MultiContouredSeatsClient_Rx	MBORREL4: Added REQ-021447 & REQ-021456 and updated table	
	MCS-ACT-REQ-237767/B-Activate/Deactivate Multi Contour Seat Feature Screen HMI	MBORREL4: Updated diagram to correctly reflect user input request (no functional changes, clarification only)	
	MCS-SD-REQ-237620/B-Activate/Deactivate Multi Contour Seat Feature Screen HMI	MBORREL4: Updated diagram to correctly reflect user input request (no functional changes, clarification only)	
	STR-407602/B-Use Cases	MBORREL4: Added REQ-250097, REQ-021354, REQ-021356	
	MCS-UC-REQ-250097/A-Select Front Seat Massage Pattern from Seat	MBORREL4: New usecase for 5way controller	
	MCS-UC-REQ-021354/B-Adjust Front Seat Massage Intensity from Seat (TcSE ROIN-291761)	MBORREL4: Updated precondition to include IGN = ACC	
	MCS-UC-REQ-021356/B-Exiting Front Massage and transitioning to Adjust bladder pressure via Seat (TcSE ROIN-292491)	MBORREL4: Updated precondition to include IGN = ACC	
	STR-407603/B-White Box View	MBORREL4: Added REQ-250099, REQ-250100, REQ-250101, REQ-250102, REQ-250103	
	MCS-ACT-REQ-237796/B-Select Massage Pattern from Touch Screen	MBORREL4: Updated name to include "from Touch Screen", added a final activity point	
	MCS-ACT-REQ-250099/A-Select Massage Pattern from Seat	MBORREL4: New act. diag. for 5way controller	
	MCS-ACT-REQ-237797/B-Set Massage Intensity from Touch Screen	MBORREL4: Updated name to include "from Touch Screen", added note, and changed "InitiateMassageIntensity" action to "InitiateMassageIntensityRequest" action (Clarification only, no functional change)	
	MCS-ACT-REQ-250100/A-Set Massage Intensity from Seat	MBORREL4: New act. diag. for 5way controller	
	MCS-SD-REQ-239326/B-Turn ON Massage Mode from Touch Screen	MBORREL4: Changed "InitiateMassageIntensity()" to "InitiateMassageIntensityRequest()" (Clarification only, no functional change)	
	MCS-SD-REQ-250101/A-Turn ON Massage Mode from Seat	MBORREL4: New seq. diag. for 5way controller	
	MCS-SD-REQ-250102/A-Select Massage Pattern from Seat	MBORREL4: New seq. diag. for 5way controller	
	MCS-SD-REQ-237799/B-Set Massage Intensity to High from Touch Screen	MBORREL4: Changed "InitiateMassageIntensity()" to "InitiateMassageIntensityRequest()" (Clarification only, no functional change)	
	MCS-SD-REQ-237800/B-Set Massage Intensity to Medium from Touch Screen	MBORREL4: Changed "InitiateMassageIntensity()" to "InitiateMassageIntensityRequest()" (Clarification only, no functional change)	

	MCS-SD-REQ-237801/B-Set Massage Intensity to Low from Touch Screen	MBORREL4: Changed "InitiateMassageIntensity()" to "InitiateMassageIntensityRequest()" (Clarification only, no functional change)
	MCS-SD-REQ-250103/A-Set Massage Intensity from Seat	MBORREL4: New seq. diag. for 5way controller
	STR-407600/B-Use Cases	MBORREL4: Added UC-REQ-021336
	MCS-UC-REQ-021336/B-Adjust Front Seat Bladder Pressure from Seat (TcSE ROIN-291759)	MBORREL4: Remove IGN=Run precondition and IGN !=Run exception usecase
	STR-407601/B-White Box View	MBORREL4: Added REQ-250048, REQ-250049, REQ-021351
	MCS-ACT-REQ-250048/A-Set Lumbar - Seat Initiated	MBORREL4: New act. diag. for 5way controller
	MCS-SD-REQ-250049/A-Set Lumbar Bladder at Seat	MBORREL4: New seq. diag. for 5way controller
	STR-407604/B-Use Cases	MBORREL4: Added REQ-021369
	MCS-UC-REQ-021369/B-Adjust Front Seat Bolster Bladder from Seat (TcSE ROIN-293589)	MBORREL4: Remove IGN=Run precondition
	STR-407605/B-White Box View	MBORREL4: Added REQ-250054, REQ-250055, REQ-250092, REQ-021380
	MCS-ACT-REQ-250054/A-Set Bolster - Seat Initiated	MBORREL4: New act. diag. for 5way controller
	MCS-SD-REQ-250055/A-Initiate Bolster Adjust at Seat - No pressure updates	MBORREL4: New seq. diag. for 5way controller
	MCS-SD-REQ-250092/A-Set Bolster at Seat	MBORREL4: New seq. diag. for 5way controller
March 8, 2017	**1.2**	
	MCS-SR-REQ-239787/B-Powermode Conditions	cwu3: Deleted ACC from pre-conditions. Updated Seat Adjust and Massage Mode to have the same powermode conditions
	MCS-TMR-REQ-239813/C-T_MCS_Screen	cwu3: Changed default value from 8 to 12. Added requirement for default value not less than the time needed by Multi Contoured Seat Server to rebuild or adjust pressures.
	MCSv2-IIR-REQ-237614/C-MultiContouredSeatsClient_Rx	cwu3: Added MD-REQ-199809/A- IgnitionStatus_St
	MCS-UC-REQ-237633/B-Open Seat Adjust Screen from Shortcut Key	cwu3: Added Note to clarify when Ignition is not in Run. No content changed.
	MCS-UC-REQ-237634/B-Exit Seat Adjust Screen from Shortcut Key	cwu3: Added Note for time out timer reference
	MCS-UC-REQ-237772/B-Select Front Seat Massage Pattern from HMI	cwu3: Deleted ACC from Pre-conditions
	MCS-UC-REQ-250097/B-Select Front Seat Massage Pattern from Seat	cwu3: Deleted ACC from Pre-conditions
	MCS-UC-REQ-021353/C-Adjust Front Seat Massage Intensity from HMI (TcSE ROIN-291760)	cwu3: Deleted ACC from Pre-conditions
	MCS-UC-REQ-021354/C-Adjust Front Seat Massage Intensity from Seat (TcSE ROIN-291761)	cwu3: Deleted ACC from Pre-conditions
	MCS-UC-REQ-021355/C-Exiting Front Massage and transitioning to Adjust bladder pressure via HMI (TcSE ROIN-292490)	cwu3: Deleted ACC from Pre-conditions
	MCS-UC-REQ-021356/C-Exiting Front Massage and transitioning to Adjust bladder pressure via Seat (TcSE ROIN-292491)	cwu3: Deleted ACC from Pre-Conditions
	MCS-UC-REQ-240862/B-Adjust Front Seat Bladder Pressure from HMI	cwu3: Added Ignition is Run to Pre-conditions
	MCS-UC-REQ-021336/C-Adjust Front Seat Bladder Pressure from Seat (TcSE ROIN-291759)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021337/B-Select Lumbar Middle Bladder at Touch Screen - No pressure updates (TcSE ROIN-200149-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021338/B-Select Lumbar Upper Bladder at Touch Screen - No pressure updates (TcSE ROIN-200156-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021340/B-Select Lumbar Lower Bladder at Touch Screen - No pressure updates (TcSE ROIN-200170-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021341/C-Decrease Lumbar Lower Bladder from Touch Screen (TcSE ROIN-200773-1)	cwu3: Added Ignition is Run to Pre-conditions

	MCS-SD-REQ-021342/C-Decrease Lumbar Middle Bladder from Touch Screen (TcSE ROIN-200780-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021343/C-Decrease Lumbar Upper Bladder from Touch Screen (TcSE ROIN-200787-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021344/C-Increase Lumbar Lower Bladder from Touch Screen (TcSE ROIN-200794-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021345/C-Increase Lumbar Middle Bladder from Touch Screen (TcSE ROIN-200801-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021346/C-Increase Lumbar Upper Bladder from Touch Screen (TcSE ROIN-200808-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-250049/B-Set Lumbar Bladder at Seat	cwu3: Revised to add Ignition is Run to Pre-conditions and move Pre-conditions from Scenarios to Constraints
	MCS-UC-REQ-240863/B-Adjust Front Seat Bolster Bladder from HMI	cwu3: Added Ignition is Run to Pre-conditions
	MCS-UC-REQ-021369/C-Adjust Front Seat Bolster Bladder from Seat (TcSE ROIN-293589)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021375/C-Increase Bolster Upper Bladders from Touch Screen (TcSE ROIN-199118-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021371/C-Increase Bolster Lower Bladders from Touch Screen (TcSE ROIN-199090-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021372/C-Decrease Bolster Upper Bladders from Touch Screen (TcSE ROIN-199097-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021373/C-Decrease Bolster Lower Bladders from Touch Screen (TcSE ROIN-199104-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021376/B-Select Bolster Upper Bladders at Touch Screen - No pressure updates (TcSE ROIN-200177-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-021378/B-Select Bolster Lower Bladders at Touch Screen - No pressure updates (TcSE ROIN-200815-1)	cwu3: Added Ignition is Run to Pre-conditions
	MCS-SD-REQ-250055/B-Initiate Bolster Adjust at Seat - No pressure updates	cwu3: Revised to add ignition Run to Pre-conditions and move Post-conditions from Scenarios to Constraints
	MCS-SD-REQ-250092/B-Set Bolster at Seat	cwu3:Revised to add ignition Run to Pre-conditions and move Post-conditions from Scenarios to Constraints
	STR-407606/B-Appendix: Reference Documents	cwu3: Added HMI specification H74a
June 28, 2018	**1.3**	**First release as a Common SPSS**
	MCS-DOC-417814/C-Physical Mapping of Classes	MBORREL4: Added CTR
	MCSv2-IIR-REQ-237613/B-MultiContouredSeatsClient_Tx	cwu3: Removed REQ-021436 & REQ-021437. These methods were not needed and were never implemented
	MCSv2-IIR-REQ-237614/D-MultiContouredSeatsClient_Rx	cwu3: Updated GSDB signal name "SeatScrnDrvOn_B_Stat" and "SeatScrnPsngrOn_B_Stat" to "SeatScrnDrvOn_B_Rq" and "SeatScrnPsngrOn_B_Rq"
	MCS-SD-REQ-239326/C-Turn ON Massage Mode from Touch Screen	MBORREL4: Updated diagram to include ActiveSeatControl status back from MCSServer (conveying implementation, clarification only)
	MCS-SD-REQ-250101/B-Turn ON Massage Mode from Seat	MBORREL4: Updated diagram to include ActiveSeatControl status back from MCSServer (conveying implementation, clarification only)
	MCS-SD-REQ-237811/B-Select Massage Pattern from Touch Screen	MBORREL4: Updated diagram to include ActiveSeatControl status back from MCSServer (conveying implementation, clarification only)
	MCS-SD-REQ-250102/B-Select Massage Pattern from Seat	MBORREL4: Updated diagram to include ActiveSeatControl status back from MCSServer (conveying implementation, clarification only)
March 6, 2020	**1.4**	
	STR-417487/C-Functional Requirements	MBORREL4: Added REQ-383519-522
	MCS-REQ-383519/A-Configurable Parameter(s) for Bladders	MBORREL4: New req.

	MCS-REQ-383520/A-Massage Pattern Availability	MBORREL4: New req.
	MCS-REQ-383521/A-Massage Intensity Indicators	MBORREL4: New req.
	MCS-SR-REQ-243309/B-Adjusting the Massage Pattern levels from the touch screen (Low/Mid/High Buttons)	MBORREL4: Updated req.
	MCS-SR-REQ-383522/A-Adjusting the Massage Pattern levels from the touch screen (Intensity Indicators)	MBORREL4: New req.
	MCS-SR-REQ-250536/B-Selecting a Massage Pattern from the touch screen	MBORREL4: Updated req.
	MD-REQ-237625/B-DriverMassagePattern_Rq	MBORREL4: Added patterns 6-10
	MD-REQ-237626/B-PassengerMassagePattern_Rq	MBORREL4: Added patterns 6-10
	MD-REQ-237627/C-DriverMassagePattern_St	MBORREL4: Added patterns 6-10
	MD-REQ-237628/C-PassengerMassagePattern_St	MBORREL4: Added patterns 6-10
June 9, 2020	**1.5**	
	MCS-DOC-417814/D-Physical Mapping of Classes	MBORREL4: Updated table
	STR-417487/D-Functional Requirements	MBORREL4: Added REQ-392306, REQ-392308, REQ-392309
	MCS-REQ-392306/A-Configurable Parameter for Number of Shortcut Keys	MBORREL4: New req.
	MCS-REQ-383521/B-Massage Intensity Indicators	MBORREL4: Updated req.
	MCS-SR-REQ-239812/C-Request to display MCS Screen via MultiContouredSeatRemoteClient (single shortcut key)	MBORREL4: Updated title and req.
	MCS-REQ-392308/A-Request to display MCS Adjust Screen via MultiContouredSeatRemoteClient (double shortcut keys)	MBORREL4: New req.
	MCS-REQ-392309/A-Request to display MCS Massage Screen via MultiContouredSeatRemoteClient (double shortcut keys)	MBORREL4: New req.
	MCS-SR-REQ-239444/C-Inactivity of any user input to MultiContoured Seats	MBORREL4: Updated req.
	MCS-SR-REQ-021427/B-Selecting the Adjust Tab from the touch screen (TcSE ROIN-200453-1)	MBORREL4: Updated req.
	MCSv2-IIR-REQ-237614/E-MultiContouredSeatsClient_Rx	MBORREL4: Updated table. Added REQ-392372, REQ-392373
	MD-REQ-237615/B-DriverSeatScreenToggle_St	MBORREL4: Updated description
	MD-REQ-392372/A-DriverMassageScreenToggle_St	MBORREL4: New req.
	MD-REQ-237617/B-PassengerSeatScreenToggle_St	MBORREL4: Updated description
	MD-REQ-392373/A-PassengerMassageScreenToggle_St	MBORREL4: New req.
	STR-407599/B-Functional Definition	MBORREL4: Added REQ-392374
	MCS-FUN-REQ-237635/B-Activate Multi Contour Seat Display HMI via Single Shortcut Key	MBORREL4: Update title
	MCS-FUN-REQ-392374/A-Activate Multi Contour Seat Display HMI via Double Shortcut Key	MBORREL4: New req.
	STR-772579/A-Use Cases	MBORREL4: New section/STR
	MCS-UC-REQ-392375/A-Open Seat Adjust Screen from Adjust Shortcut Key	MBORREL4: New usecase
	MCS-UC-REQ-392376/A-Exit Seat Adjust Screen from Adjust Shortcut Key	MBORREL4: New usecase

	MCS-UC-REQ-392377/A-Open Seat Massage Screen from Massage Shortcut Key (Massage is On)	MBORREL4: New usecase
	MCS-UC-REQ-392378/A-Open Seat Massage Screen from Massage Shortcut Key (Massage is Off)	MBORREL4: New usecase
	MCS-UC-REQ-392379/A-Exit Seat Massage Screen from Massage Shortcut Key	MBORREL4: New usecase
	STR-772581/A-White Box View	MBORREL4: New section/STR
	MCS-ACT-REQ-392384/A-Activate/Deactivate Adjust Screen HMI	MBORREL4: New req.
	MCS-ACT-REQ-392388/A-Activate/Deactivate Massage Screen HMI	MBORREL4: New req.
	MCS-SD-REQ-392385/A-Activate/Deactivate Adjust Screen HMI	MBORREL4: New req.
	MCS-SD-REQ-392389/A-Activate/Deactivate Massage Screen HMI	MBORREL4: New req.
October 7, 2021	**1.6**	
	STR-417487/E-Functional Requirements	MBORREL4: Added REQ-454257-454260
	MCSv2-REQ-454257/A-Powermode Conditions v2 - Front Driver	MBORREL4: New req. for DCO and PDC
	MCSv2-REQ-454258/A-Powermode Conditions v2 - Front Driver Notifications	MBORREL4: New req. for DCO and PDC
	MCSv2-REQ-454259/A-Powermode Conditions v2 - Front Passenger	MBORREL4: New req. for DCO and PDC
	MCSv2-REQ-454260/A-Powermode Conditions v2 - Front Passenger Notifications	MBORREL4: New req. for DCO and PDC
	MCSv2-IIR-REQ-237614/F-MultiContouredSeatsClient_Rx	MBORREL4: Updated table. Added REQ-454277, REQ-454278
	MD-REQ-454277/A-FrontDriverMCSMode_St	MBORREL4: New req. for DCO
	MD-REQ-454278/A-FrontPassengerMCSMode_St	MBORREL4: New req. for DCO
	MCS-UC-REQ-237772/C-Select Front Seat Massage Pattern from HMI	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
	MCS-UC-REQ-250097/C-Select Front Seat Massage Pattern from Seat	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
	MCS-UC-REQ-021353/D-Adjust Front Seat Massage Intensity from HMI (TcSE ROIN-291760)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
	MCS-UC-REQ-021354/D-Adjust Front Seat Massage Intensity from Seat (TcSE ROIN-291761)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
	MCS-UC-REQ-021355/D-Exiting Front Massage and transitioning to Adjust bladder pressure via HMI (TcSE ROIN-292490)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
	MCS-UC-REQ-021356/D-Exiting Front Massage and transitioning to Adjust bladder pressure via Seat (TcSE ROIN-292491)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
	MCS-UC-REQ-240862/C-Adjust Front Seat Bladder Pressure from HMI	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
	MCS-UC-REQ-021336/D-Adjust Front Seat Bladder Pressure from Seat (TcSE ROIN-291759)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
	MCS-SD-REQ-021337/C-Select Lumbar Middle Bladder at Touch Screen - No pressure updates (TcSE ROIN-200149-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
	MCS-SD-REQ-021338/C-Select Lumbar Upper Bladder at Touch Screen - No pressure updates (TcSE ROIN-200156-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
	MCS-SD-REQ-021340/C-Select Lumbar Lower Bladder at Touch Screen - No pressure updates (TcSE ROIN-200170-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
	MCS-SD-REQ-021341/D-Decrease Lumbar Lower Bladder from Touch Screen (TcSE ROIN-200773-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
	MCS-SD-REQ-021342/D-Decrease Lumbar Middle Bladder from Touch Screen (TcSE ROIN-200780-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"

MCS-SD-REQ-021343/D-Decrease Lumbar Upper Bladder from Touch Screen (TcSE ROIN-200787-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
MCS-SD-REQ-021344/D-Increase Lumbar Lower Bladder from Touch Screen (TcSE ROIN-200794-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
MCS-SD-REQ-021345/D-Increase Lumbar Middle Bladder from Touch Screen (TcSE ROIN-200801-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
MCS-SD-REQ-021346/D-Increase Lumbar Upper Bladder from Touch Screen (TcSE ROIN-200808-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
MCS-SD-REQ-250049/C-Set Lumbar Bladder at Seat	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
MCS-UC-REQ-240863/C-Adjust Front Seat Bolster Bladder from HMI	MBORREL4: Updated Pre-Conditions to "Powermode Conditions Met"
MCS-UC-REQ-021369/D-Adjust Front Seat Bolster Bladder from Seat (TcSE ROIN-293589)	MBORREL4: Updated Pre-Conditions to "Powermode Conditions Met"
MCS-SD-REQ-021375/D-Increase Bolster Upper Bladders from Touch Screen (TcSE ROIN-199118-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
MCS-SD-REQ-021371/D-Increase Bolster Lower Bladders from Touch Screen (TcSE ROIN-199090-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
MCS-SD-REQ-021372/D-Decrease Bolster Upper Bladders from Touch Screen (TcSE ROIN-199097-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
MCS-SD-REQ-021373/D-Decrease Bolster Lower Bladders from Touch Screen (TcSE ROIN-199104-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
MCS-SD-REQ-021376/C-Select Bolster Upper Bladders at Touch Screen - No pressure updates (TcSE ROIN-200177-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
MCS-SD-REQ-021378/C-Select Bolster Lower Bladders at Touch Screen - No pressure updates (TcSE ROIN-200815-1)	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
MCS-SD-REQ-250055/C-Initiate Bolster Adjust at Seat - No pressure updates	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"
MCS-SD-REQ-250092/C-Set Bolster at Seat	MBORREL4: Updated Pre-conditions to "Powermode Conditions Met"

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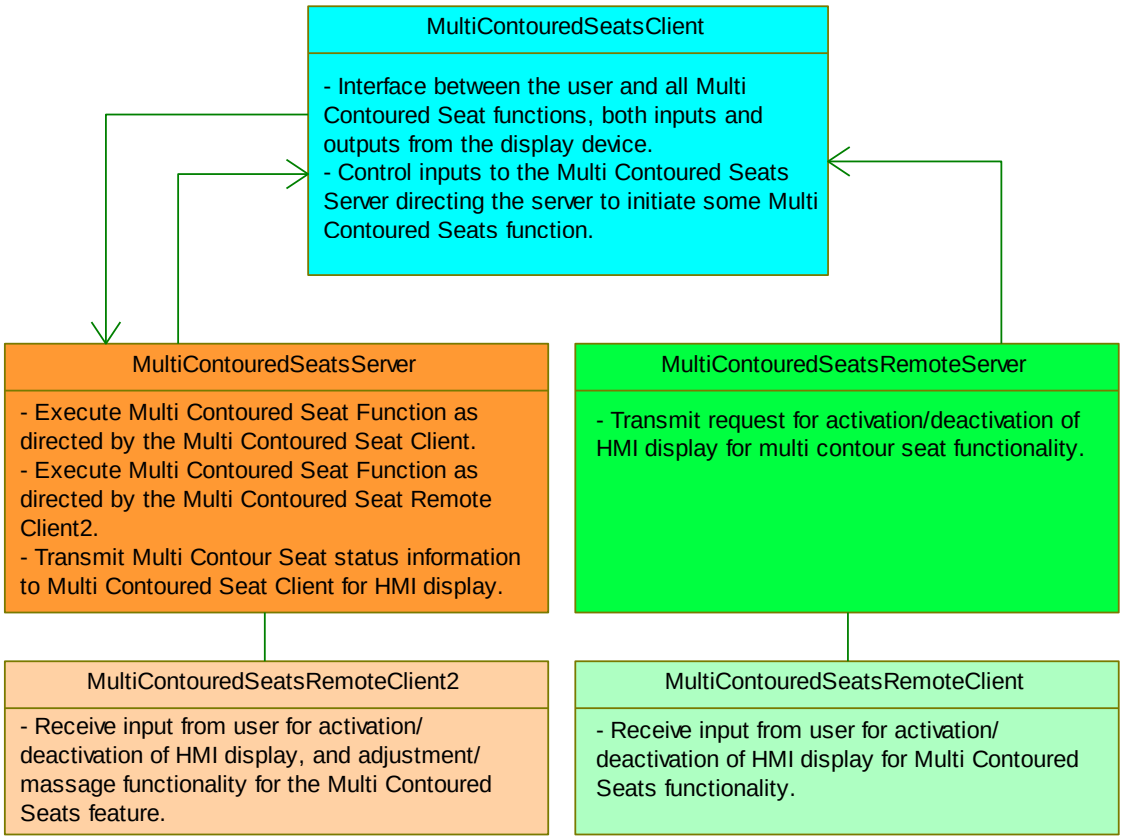
1 Architectural Design

1.1 MCSv2-SV-REQ-237612/B-IBD_MultiContouredSeatSystem

Internal Block Diagram



1.2 Physical Mapping of Classes

The table below shows an example of how the logical classes may be mapped into physical modules. This mapping example is specific to the CGEA1.3 architecture and does not necessarily carryover to other vehicle architectures.

Logical Class	Physical Module (ECU)
Multi Contoured Seat Remote Client	Switch Pack (Shortcut Key or Keys)
Multi Contoured Seat Remote Client2	Switch Pack (5way Controller)
Multi Contoured Seat Remote Server	DSM / PSM
Multi Contoured Seat Server	MCSM
Multi Contoured Seat Client	APIM, CTR

1.3 MCS-CLD-REQ-239296/A-Multi Contoured Seat Remote Server

The Multi Contoured Seat Remote Server has one function:

1. Transmit request for activation/deactivation of HMI display for multi contour seat functionality.

1.4 MCS-CLD-REQ-239805/A-Multi Contoured Seat Remote Client

The Multi Contoured Seat Remote Client has one function:

1. Receive input from user for activation/deactivation of HMI display for Multi Contoured Seats functionality.

1.5 MCS-CLD-REQ-250012/A-Multi Contoured Seat Remote Client2

The Multi Contoured Seat Remote Client2 has one function:

1. Receive input from user for activation/deactivation of HMI display, and adjustment/massage functionality for the Multi Contoured Seats feature.

1.6 MCS-CLD-REQ-239811/B-Multi Contoured Seat Server

The Multi Contoured Seat Server has three functions:

1. Execute Multi Contoured Seat Function as directed by the Multi Contoured Seat Client.
2. Execute Multi Contoured Seat Function as directed by the Multi Contoured Seat Remote Client2.
3. Transmit Multi Contour Seat status information to Multi Contoured Seat Client for HMI display.

1.7 MCS-CLD-REQ-239443/A-Multi Contoured Seat Client

The Multi Contoured Seats Client has two functions:

1. Interface between the user and all Multi Contoured Seat functions, both inputs and outputs from the display device.
2. Control inputs to the Multi Contoured Seats Server directing the server to initiate some Multi Contoured Seats function.

1.7.1 Functional Requirements

1.7.1.1 MCS-SR-REQ-239787/B-Powermode Conditions

The MultiContoured Seat Client shall only allow the massage and seat adjust functionality of this feature when the Ignition_Status = Run, and the touch screen display is On (HMI_HMIMode_St=On).

1.7.1.2 MCSv2-REQ-454257/A-Powermode Conditions v2 - Front Driver

When DCO (Drive Control Optimization) is supported/enabled on the MultiContoured Seat Client, the MultiContoured Seat Client shall allow the front driver MCS functionality as per the below:

- When FrontDriverMCSMode_St = “(0x2) Partially_Active”, front driver Adjust functionality shall be allowed
- When FrontDriverMCSMode_St = “(0x3) Fully_Active”, front driver Massage & Adjust functionality shall be allowed

1.7.1.3 MCSv2-REQ-454258/A-Powermode Conditions v2 - Front Driver Notifications

Per REQ-454257, if the user attempts to use the front driver MCS screens/menu when the below conditions are true, the corresponding notifications shall be shown:

- If FrontDriverMCSMode_St = “(0x0) Null” or “(0x1) Off”, the MultiContoured Seat Client shall display a notification indicating that the driver side Massage and Adjust functionality is not available
- If FrontDriverMCSMode_St = “(0x2) Partially_Active”, the MultiContoured Seat Client shall display a notification indicating that the driver side Massage functionality is not available

- If FrontDriverMCSMode_St & FrontPassengerMCSMode_St = “(0x0) Null” or “(0x1) Off”, the MultiContoured Seat Client shall display a notification indicating that MCS feature is not available

1.7.1.4 MCSv2-REQ-454259/A-Powermode Conditions v2 - Front Passenger

When DCO (Drive Control Optimization) is supported/enabled on the MultiContoured Seat Client, the MultiContoured Seat Client shall allow the front passenger MCS functionality as per the below:

- When FrontPassengerMCSMode_St = “(0x2) Partially_Active”, front passenger Adjust functionality shall be allowed
- When FrontPassengerMCSMode_St = “(0x3) Fully_Active”, front passenger Massage & Adjust functionality shall be allowed

1.7.1.5 MCSv2-REQ-454260/A-Powermode Conditions v2 - Front Passenger Notifications

Per REQ-454259, if the user attempts to use the front passenger MCS screens/menu when the below conditions true, the corresponding notifications shall be shown:

- If FrontPassengerMCSMode_St = “(0x0) Null” or “(0x1) Off”, the MultiContoured Seat Client shall display a notification indicating that the passenger side Massage and Adjust functionality is not available

- If FrontPassengerMCSMode _St = “(0x2) Partially_Active”, the MultiContoured Seat Client shall display a notification indicating that the passenger side Massage functionality is not available

- If FrontDriverMCSMode_St & FrontPassengerMCSMode_St = “(0x0) Null” or “(0x1) Off”, the MultiContoured Seat Client shall display a notification indicating that MCS feature is not available

1.7.1.6 MCS-SR-REQ-239563/A-Configurable Parameter for Enhanced MCS

The Multi Contoured Seat Client shall have a configurable parameter to determine whether the vehicle supports Enhanced Multi Contoured Seats. If the parameter indicates that the vehicle is to support Enhanced Multi Contoured Seats, then all functionality and signals defined in this SPSS shall be used. The Legacy Multi Contoured Seats SPSS shall not be used.

If the configurable parameter for the Legacy Multi Contoured Seats feature is also configured On, the Enhanced Multi Contoured Seats feature shall take priority and a DTC shall be set by the Multi Contoured Seat Client to signify this conflict.

1.7.1.7 MCS-REQ-392306/A-Configurable Parameter for Number of Shortcut Keys

The Multi Contoured Seat Client shall have a configurable parameter to determine the number of Shortcut Keys the Multi Contoured Seat Remote Client supports. This parameter shall only be applicable when the vehicle supports Enhanced Multi Contoured Seats.

- If the parameter indicates a Single Shortcut Key, then all functionality and signals defined in MCS-FUN-REQ-237635 shall be used. All requirements referencing “shortcut key” shall be applicable.
- If the parameter indicates Double Shortcut Keys, then all functionality and signals defined in MCS-FUN-REQ-392374 shall be used. All requirements referencing “adjust shortcut key,” “massage shortcut key,” or “double shortcut keys” shall be applicable.

1.7.1.8 MCS-REQ-383519/A-Configurable Parameter(s) for Bladders

The Multi Contoured Seat Client shall have a configurable parameter(s) for the number of bladders. The number of bladders shall include: 3, 7, 11, 17, 21 bladders.

1.7.1.9 MCS-REQ-383520/A-Massage Pattern Availability

The Multi Contoured Seat Client shall offer/allow the Massage Patterns below when configured for Enhanced MCS:

Bladder Configuration	Available Massage Patterns
11	1-5
21	6-10

1.7.1.10 MCS-REQ-383521/B-Massage Intensity Indicators

When the Multi Contoured Seat Client is configured for Enhanced MCS (per REQ-239563) and the Vehicle Config. != P702, the Multi Contoured Seat Client shall provide Massage Intensity Indicators rather than separate Low/Med/High Intensity buttons. Refer to REQ-383522 for button behavior.

1.7.1.11 MCS-SR-REQ-021423/A-MultiContoured Seats Change Request Latency - Driver Seat (TcSE ROIN-199636-1)

The MultiContoured Seats Client shall ignore the DriverActiveSeatControl_St status message for T_Response_SeatMode after sending DriverActiveSeatControl_Rq to the MultiContoured Seats Server to allow for Gateway Latency.

1.7.1.12 MCS-SR-REQ-021429/A-MultiContoured Seats Change Request Latency - Passenger Seat (TcSE ROIN-201074-1)

The MultiContoured Seats Client shall ignore the PassengerActiveSeatControl_St status message for T_Response_SeatMode after sending PassengerActiveSeatControl_Rq to the MultiContoured Seats Server to allow for Gateway Latency.

1.7.1.13 MCS-TMR-REQ-021424/A-Change Request Latency timing (TcSE ROIN-199637-1)

Name	Description	Units	Range	Resolution	Default
Change Request Latency timing	Minimum amount of time between sending signals (DriverActiveSeatControl_Rq or	msec	0-1000	10	500

	PassengerActiveSeatControl_Rq) then updating the HMI based on status signals (DriverActiveSeatControl_St or PassengerActiveSeatControl_St) by the MultiContoured Seats Client.				

1.7.1.14 MCS-SR-REQ-239812/C-Request to display MCS Screen via MultiContouredSeatRemoteClient (single shortcut key)

When the MultiContouredSeatsUser requests to make seat adjustments via the specific single Driver or Passenger Shortcut Keys, the Multi Contoured Seat Client shall monitor the respective signals:

DriverSeatScreenToggle_St
PassengerSeatScreenToggle_St

When these signals transition from Off to On:

- If not already displayed, the Multi Contoured Seat Client shall display the Seat Adjust Screen for the respective signal/user (Driver or Passenger) when allowed (see REQ-239444 & REQ-239445).
- If already displayed, the Multi Contoured Seat Client shall close the Seat Adjust Screen for the respective signal/user (Driver or Passenger) and return to the last displayed screen.

When the MultiContouredSeatsUser completes their input (releases the button) and the respective signal reverts to Off, there shall be no change of display by the Multi Contoured Seat Client.

1.7.1.15 MCS-REQ-392308/A-Request to display MCS Adjust Screen via MultiContouredSeatRemoteClient (double shortcut keys)

When the MultiContouredSeatsUser requests to make a seat adjustment via the specific Driver or Passenger Adjust Shortcut Keys, the Multi Contoured Seat Client shall monitor the respective signals:

DriverSeatScreenToggle_St
PassengerSeatScreenToggle_St

When these signals transition from Off to On:

- If not already displayed, the Multi Contoured Seat Client shall display the Seat Adjust Screen for the respective signal/user (Driver or Passenger) when allowed (see REQ-239444 & REQ-239445).
- If already displayed, the Multi Contoured Seat Client shall close the Seat Adjust Screen for the respective signal/user (Driver or Passenger) and return to the last displayed screen.
- If the Massage Mode is active for the respective signal/user (Driver or Passenger), the Multi Contoured Seat Client shall request to activate Adjust Mode (per REQ-021427) before displaying the Seat Adjust Screen for the respective signal/user (Driver or Passenger) when allowed (see REQ-239444 & REQ-239445).

When the MultiContouredSeatsUser completes their input (releases the button) and the respective signal reverts to Off, there shall be no change of display by the Multi Contoured Seat Client.

1.7.1.16 MCS-REQ-392309/A-Request to display MCS Massage Screen via MultiContouredSeatRemoteClient (double shortcut keys)

When the MultiContouredSeatsUser requests to make a seat massage adjustment via the specific Driver or Passenger Massage Shortcut Keys, the Multi Contoured Seat Client shall monitor the respective signals:

DriverMassageScreenToggle_St
PassengerMassageScreenToggle_St

When these signals transition from Off to On:

- If not already displayed, the Multi Contoured Seat Client shall display the Seat Massage Screen for the respective signal/user (Driver or Passenger) when allowed (see REQ-239444 & REQ-239445).
- If already displayed, the Multi Contoured Seat Client shall close the Seat Massage Screen for the respective signal/user (Driver or Passenger) and return to the last displayed screen.

- If the Massage Mode is not active for the respective signal/user (Driver or Passenger), the Multi Contoured Seat Client shall request to activate Massage Mode (per REQ-239446) before displaying the Seat Massage Screen for the respective signal/user (Driver or Passenger) when allowed (see REQ-239444 & REQ-239445).
    - If the powermode conditions are not met (see REQ-239787), this request shall not be sent.

When the MultiContouredSeatsUser completes their input (releases the button) and the respective signal reverts to Off, there shall be no change of display by the Multi Contoured Seat Client.

1.7.1.17 MCS-SR-REQ-250020/A-Request to display MCS Screen via MultiContouredSeatRemoteClient2

When the MultiContouredSeatsUser requests to make seat adjustments via the specific Driver or Passenger 5way controller, the Multi Contoured Seat Client shall monitor the respective signals:

DriverInitiateSeatControlMode_St
PassengerInitiateSeatControlMode_St

When these signals transition from from SeatControlOff to SeatControlOn:

- If not already displayed, the Multi Contoured Seat Client shall display the Seat Adjust Screen for the respective signal/user (Driver or Passenger) when allowed (see REQ-239444 & REQ-239445).
- If already displayed, the Multi Contoured Seat Client shall continue to display the current Seat Adjust Screen (no screen change).

When the MultiContouredSeatsUser completes their input (releases the button) and the respective signal reverts to SeatControlOff, there shall be no change of display by the Multi Contoured Seat Client.

1.7.1.18 MCS-SR-REQ-239444/C-Inactivity of any user input to MultiContoured Seats

After the MultiContouredSeatUser has made their last input, and all seat adjustment and massage request signals have reverted to Inactive or Null, and the:

- DriverSeatScreenToggle_St or PassengerSeatScreenToggle_St has reverted to Off (when configured for Single Shortcut Key), OR
- DriverSeatScreenToggle_St or PassengerSeatScreenToggle_St or DriverMassageScreenToggle_St or PassengerMassageScreenToggle_St has reverted to Off (when configured for Double Shortcut Key), OR
- DriverInitiateSeatControlMode_St or PassengerInitiateSeatControlMode_St has reverted to SeatControlOff (for programs with the 5way controller),

the Multi Contoured Seat Client shall start the T_MCS_Input and T_MCS_Screen timers.

- While T_MCS_Input is active (not expired), the opposing seat's Shortcut Key(s) or 5way controller shall not be able to request to become the primary seat on the touch screen display.
    - This timer shall not apply to the "Driver / Passenger" touch screen buttons. These buttons shall always have request control.
- After T_MCS_Input expires, the opposing seat's Shortcut Key(s) or 5way controller shall be able to request to become the primary seat on the touch screen display.
- After T_MCS_Screen expires, the Seat Adjust Screen or Seat Massage Screen being shown on the touch screen display shall close.

If the user makes another input on the HMI (via any seat or massage request signal) or a 5way controller (via DriverInitiateSeatControlMode_St or PassengerInitiateSeatControlMode_St) within either timer, both the T_MCS_Input and T_MCS_Screen timers shall restart on input, and initialize upon the release of the users last input, when the relevant request signal has once again reverted to Inactive or Null.

If the user closes the Seat Adjust Screen or Seat Massage Screen using the HMI or the originating Shortcut Key (via DriverSeatScreenToggle_St or PassengerSeatScreenToggle_St or DriverMassageScreenToggle_St or PassengerMassageScreenToggle_St) within either timer, both the T_MCS_Input and T_MCS_Screen timers shall become inactive and return to their default state. These timers and their functionality shall not be used when the Seat Adjust Screen or Seat Massage Screen is not displayed.

1.7.1.19 MCS-TMR-REQ-239445/B-T_MCS_Input

Name	Description	Units	Range	Resolution	Default
T_MCS_Input	Time allowed from the MultiContoured Seats Client after the users last input (either by the Shortcut Key, touch screen display, or 5way controller) before allowing the opposing seat's Shortcut Key or 5way controller to request screen control.	sec	0-20	1	6

1.7.1.20 MCS-TMR-REQ-239813/C-T_MCS_Screen

Name	Description	Units	Range	Resolution	Default
T_MCS_Screen	Time allowed from the Multi Contoured Seat Client after the users last input (either from the Shortcut Key, touch screen display, or 5way controller) before closing the HMI screen. The default value of this timer shall not be less than the required time by Multi Contoured Seat Server to rebuild or change bladder pressure. Please refer to HMI requirement [H74a.R014] for the most recent and correct value.	sec	0-20	1	12

1.7.1.21 MCS-SR-REQ-021430/A-Highlighted Function and pressure percentage memory (TcSE ROIN-201098-1)

The MultiContouredSeats Client shall remember Lumbar bladder fill percentages, and Bolster bladder fill percentages upon powering down of current key cycle. The Client will use these values during initialization of the next key cycle, until it receives an updated actual value from the MultiContouredSeats Server.

1.7.1.22 MCS-SR-REQ-021427/B-Selecting the Adjust Tab from the touch screen (TcSE ROIN-200453-1)

If the user selects the adjust tab from the touch screen, or the Massage Off button (when configured for Double Shortcut Key), the MCS Client shall initiate a DriverActiveSeatControl_Rq or PassengerActiveSeatControl_Rq with parameters equal to

HighlightedFunction = MiddleLumbar
SeatModeSelect = Inactive

1.7.1.23 MCS-SR-REQ-239446/A-Selecting the Massage Tab from the touch screen

If the user selects the Massage tab from the touch screen, the MCS Client shall initiate an DriverActiveSeatControl_Rq or PassengerActiveSeatControl_Rq with parameters equal to

HighlightedFunction = CushionMassage
SeatModeSelect = Inactive

1.7.1.24 MCS-SR-REQ-243309/B-Adjusting the Massage Pattern levels from the touch screen (Low/Mid/High Buttons)

If the user selects the Massage Pattern's Low, Med, or High buttons from the touch screen, the MCS Client shall initiate an DriverActiveSeatControl_Rq or PassengerActiveSeatControl_Rq with parameters equal to

HighlightedFunction = CushionMassage
SeatModeSelect = Low_2, Med_2, or High_2

Note: These encodings shall only be used for the Massage Patterns offered by this feature (not for the Legacy MCS).
Note: This requirement shall not be used when configured as per REQ-383521.

1.7.1.25 MCS-SR-REQ-383522/A-Adjusting the Massage Pattern levels from the touch screen (Intensity Indicators)

If the user selects an already active Massage Pattern button from the touch screen (per DriverMassagePattern_St, PassengerMassagePattern_St), the MCS Client shall initiate a DriverActiveSeatControl_Rq or PassengerActiveSeatControl_Rq with parameters equal to

HighlightedFunction = CushionMassage
SeatModeSelect = Low_2, Med_2, or High_2

Where SeatModeSelect shall:

- Step through the above three values for every press of the active Massage Pattern button
- Step through starting from the active intensity value (per DriverMassageIntensity_St, PassengerMassageIntensity_St)
    - Ex. If DriverMassageIntensity_St = Medium, the next press shall initiate a DriverActiveSeatControl_Rq with SeatModeSelect = Low_2
- Step through in the order of High_2 > Med_2 > Low_2 > High_2…

Note: These encodings shall only be used for the Massage Patterns offered by this feature (not for the Legacy MCS).
Note: This requirement shall only be used when configured as per REQ-383521.

1.7.1.26 MCS-SR-REQ-250536/B-Selecting a Massage Pattern from the touch screen

If the user selects a Massage Pattern button from the touch screen, the MCS Client shall initiate a DriverMassagePattern_Rq or PassengerMassagePattern_Rq with the Preset parameter equal to the selected pattern.

If the MCS Client is configured as per REQ-383521, the selection of a new (not currently active) Massage Pattern shall not result in a change or request of a new Massage Pattern Intensity. Massage Pattern Intensity shall carry forward to all Massage Patterns.

1.7.1.27 MCS-SR-REQ-239814/A-Multi Contoured Seats Adjustment via TouchScreen

If the user presses any seat adjustment or massage button from the touch screen display, the Multi Contoured Seat Client shall set the applicable request signals (See REQ-237613) to their associated parameters.

Those request signals shall then transmit the associated parameters continuously as long as the button is pressed by the user. Upon release of the button, those request signals shall return to “Inactive” or “Null.”

When any seat adjustment or massage button is pressed from the touch screen display, the associated parameters shall be held for a minimum of 100ms.

The Multi Contoured Seat Client does not arbitrate if an input is a "press and hold" or a "tap". This shall be done by the Multi Contoured Seat Server.

1.8 MultiContouredSeatClient Interface

1.8.1 MCSv2-IIR-REQ-237613/B-MultiContouredSeatsClient_Tx

The MultiContouredSeatsClient_Tx represents all the Multi Contoured Seats feature related signals transmitted by the Multi Countoured Seat Client object. The below table represents the mapping of the logical signal names (as described in this specification) to the global GSDB signal names.

Logical Signal Name	Parameter Name	GSDB Signal Name
DriverActiveSeatControl_Rq	HighlightedFunction	SeatFnDrv_D_Rq
	SeatModeSelect	SeatFnChngDrv2_D_Rq
DriverMassagePattern_Rq	Preset	SeatMasgDrv_D_Rq
PassengerActiveSeatControl_Rq	HighlightedFunction	SeatFnPsgr_D_Rq
	SeatModeSelect	SeatFnChngPsgr2_D_Rq
PassengerMassagePattern_Rq	Preset	SeatMasgPsngr_D_Rq

Note: GSDB signal names are reference only. The Global Signal Database (GSDB) is the master for all signals. If there is a conflict bring to the module D&R's attention.

1.8.1.1 MD-REQ-021435/B-DriverActiveSeatControl_Rq (TcSE ROIN-199569-2)

Message Type: Request

This method is a signal from the Multi Contoured Seat Client to the Multi Contoured Seat Server (Driver's side). This request indicates to the server what seat control update is requested (Massage, Bolster, Lumbar)

Name	Literals	Value	Description
HighlightedFunction	-	-	Requested active function.
	Inactive	0x0	
	LowerLumbar	0x1	
	MiddleLumbar	0x2	
	UpperLumbar	0x3	
	LowerBolster	0x4	
	UpperBolster	0x5	
	LumbarMassage	0x6	
	CushionMassage	0x7	This encoding shall be used for "Massage Patterns" when configured for Enhanced MCS
SeatModeSelect	-	-	Indicates if the current highlighted function should increase pressure, decrease pressure, or increase/decrease seat/lumbar massage intensity.
	Inactive	0x0	
	Not_Used	0x1	
	Increase	0x2	
	Decrease	0x3	
	Off	0x4	
	Low	0x5	
	High	0x6	
	Off_2	0x7	This encoding shall be used to request Massage Pattern changes when configured for Enhanced MCS
	Low_2	0x8	This encoding shall be used to request Massage Pattern changes when configured for Enhanced MCS
	Med_2	0x9	This encoding shall be used to request Massage Pattern changes when configured for Enhanced MCS
	High_2	0xA	This encoding shall be used to request Massage Pattern changes when configured for Enhanced MCS

	Not_Used	0xB-0xE	
	Fault	0xF	

1.8.1.2 MD-REQ-237625/B-DriverMassagePattern_Rq

Message Type : Request

This method is a signal from the Multi Contoured Seat Client to the Multi Contoured Seat Server (Driver's side). This request indicates to the server what seat massage pattern preset the user has selected.

Name	Literals	Value	Description
Preset	-	-	Requested Pattern Preset
	Null	0x0	
	Pattern 1	0x1	
	Pattern 2	0x2	
	Pattern 3	0x3	
	Pattern 4	0x4	
	Pattern 5	0x5	
	Pattern 6	0x6	
	Pattern 7	0x7	
	Pattern 8	0x8	
	Pattern 9	0x9	
	Pattern 10	0xA	
	Not Used	0xB-0xF	

1.8.1.3 MD-REQ-021437/B-PassengerActiveSeatControl_Rq (TcSE ROIN-201060-2)

Message Type: Request

This method is a signal from the Multi Contoured Seat Client to the Multi Contoured Seat Server (Passenger's side). This request indicates to the server what seat control update is requested (Massage, Bolster, Lumbar)

Name	Literals	Value	Description
HighlightedFunction	-	-	Requested active function.
	Inactive	0x0	
	LowerLumbar	0x1	
	MiddleLumbar	0x2	
	UpperLumbar	0x3	
	LowerBolster	0x4	
	UpperBolster	0x5	
	LumbarMassage	0x6	
	CushionMassage	0x7	This encoding shall be used for “Massage Patterns” when configured for Enhanced MCS
SeatModeSelect	-	-	Indicates if the current highlighted function should increase pressure, decrease pressure, or increase/decrease seat/lumbar massage intensity.
	Inactive	0x0	
	Not_Used	0x1	
	Increase	0x2	
	Decrease	0x3	
	Off	0x4	
	Low	0x5	
	High	0x6	

	Off_2	0x7	This encoding shall be used to request Massage Pattern changes when configured for Enhanced MCS
	Low_2	0x8	This encoding shall be used to request Massage Pattern changes when configured for Enhanced MCS
	Med_2	0x9	This encoding shall be used to request Massage Pattern changes when configured for Enhanced MCS
	High_2	0xA	This encoding shall be used to request Massage Pattern changes when configured for Enhanced MCS
	Not_Used	0xB-0xE	
	Fault	0xF	

1.8.1.4 MD-REQ-237626/B-PassengerMassagePattern_Rq

Message Type : Request

This method is a signal from the Multi Contoured Seat Client to the Multi Contoured Seat Server (Passenger side). This request indicates to the server what seat massage pattern preset the user has selected.

Name	Literals	Value	Description
Preset	-	-	Requested Pattern Preset
	Null	0x0	
	Pattern 1	0x1	
	Pattern 2	0x2	
	Pattern 3	0x3	
	Pattern 4	0x4	
	Pattern 5	0x5	
	Pattern 6	0x6	
	Pattern 7	0x7	
	Pattern 8	0x8	
	Pattern 9	0x9	
	Pattern 10	0xA	
	Not Used	0xB-0xF	

1.8.2 MCSv2-IIR-REQ-237614/F-MultiContouredSeatsClient_Rx

The MultiContouredSeatsClient_Rx represents all the Multi Contoured Seats feature related signals received by the Multi Countoured Seat Client object. The below table represents the mapping of the logical signal names (as described in this specification) to the global GSDB signal names.

Logical Signal Name	Parameter Name	GSDB Signal Name
DriverActiveSeatControl_St	HighlightedFunction	SeatFnDrv_D_Stat
	PressureUpdates	SeatPDrv_B_Stat
DriverBolsterPressureLower_St	ActualPressure	SeatBlLoDrv_Pc_Actl
DriverBolsterPressureUpper_St	ActualPressure	SeatBlUpDrv_Pc_Actl
DriverLumbarPressureLower_St	ActualPressure	SeatLmbrLoDrv_Pc_Actl
DriverLumbarPressureMiddle_St	ActualPressure	SeatLmbrMidDrv_Pc_Actl
DriverLumbarPressureUpper_St	ActualPressure	SeatLmbrUpDrv_Pc_Actl
DriverSeatScreenToggle_St	Mode	SeatScrnDrvOn_B_Rq
DriverMassageScreenToggle_St	Mode	StmsScrnDrvOn_B_Rq
DriverMassageIntensity_St	MassageIntensity	SeatIntnsDrv_D_Stat
DriverMassagePattern_St	Preset	SeatMasgDrv_D_Stat
DriverInitiateSeatControlMode_St	Mode	SeatSwtchDrv_B_Stat
FrontDriverMCSMode_St	Mode	MCSFrDrMode_Stat
PassengerActiveSeatControl_St	HighlightedFunction	SeatFnPsgr_D_Stat
	PressureUpdates	SeatPPsgr_B_Stat
PassengerBolsterPressureLower_St	ActualPressure	SeatBlLoPsgr_Pc_Actl
PassengerBolsterPressureUpper_St	ActualPressure	SeatBlUpPsgr_Pc_Actl
PassengerLumbarPressureLower_St	ActualPressure	SeatLmbrLoPsgr_Pc_Actl
PassengerLumbarPressureMiddle_St	ActualPressure	SeatLmbrMidPsgr_Pc_Actl
PassengerLumbarPressureUpper_St	ActualPressure	SeatLmbrUpPsgr_Pc_Actl
PassengerSeatScreenToggle_St	Mode	SeatScrnPsngrOn_B_Rq
PassengerMassageScreenToggle_St	Mode	StmsScrnPsngrOn_B_Rq
PassengerMassageIntensity_St	MassageIntensity	SeatIntnsPsngr_D_Stat
PassengerMassagePattern_St	Preset	SeatMasgPsngr_D_Stat
PassengerInitiateSeatControlMode_St	Mode	SeatSwtchPsgr_B_Stat
FrontPassengerMCSMode_St	Mode	MCSFrPsngrMode_Stat
IgnitionStatus_St	Type	Ignition_Status

Note: GSDB signal names are reference only. The Global Signal Database (GSDB) is the master for all signals. If there is a conflict bring to the module D&R's attention.

1.8.2.1 MD-REQ-021443/B-DriverActiveSeatControl_St (TcSE ROIN-199404-1)

Message Type: Status

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client. If the seat function is being controlled at the seat HMI, this signal indicates what seat mode is to be highlighted by the display HMI. If the seat function is being controlled at the display HMI, this signal is a confirmation from the Server that the function that was requested by DriverActiveSeatControl_Rq has been accepted, and the Server is reacting to inputs from the display client.

Name	Literals	Value	Description
HighlightedFunction	-	-	Indicates the current active function.
	Null	0x0	
	LowerLumbar	0x1	
	MiddleLumbar	0x2	

	UpperLumbar	0x3	
	LowerBolster	0x4	
	UpperBolster	0x5	
	LumbarMassage	0x6	
	CushionMassage	0x7	This encoding shall be used for “Massage Patterns” when configured for Enhanced MCS
PressureUpdates	-	-	Indicates if the pressure of the highlighted function is currently being updated.
	NotUpdating	0x0	
	Updating	0x1	

1.8.2.2 MD-REQ-021444/A-DriverBolsterPressureLower_St (TcSE ROIN-199410-1)

Message Type: Status

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client indicating the status of the Bolster Lower Bladder Pair Pressure in percentage of full.

Name	Literals	Value	Description
ActualPressure	-	0x00 – 0x64	Percentage of Full

1.8.2.3 MD-REQ-021445/A-DriverBolsterPressureUpper_St (TcSE ROIN-199412-1)

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client indicating the status of the Bolster Upper Bladder Pair Pressure in percentage of full.

Name	Literals	Value	Description
ActualPressure	-	0x00 – 0x64	Percentage of Full

1.8.2.4 MD-REQ-021449/A-DriverLumbarPressureLower_St (TcSE ROIN-199409-1)

Message Type: Status

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client indicating the status of the Lumbar Lower Bladder Pressure in percentage of full.

Name	Literals	Value	Description
ActualPressure	-	0x00 – 0x64	Percentage of Full

1.8.2.5 MD-REQ-021450/A-DriverLumbarPressureMiddle_St (TcSE ROIN-199422-1)

Message Type: Status

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client indicating the status of the Lumbar Middle Bladder Pressure in percentage of full.

Name	Literals	Value	Description
ActualPressure	-	0x00 – 0x64	Percentage of Full

1.8.2.6 MD-REQ-021451/A-DriverLumbarPressureUpper_St (TcSE ROIN-199416-1)

Message Type: Status

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client indicating the status of the Lumbar Upper Bladder Pressure in percentage of full.

Name	Literals	Value	Description
ActualPressure	-	0x00 – 0x64	Percentage of Full

1.8.2.7 MD-REQ-237615/B-DriverSeatScreenToggle_St

Message Type: Status

This method is a signal from a seat feature server (Driver's side) to a seat feature client informing the Client that a request has been made by the user, via seat controls (Shortcut Key or Adjust Shortcut Key), to toggle the current on/off state of the seat feature's control function. This signal allows the Client to update the HMI output and activate/deactivate HMI controls.

Name	Literals	Value	Description
Mode	-	-	Request to activate drivers side seat adjust screen in HMI
	Off	0x0	
	On	0x1	

1.8.2.8 MD-REQ-392372/A-DriverMassageScreenToggle_St

Message Type: Status

This method is a signal from a seat feature server (Driver's side) to a seat feature client informing the Client that a request has been made by the user, via seat controls (Massage Shortcut Key), to toggle the current on/off state of the seat feature's massage control function. This signal allows the Client to update the HMI output and activate/deactivate HMI controls.

Name	Literals	Value	Description
Mode	-	-	Request to activate drivers side seat massage screen in HMI
	Off	0x0	
	On	0x1	

1.8.2.9 MD-REQ-237616/B-DriverMassageIntensity_St

Message Type: Status

This method is a signal from the Multi Contoured Seat Server (Driver's Side) to the Multi Contoured Seat Client which reports the current value of Massage Intensity.

Name	Literals	Value	Description
MassageIntensity	-	-	Current value of Massage Intensity
	Null	0x0	
	Off	0x1	
	Low	0x2	
	Medium	0x3	
	High	0x4	

1.8.2.10 MD-REQ-237627/C-DriverMassagePattern_St

Message Type: Status

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client (Driver's side). This status confirms client initiated request and reports what pattern is active.

Name	Literals	Value	Description
Preset	-	-	Requested Pattern Preset
	Null	0x0	
	Pattern 1	0x1	
	Pattern 2	0x2	
	Pattern 3	0x3	
	Pattern 4	0x4	
	Pattern 5	0x5	
	Pattern 6	0x6	
	Pattern 7	0x7	
	Pattern 8	0x8	
	Pattern 9	0x9	
	Pattern 10	0xA	
	Not Used	0xB-0xF	

1.8.2.11 MD-REQ-021447/A-DriverInitiateSeatControlMode_St (TcSE ROIN-199414-1)

Message Type: Status

This method is a signal from the Multi Contoured Seat Server (Driver's side) to the Multi Contoured Seat Client informing the Client that a request has been made by the user to change a Multi Contoured Seat function from the seat controls. This signal allows the Client to update the HMI output.

Name	Literals	Value	Description
Mode	-	-	
	SeatControlOff	0x0	
	SeatControlOn	0x1	

1.8.2.12 MD-REQ-454277/A-FrontDriverMCSMode_St

Message Type: Status

This method is a signal from the Multi Contoured Seat Server (Front Driver's side) to the Multi Contoured Seat Client informing the Client of the feature status.

Name	Literals	Value	Description
Mode	-	-	
	Null	0x0	
	Off	0x1	
	Partially_Active	0x2	
	Fully_Active	0x3	

1.8.2.13 MD-REQ-021452/B-PassengerActiveSeatControl_St (TcSE ROIN-201068-1)

Message Type: Status

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client. If the seat function is being controlled at the seat HMI, this signal indicates what seat mode is to be highlighted by the display HMI. If the seat function is being controlled at the display HMI, this signal is a confirmation from the Server that the function that was requested by PassengerActiveSeatControl_Rq has been accepted, and the Server is reacting to inputs from the display client.

Name	Literals	Value	Description
HighlightedFunction	-	-	Indicates the current active function.
	Null	0x0	

	LowerLumbar	0x1	
	MiddleLumbar	0x2	
	UpperLumbar	0x3	
	LowerBolster	0x4	
	UpperBolster	0x5	
	LumbarMassage	0x6	
	CushionMassage	0x7	This encoding shall be used for “Massage Patterns” when configured for Enhanced MCS
PressureUpdates	-	-	Indicates if the pressure of the highlighted function is currently being updated.
	NotUpdating	0x0	
	Updating	0x1	

1.8.2.14 MD-REQ-021453/A-PassengerBolsterPressureLower_St (TcSE ROIN-201069-1)

Message Type: Status

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client indicating the status of the Bolster Lower Bladder Pair Pressure in percentage of full.

Name	Literals	Value	Description
ActualPressure	-	0x00 – 0x64	Percentage of Full

1.8.2.15 MD-REQ-021454/A-PassengerBolsterPressureUpper_St (TcSE ROIN-201070-1)

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client indicating the status of the Bolster Upper Bladder Pair Pressure in percentage of full.

Name	Literals	Value	Description
ActualPressure	-	0x00 – 0x64	Percentage of Full

1.8.2.16 MD-REQ-021458/A-PassengerLumbarPressureLower_St (TcSE ROIN-201071-1)

Message Type: Status

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client indicating the status of the Lumbar Lower Bladder Pressure in percentage of full.

Name	Literals	Value	Description
ActualPressure	-	0x00 – 0x64	Percentage of Full

1.8.2.17 MD-REQ-021459/A-PassengerLumbarPressureMiddle_St (TcSE ROIN-201072-1)

Message Type: Status

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client indicating the status of the Lumbar Middle Bladder Pressure in percentage of full.

Name	Literals	Value	Description
ActualPressure	-	0x00 – 0x64	Percentage of Full

1.8.2.18 MD-REQ-021460/A-PassengerLumbarPressureUpper_St (TcSE ROIN-201073-1)

Message Type: Status

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client indicating the status of the Lumbar Upper Bladder Pressure in percentage of full.

Name	Literals	Value	Description
ActualPressure	-	0x00 – 0x64	Percentage of Full

1.8.2.19 MD-REQ-237617/B-PassengerSeatScreenToggle_St

Message Type: Status

This method is a signal from the seat feature server (Passenger's side) to a seat feature client informing the Client that a request has been made by the user, via seat controls (Shortcut Key or Adjust Shortcut Key), to toggle the current on/off state of the seat feature's control function. This signal allows the Client to update the HMI output and activate/deactivate HMI controls.

Name	Literals	Value	Description
Mode	-	-	Request to activate passengers side seat adjust screen in HMI
	Off	0x0	
	On	0x1	

1.8.2.20 MD-REQ-392373/A-PassengerMassageScreenToggle_St

Message Type: Status

This method is a signal from a seat feature server (Passenger's side) to a seat feature client informing the Client that a request has been made by the user, via seat controls (Massage Shortcut Key), to toggle the current on/off state of the seat feature's massage control function. This signal allows the Client to update the HMI output and activate/deactivate HMI controls.

Name	Literals	Value	Description
Mode	-	-	Request to activate passengers side seat massage screen in HMI
	Off	0x0	
	On	0x1	

1.8.2.21 MD-REQ-237629/B-PassengerMassageIntensity_St

Message Type: Status

This method is a signal from the Multi Contoured Seat Server (Passenger's Side) to the Multi Contoured Seat Client which reports the current value of Massage Intensity.

Name	Literals	Value	Description
MassageIntensity	-	-	Current value of Massage Intensity
	Null	0x0	
	Off	0x1	
	Low	0x2	
	Medium	0x3	
	High	0x4	

1.8.2.22 MD-REQ-237628/C-PassengerMassagePattern_St

Message Type: Status

This method is a signal from the Multi Contoured Seat Server to the Multi Contoured Seat Client (Passenger's side). This status confirms client initiated request and reports what pattern is active.

Name	Literals	Value	Description
Preset	-	-	Requested Pattern Preset
	Null	0x0	
	Pattern 1	0x1	
	Pattern 2	0x2	
	Pattern 3	0x3	
	Pattern 4	0x4	
	Pattern 5	0x5	
	Pattern 6	0x6	
	Pattern 7	0x7	
	Pattern 8	0x8	
	Pattern 9	0x9	
	Pattern 10	0xA	
	Not Used	0xB-0xF	

1.8.2.23 MD-REQ-021456/A-PassengerInitiateSeatControlMode_St (TcSE ROIN-201061-1)

Message Type: Status

This method is a signal from the Multi Contoured Seat Server (Passenger's side) to the Multi Contoured Seat Client informing the Client that a request has been made by the user to change a Multi Contoured Seat function from the seat controls. This signal allows the Client to update the HMI output.

Name	Literals	Value	Description
Mode	-	-	
	SeatControlOff	0x0	
	SeatControlOn	0x1	

1.8.2.24 MD-REQ-454278/A-FrontPassengerMCSMode_St

Message Type: Status

This method is a signal from the Multi Contoured Seat Server (Front Passenger's side) to the Multi Contoured Seat Client informing the Client of the feature status.

Name	Literals	Value	Description
Mode	-	-	
	Null	0x0	
	Off	0x1	
	Partially_Active	0x2	
	Fully_Active	0x3	

1.8.2.25 MD-REQ-199809/A-IgnitionStatus_St

Message Type: Status

Signal used to indicate ignition state.

Name	Literals	Value	Description
Type	-	-	Indicates ignition state

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

2 Functional Definition

2.1 MCS-FUN-REQ-237635/B-Activate Multi Contour Seat Display HMI via Single Shortcut Key

2.1.1 Use Cases

2.1.1.1 MCS-UC-REQ-237633/B-Open Seat Adjust Screen from Shortcut Key

Actors	Vehicle Occupant
Pre-conditions	Display is ON HMI is not displaying seat control feature screen
Scenario Description	User presses seat shortcut key to bring up seat controls
Post-conditions	HMI indicates {brings up seat control feature screen}
List of Exception Use Cases	MCS-UC-REQ-237634-Exit Seat Adjust Screen from Shortcut Key
Interfaces	G-HMI & vehicle system
Note	Pressing the Shortcut key will bring up the Multi Control Seat Menu when the HMI display is On. If Ignition is not in RUN, the real control menu (button input) will be greyed-out with only the Return button available. Please refer to [H74a.R030]

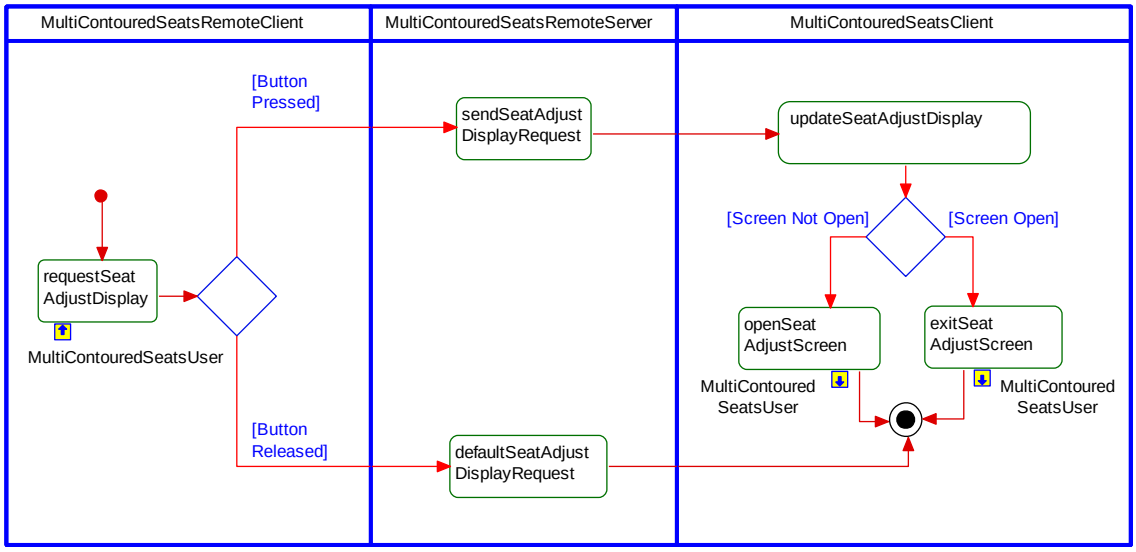
2.1.1.2 MCS-UC-REQ-237634/B-Exit Seat Adjust Screen from Shortcut Key

Actors	Vehicle Occupant
Pre-conditions	Display is ON HMI is displaying seat control feature screen
Scenario Description	User presses seat shortcut key prior to screen timeout
Post-conditions	HMI exits seat control screen and returns to prior screen
List of Exception Use Cases	Screen Timeout duration has expired
Interfaces	G-HMI & vehicle system
Note	For “screen timeout” refer to MCS-TMR-REQ-239813-T_MCS_Screen

2.1.2 White Bow View

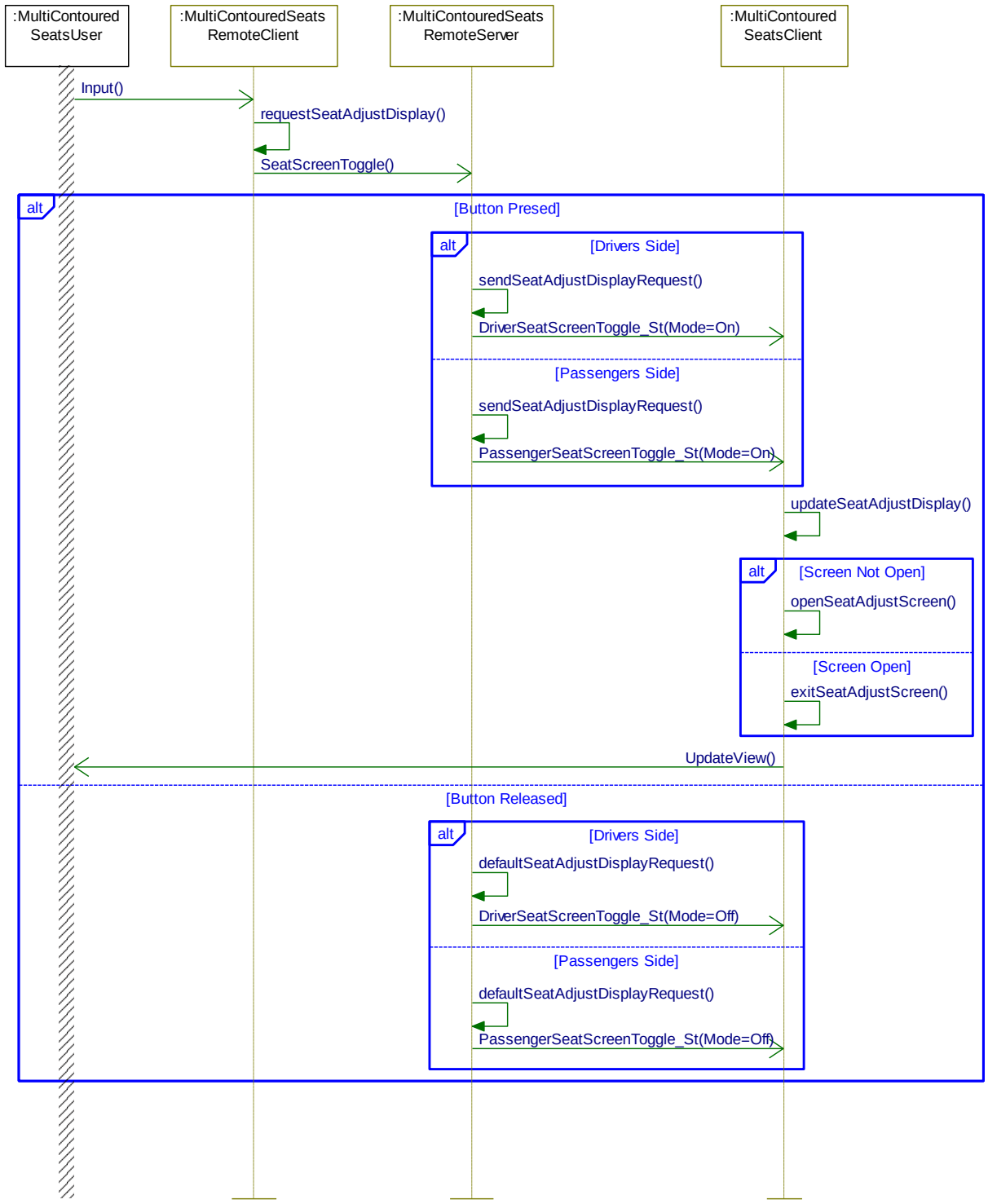
2.1.2.1 MCS-ACT-REQ-237767/B-Activate/Deactivate Multi Contour Seat Feature Screen HMI

Activity Diagram



2.1.2.2 MCS-SD-REQ-237620/B-Activate/Deactivate Multi Contour Seat Feature Screen HMI

Sequence Diagram



2.2 MCS-FUN-REQ-392374/A-Activate Multi Contour Seat Display HMI via Double Shortcut Key

2.2.1 Use Cases

2.2.1.1 MCS-UC-REQ-392375/A-Open Seat Adjust Screen from Adjust Shortcut Key

Actors	Vehicle Occupant
Pre-conditions	Display is ON HMI is not displaying seat control feature screen
Scenario Description	User presses seat adjust shortcut key to bring up seat controls
Post-conditions	HMI indicates {brings up seat control feature screen}
List of Exception Use Cases	MCS-UC-REQ-392376-Exit Seat Adjust Screen from Adjust Shortcut Key
Interfaces	G-HMI & vehicle system
Note	Pressing the Adjust Shortcut key will bring up the Multi Control Seat Adjust Menu when the HMI display is On. If Ignition is not in RUN, the real control menu (button input) will be greyed-out with only the Return button available. Please refer to [H74a.R030]

2.2.1.2 MCS-UC-REQ-392376/A-Exit Seat Adjust Screen from Adjust Shortcut Key

Actors	Vehicle Occupant
Pre-conditions	Display is ON HMI is displaying seat control feature screen
Scenario Description	User presses seat adjust shortcut key prior to screen timeout
Post-conditions	HMI exits seat control screen and returns to prior screen
List of Exception Use Cases	Screen Timeout duration has expired
Interfaces	G-HMI & vehicle system
Note	For “screen timeout” refer to MCS-TMR-REQ-239813-T_MCS_Screen

2.2.1.3 MCS-UC-REQ-392377/A-Open Seat Massage Screen from Massage Shortcut Key (Massage is On)

Actors	Vehicle Occupant
Pre-conditions	Display is ON Massage is ON HMI is not displaying seat massage controls feature screen

Scenario Description	User presses seat massage shortcut key to bring up seat massage controls
Post-conditions	HMI indicates {brings up seat massage control feature screen}
List of Exception Use Cases	MCS-UC-REQ-392379-Exit Seat Massage Screen from Massage Shortcut Key
Interfaces	G-HMI & vehicle system
Note	Pressing the Massage Shortcut key will bring up the Multi Control Seat Massage Menu when the HMI display is On. If Ignition is not in RUN, the real control menu (button input) will be greyed-out with only the Return button available. Please refer to [H74a.R030]

2.2.1.4 MCS-UC-REQ-392378/A-Open Seat Massage Screen from Massage Shortcut Key (Massage is Off)

Actors	Vehicle Occupant
Pre-conditions	Display is ON Massage is OFF HMI is not displaying seat massage controls feature screen
Scenario Description	User presses seat massage shortcut key to bring up seat massage controls
Post-conditions	Massage turns ON HMI indicates {brings up seat massage control feature screen}
List of Exception Use Cases	MCS-UC-REQ-392379-Exit Seat Massage Screen from Massage Shortcut Key
Interfaces	G-HMI & vehicle system
Note	Pressing the Massage Shortcut key will bring up the Multi Control Seat Massage Menu when the HMI display is On. If Ignition is not in RUN, the real control menu (button input) will be greyed-out with only the Return button available. Massage will not turn on when Ignition is not in RUN. Please refer to [H74a.R030]

2.2.1.5 MCS-UC-REQ-392379/A-Exit Seat Massage Screen from Massage Shortcut Key

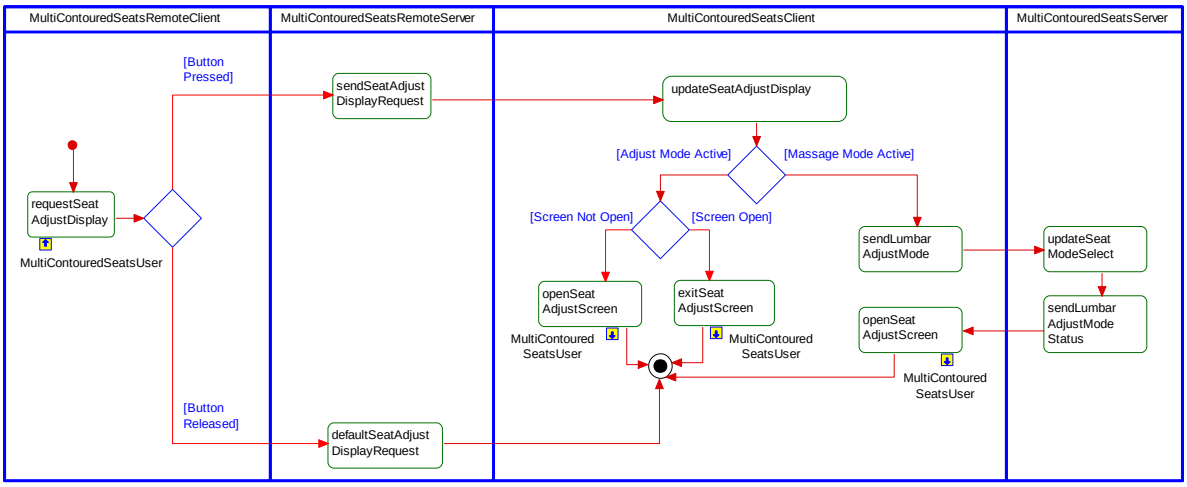
Actors	Vehicle Occupant
Pre-conditions	Display is ON HMI is displaying seat massage control feature screen
Scenario Description	User presses seat massage shortcut key prior to screen timeout
Post-conditions	HMI exits seat massage control screen and returns to prior screen
List of Exception Use Cases	Screen Timeout duration has expired

Interfaces	G-HMI & vehicle system
Note	For “screen timeout” refer to MCS-TMR-REQ-239813-T_MCS_Screen If Massage is ON, it will remain ON. The massage shortcut key will not turn Off Massage.

2.2.2 White Box View

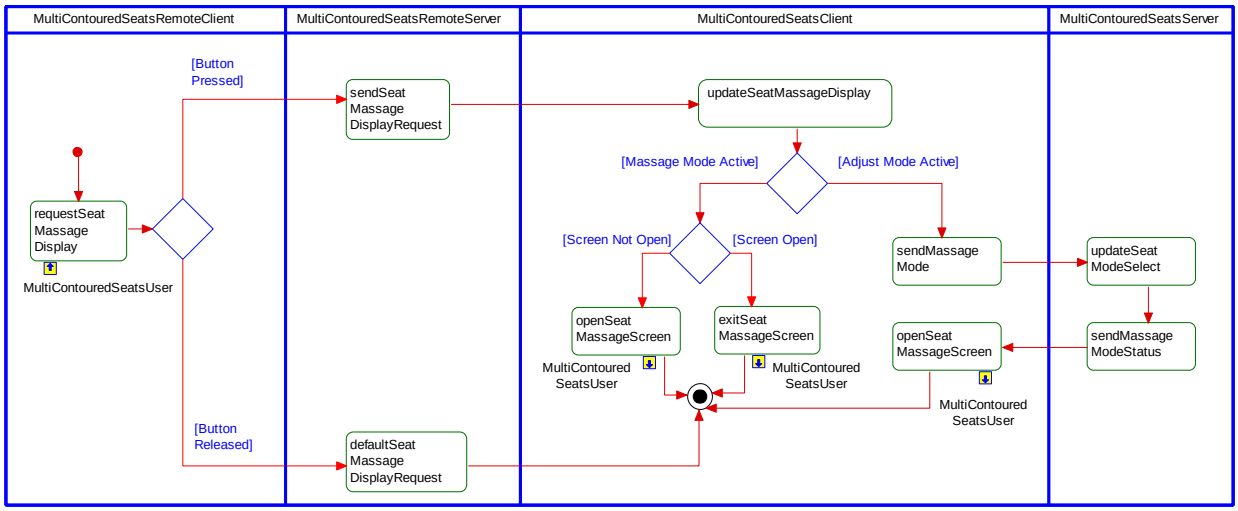
2.2.2.1 MCS-ACT-REQ-392384/A-Activate/Deactivate Adjust Screen HMI

Activity Diagram



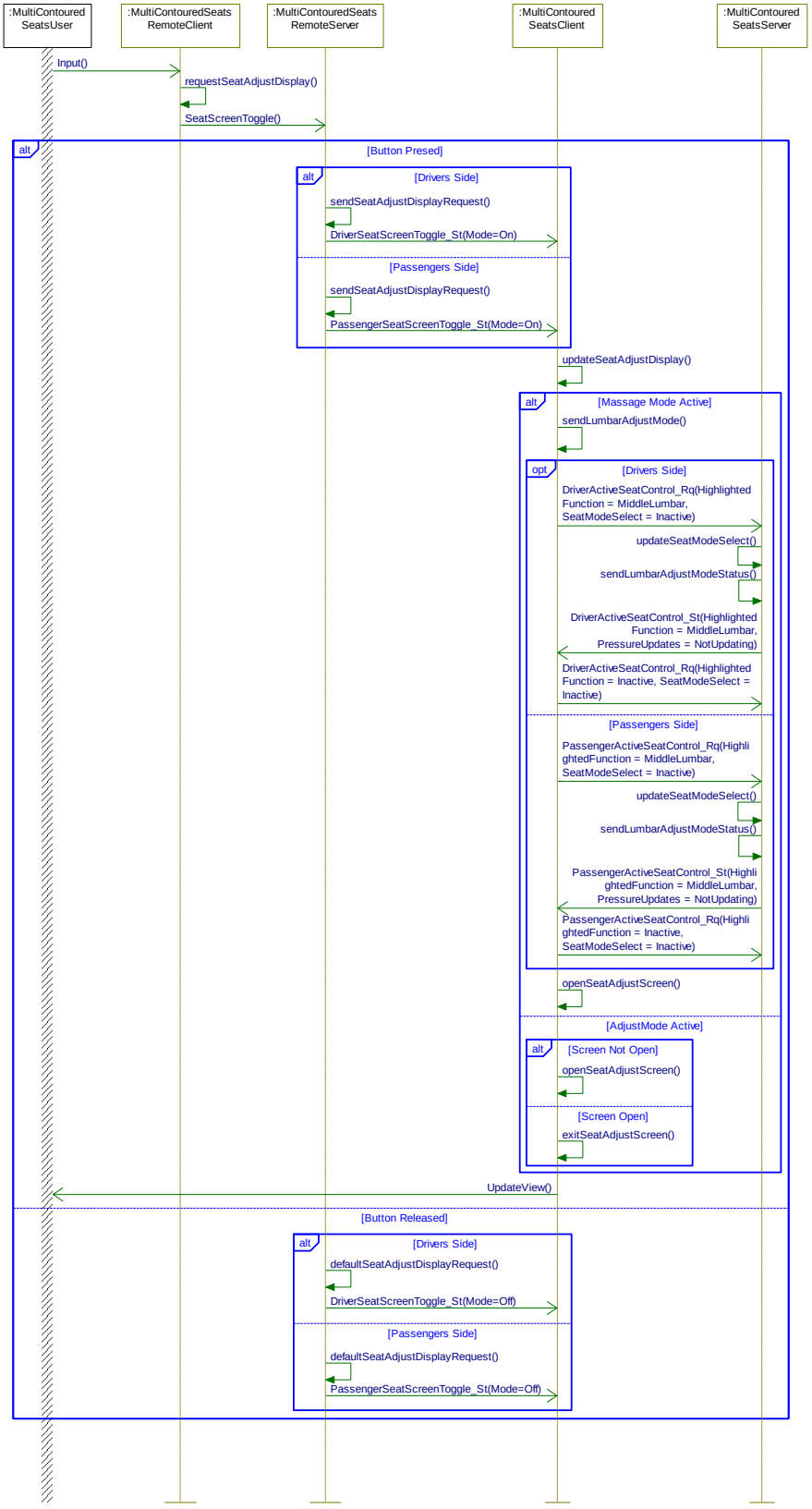
2.2.2.2 MCS-ACT-REQ-392388/A-Activate/Deactivate Massage Screen HMI

Activity Diagram



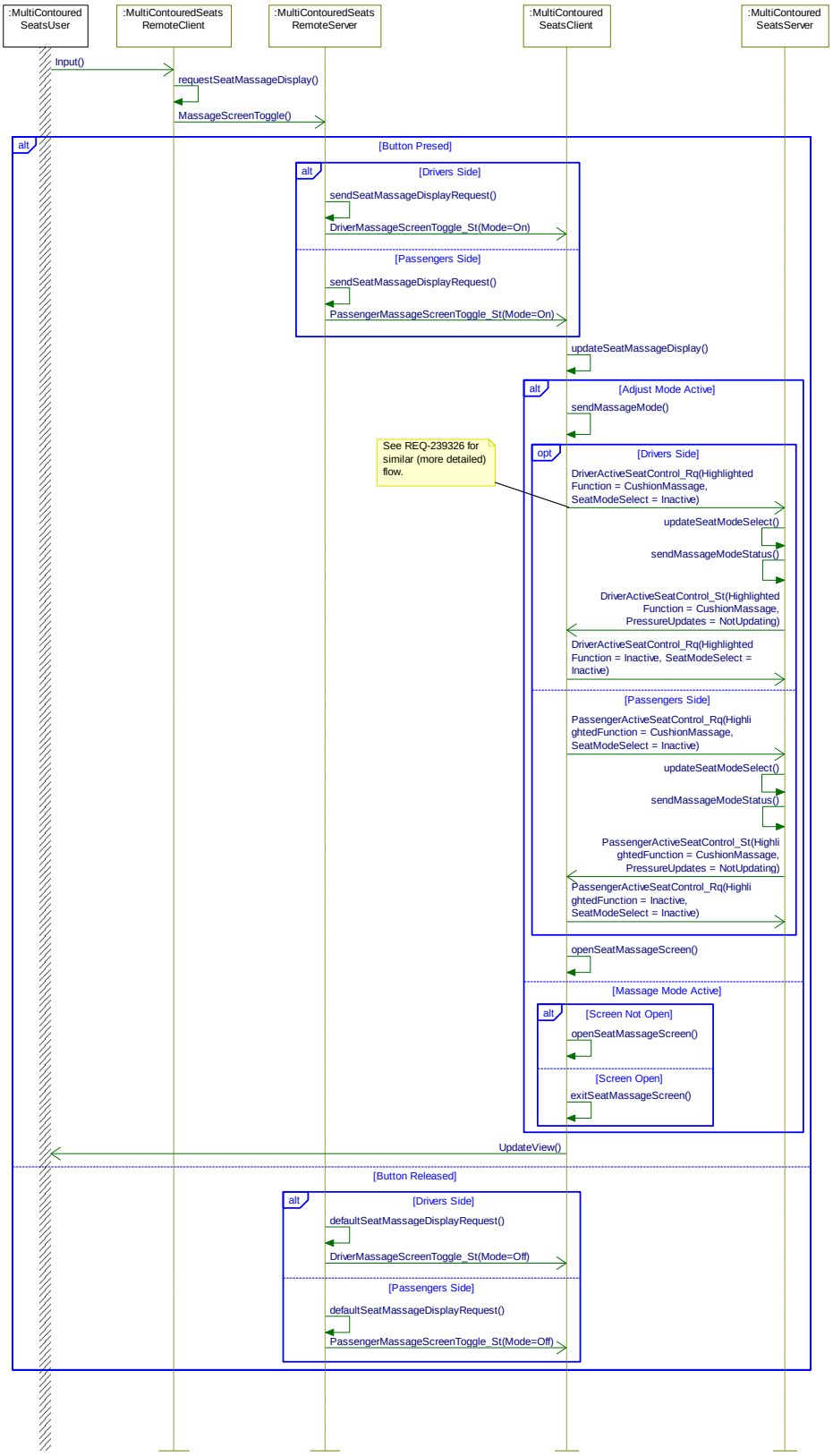
2.2.2.3 MCS-SD-REQ-392385/A-Activate/Deactivate Adjust Screen HMI

Sequence Diagram



2.2.2.4 MCS-SD-REQ-392389/A-Activate/Deactivate Massage Screen HMI

Sequence Diagram



2.3 MCS-FUN-REQ-237622/A-Set Massage Pattern

2.3.1 Use Cases

2.3.1.1 MCS-UC-REQ-237772/C-Select Front Seat Massage Pattern from HMI

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions Met
Scenario Description	User Selects < Massage Pattern> via HMI
Post-conditions	HMI indicates (Selected Pattern & Intensity} Selected Massage Pattern Activates
List of Exception Use Cases	NA
Interfaces	G-HMI & vehicle system
Links to Referenced Use Cases	NA

2.3.1.2 MCS-UC-REQ-250097/C-Select Front Seat Massage Pattern from Seat

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions Met
Scenario Description	User Selects <Massage Pattern> via Seat
Post-conditions	HMI indicates (Selected Pattern & Intensity} Selected Massage Pattern Activates
List of Exception Use Cases	NA
Interfaces	G-HMI & vehicle system
Links to Referenced Use Cases	NA

2.3.1.3 MCS-UC-REQ-021353/D-Adjust Front Seat Massage Intensity from HMI (TcSE ROIN-291760)

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions Met
Scenario Description	User Selects < Massage Intensity> via HMI
Post-conditions	HMI indicates (Mode & Intensity}
List of Exception Use Cases	NA
Interfaces	G-HMI & vehicle system
Links to Referenced Use Cases	NA

2.3.1.4 MCS-UC-REQ-021354/D-Adjust Front Seat Massage Intensity from Seat (TcSE ROIN-291761)

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions Met
Scenario Description	User Selects <Massage Intensity> via seat
Post-conditions	HMI indicates (Mode & Intensity}
List of Exception Use Cases	NA
Interfaces	G-HMI & vehicle system
Links to Referenced Use Cases	NA

2.3.1.5 MCS-UC-REQ-021355/D-Exiting Front Massage and transitioning to Adjust bladder pressure via HMI (TcSE ROIN-292490)

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions Met Massage Screen is ON
Scenario Description	User exiting Massage and transitioning to Adjust bladder pressure via HMI
Post-conditions	HMI Pop – Up indicates {Massage off and restoring seat settings}
List of Exception Use Cases	NA
Interfaces	G-HMI & vehicle system
Links to Referenced Use Cases	NA

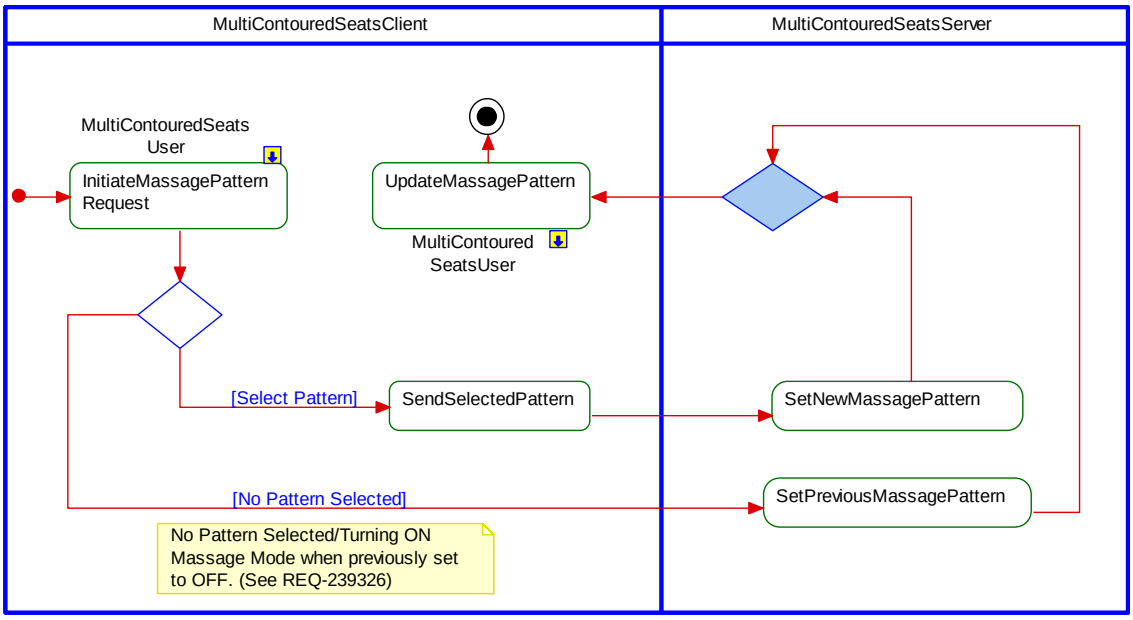
2.3.1.6 MCS-UC-REQ-021356/D-Exiting Front Massage and transitioning to Adjust bladder pressure via Seat (TcSE ROIN-292491)

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions Met Massage Screen is ON
Scenario Description	User exiting Massage and transitioning to Adjust bladder pressure via Seat.
Post-conditions	HMI Pop – Up indicates {Massage off and restoring seat settings}
List of Exception Use Cases	NA
Interfaces	G-HMI & vehicle system
Links to Referenced Use Cases	NA

2.3.2 White Box View

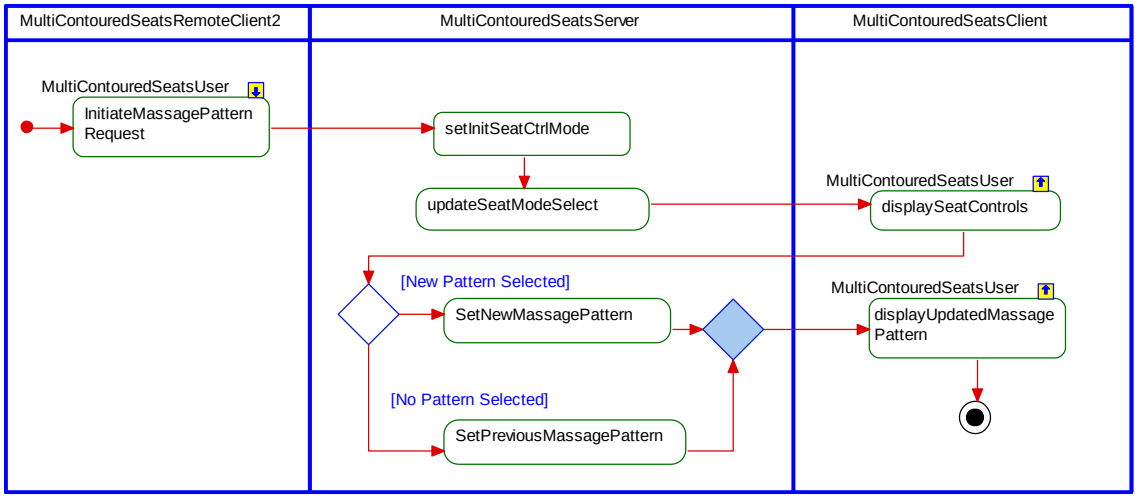
2.3.2.1 MCS-ACT-REQ-237796/B-Select Massage Pattern from Touch Screen

Activity Diagram



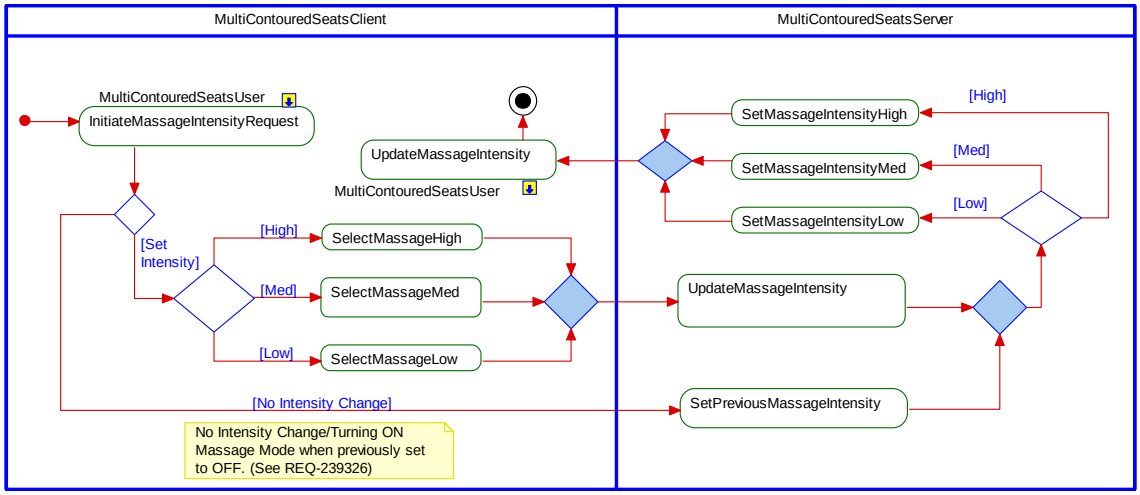
2.3.2.2 MCS-ACT-REQ-250099/A-Select Massage Pattern from Seat

Activity Diagram



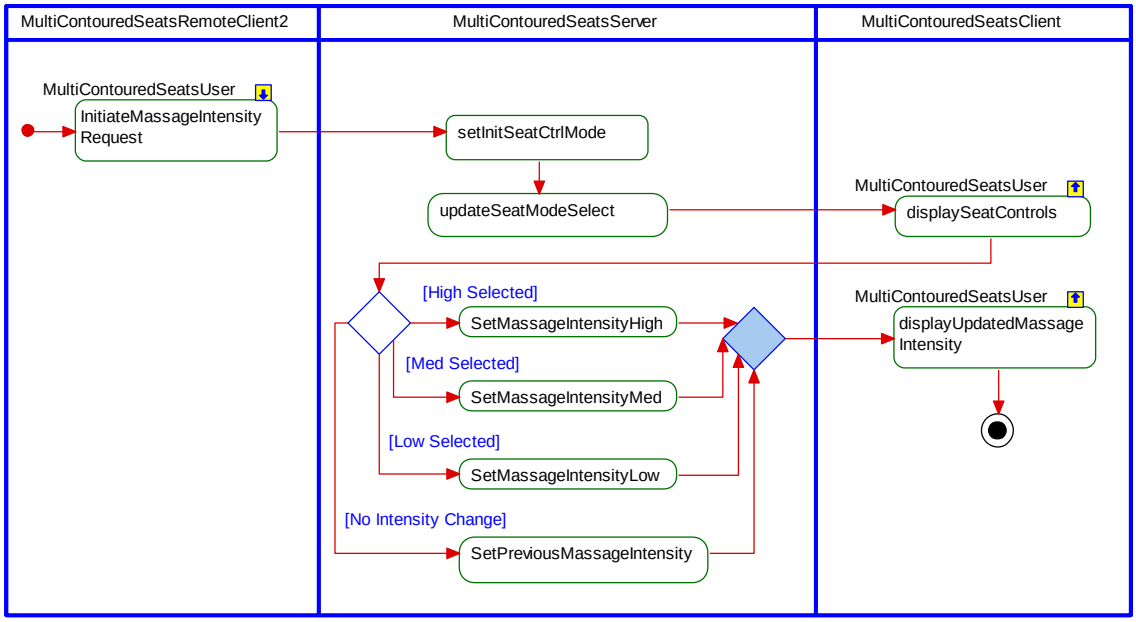
2.3.2.3 MCS-ACT-REQ-237797/B-Set Massage Intensity from Touch Screen

Activity Diagram



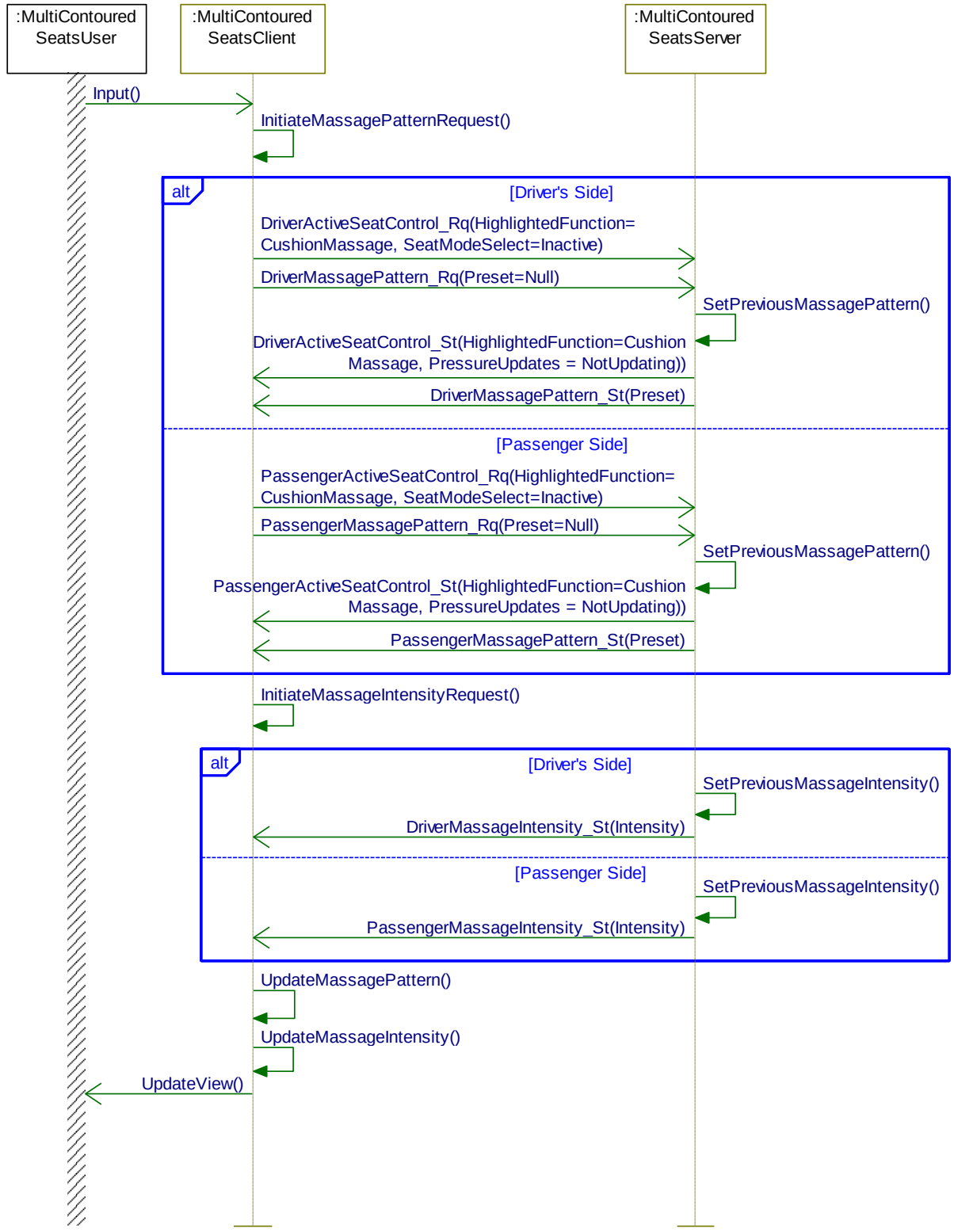
2.3.2.4 MCS-ACT-REQ-250100/A-Set Massage Intensity from Seat

Activity Diagram



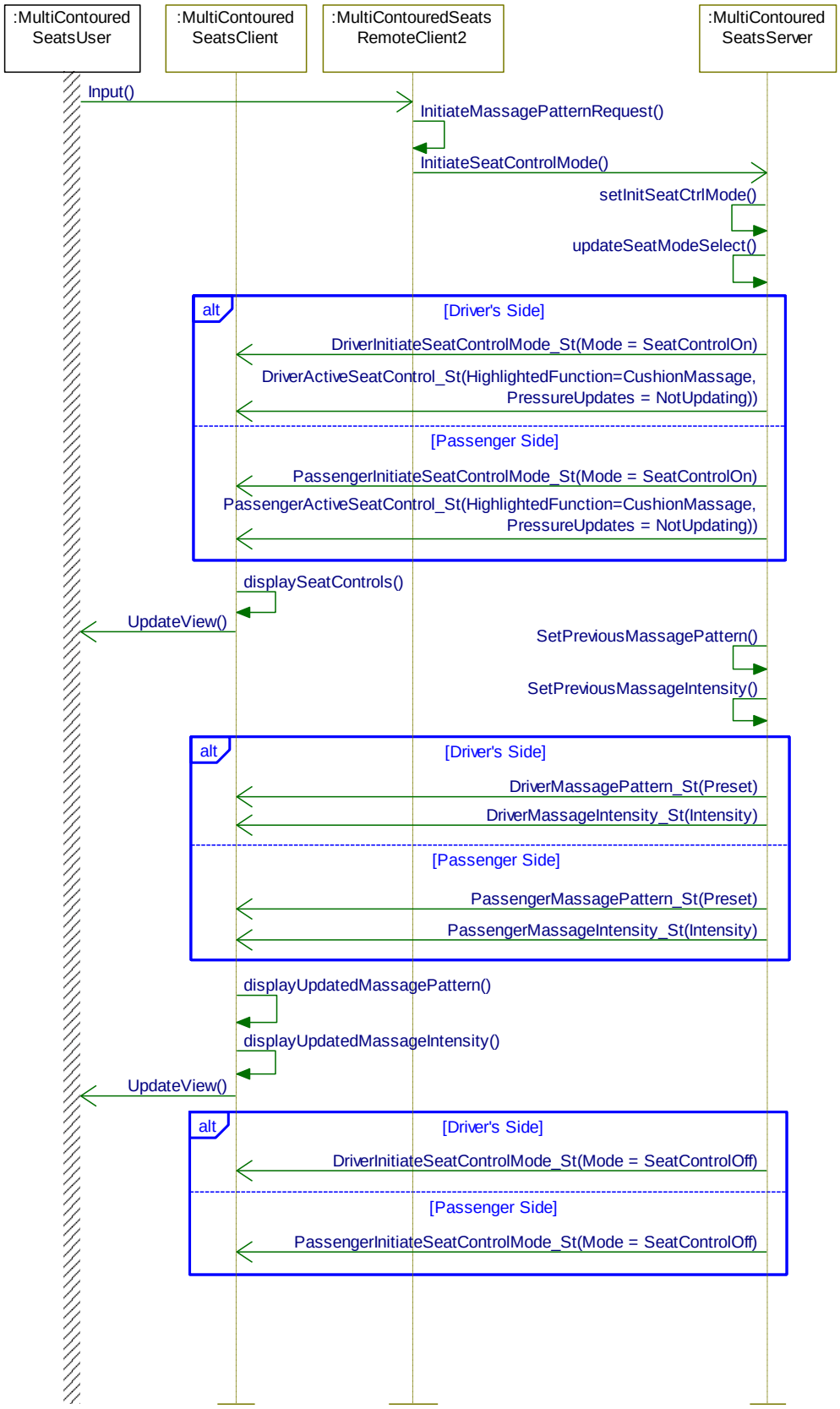
2.3.2.5 MCS-SD-REQ-239326/C-Turn ON Massage Mode from Touch Screen

Sequence Diagram



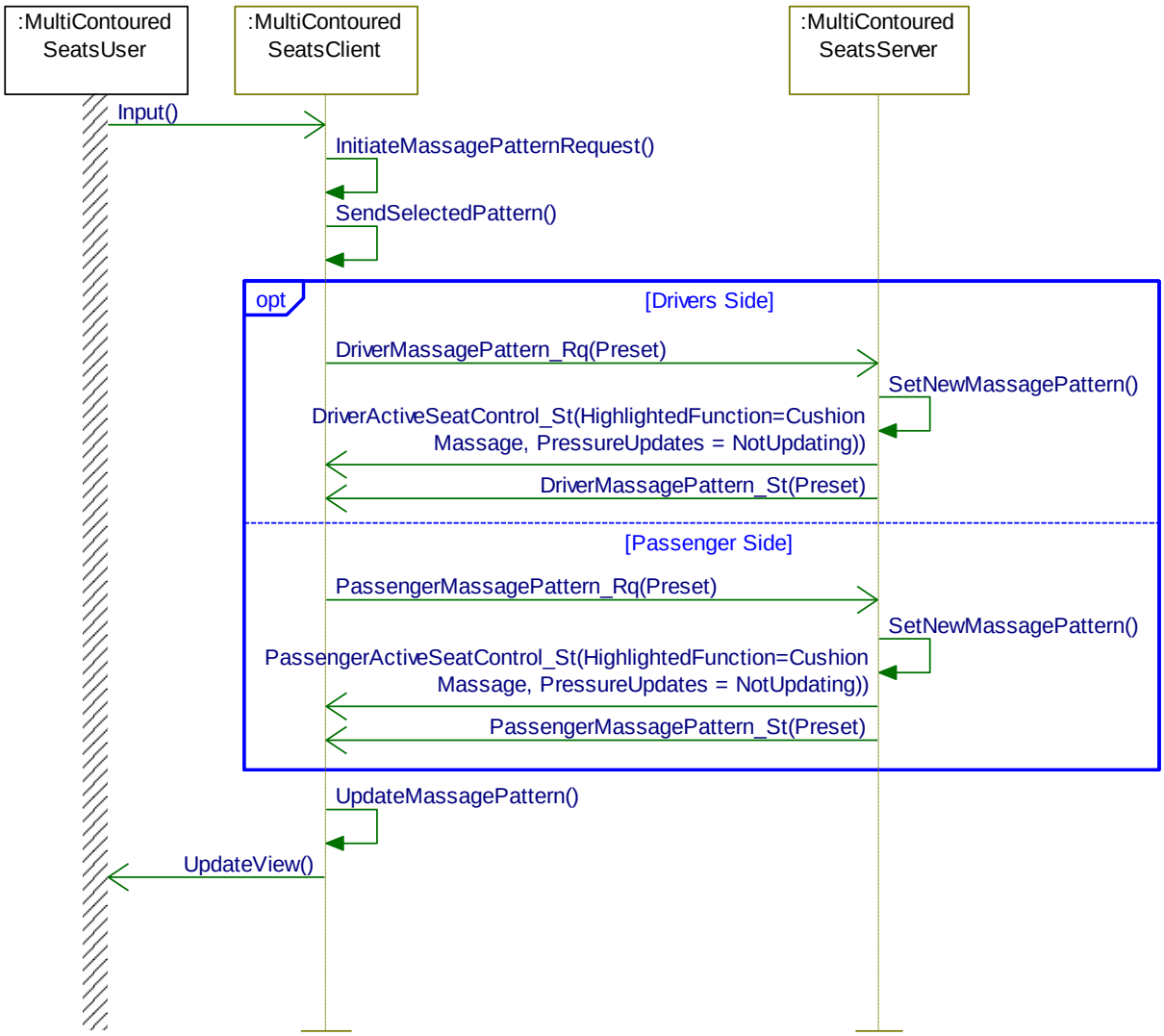
2.3.2.6 MCS-SD-REQ-250101/B-Turn ON Massage Mode from Seat

Sequence Diagram



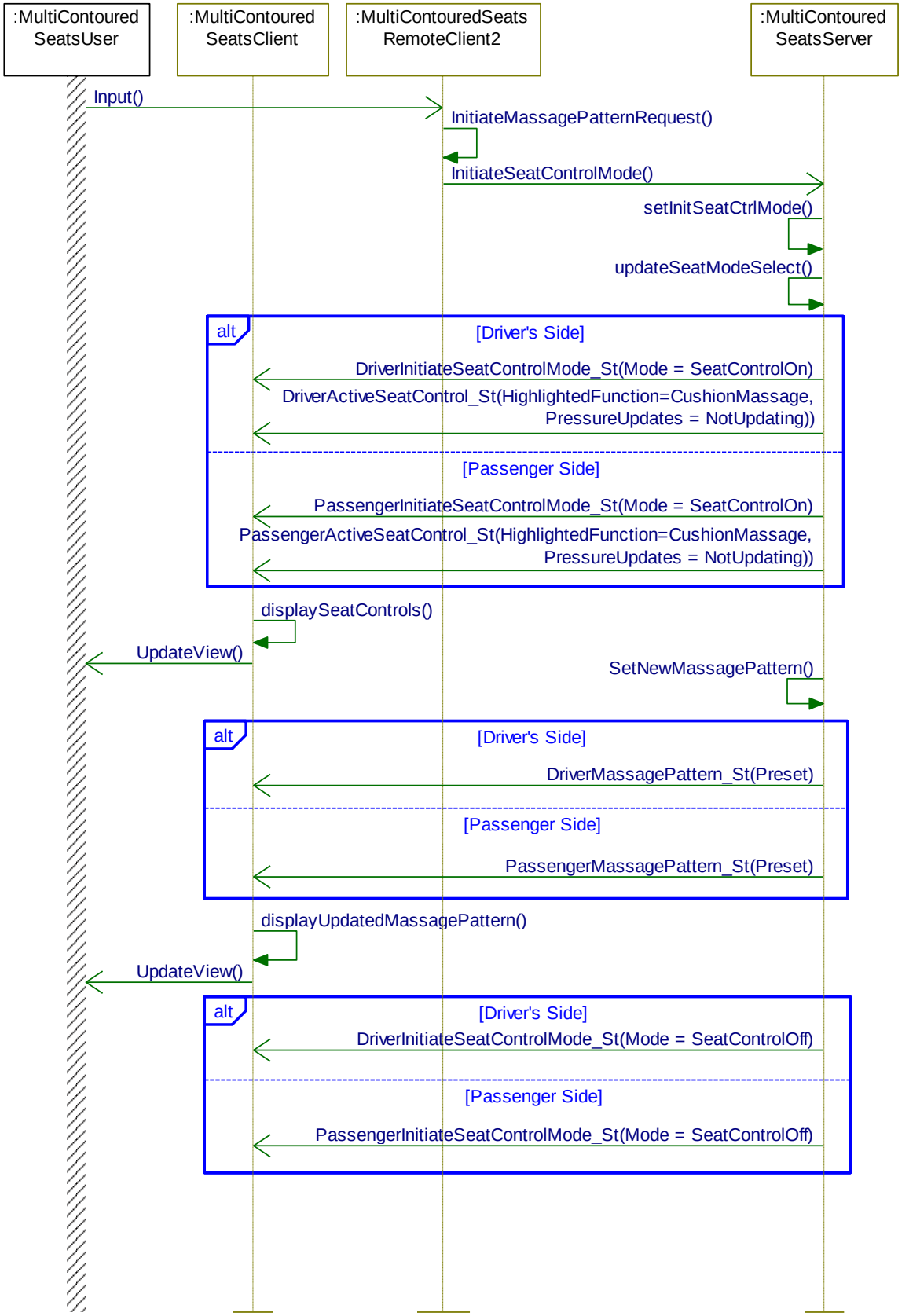
2.3.2.7 MCS-SD-REQ-237811/B-Select Massage Pattern from Touch Screen

Sequence Diagram



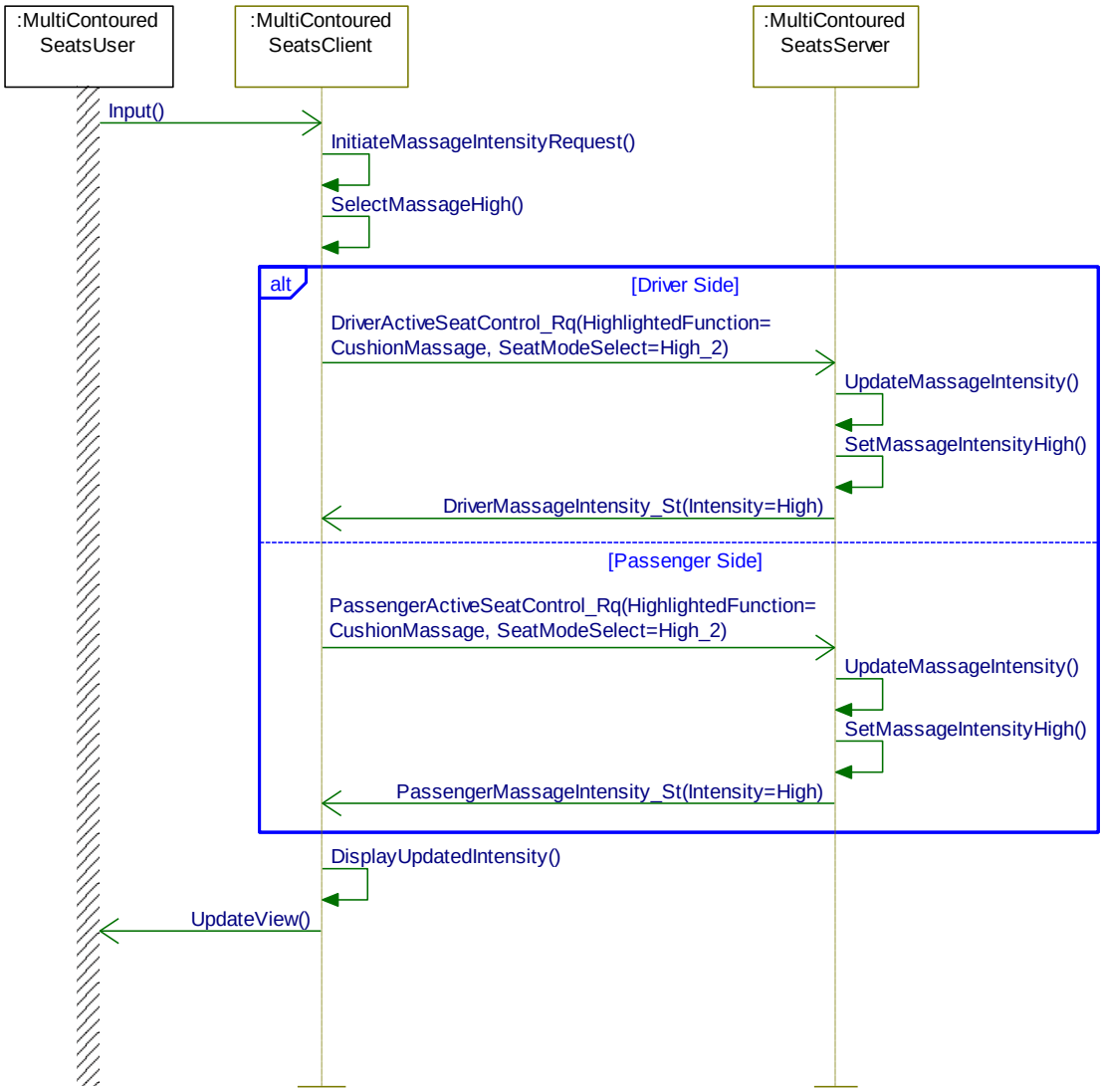
2.3.2.8 MCS-SD-REQ-250102/B-Select Massage Pattern from Seat

Sequence Diagram



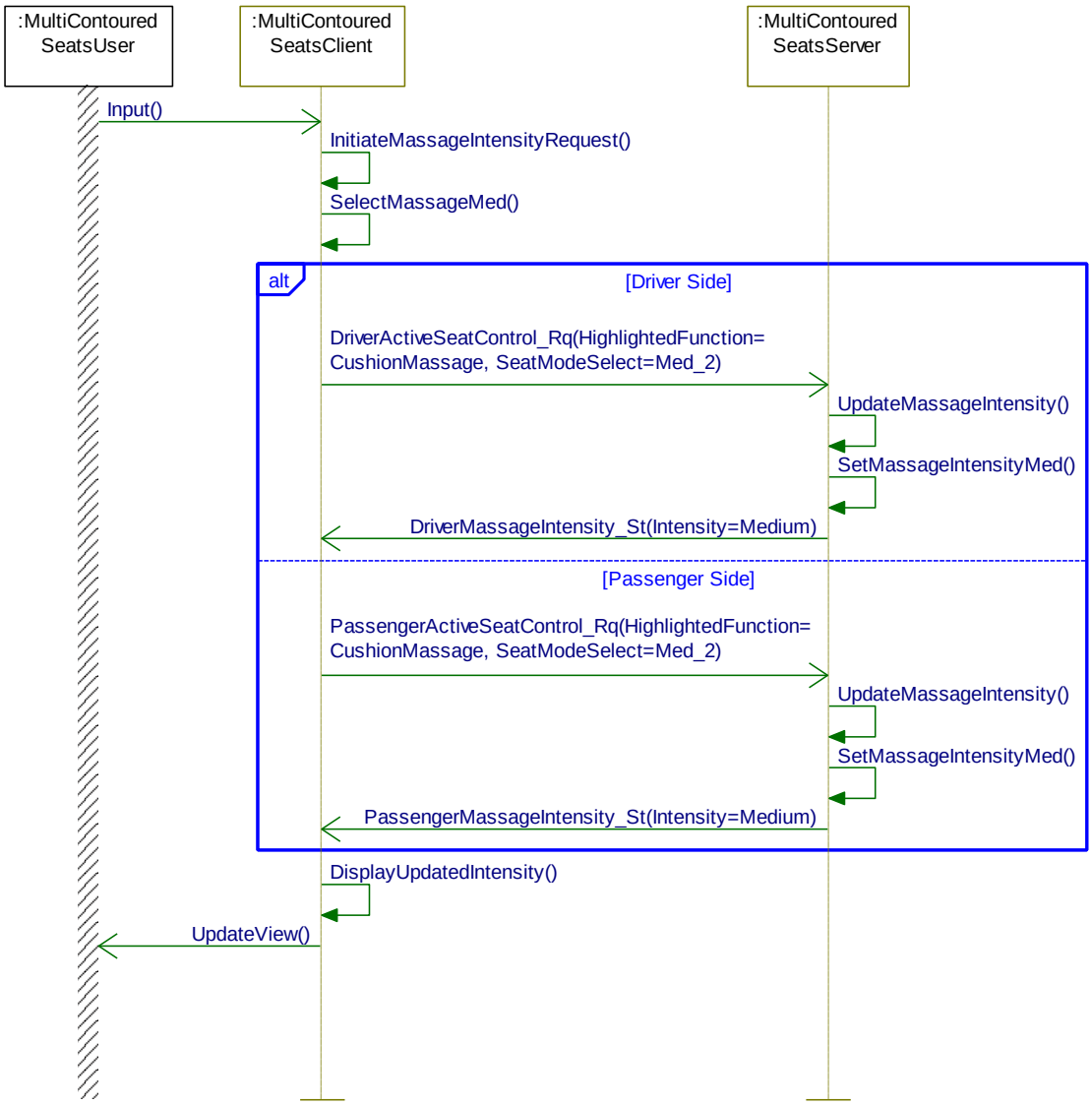
2.3.2.9 MCS-SD-REQ-237799/B-Set Massage Intensity to High from Touch Screen

Sequence Diagram



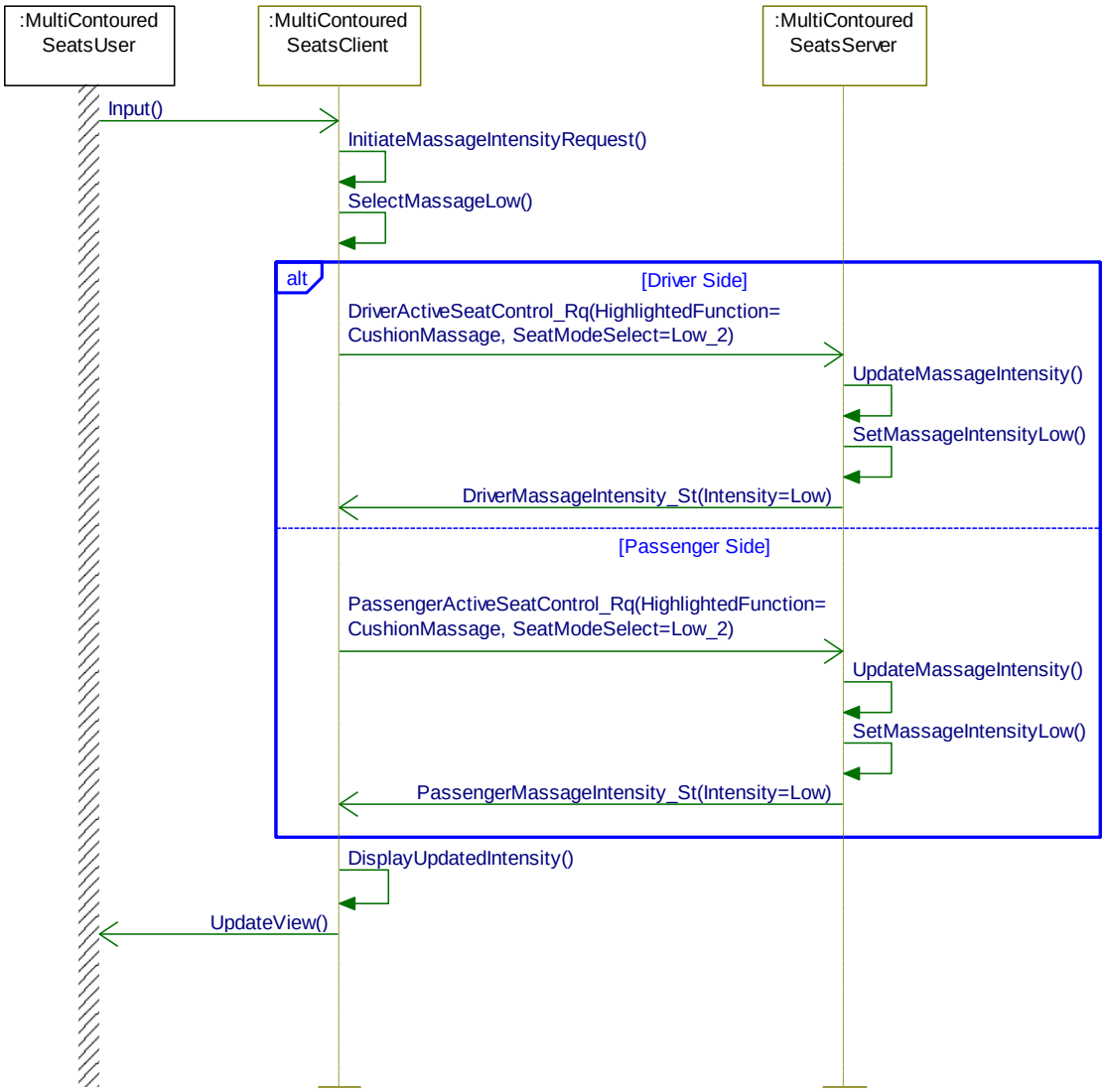
2.3.2.10 MCS-SD-REQ-237800/B-Set Massage Intensity to Medium from Touch Screen

Sequence Diagram



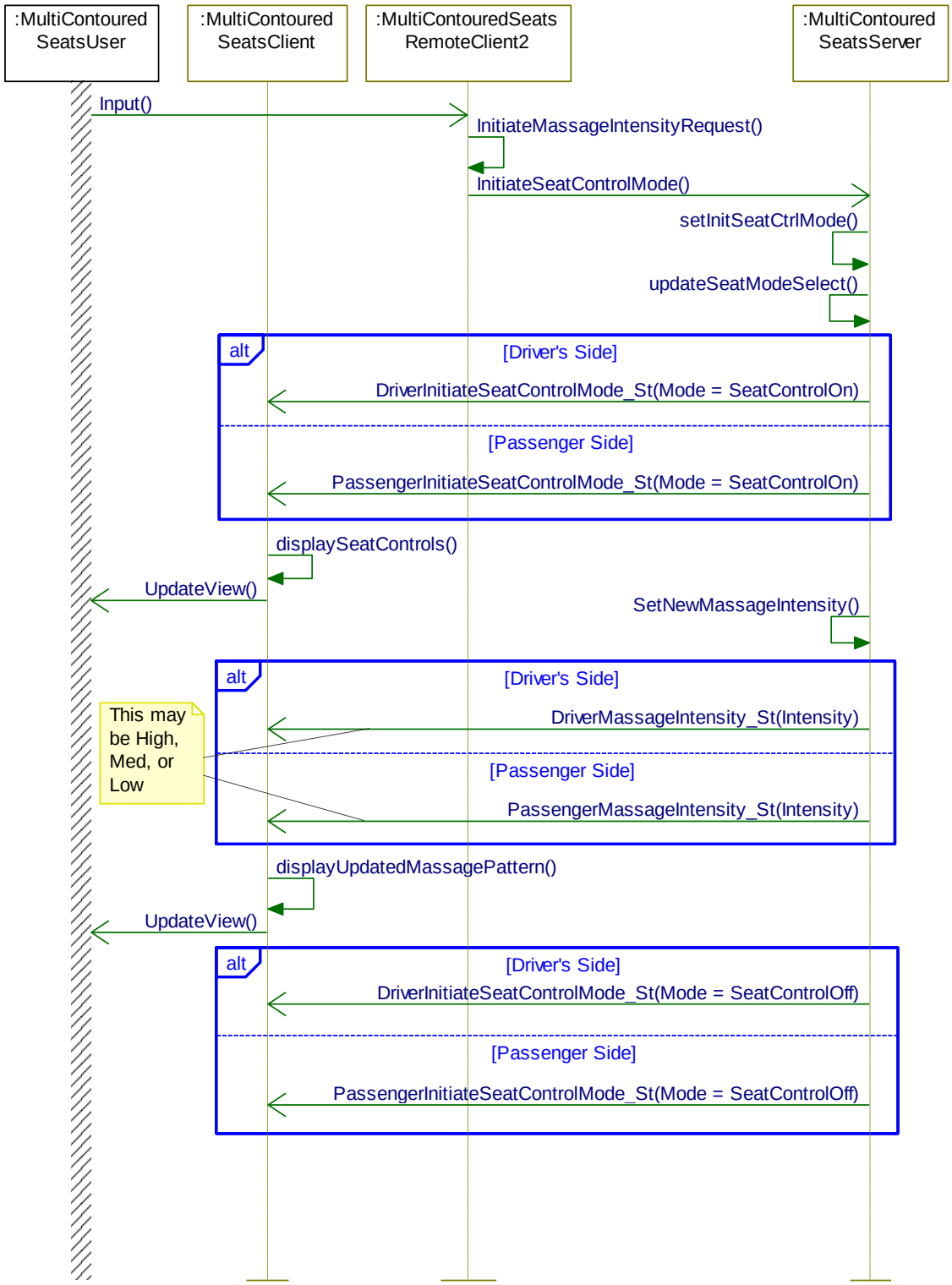
2.3.2.11 MCS-SD-REQ-237801/B-Set Massage Intensity to Low from Touch Screen

Sequence Diagram



2.3.2.12 MCS-SD-REQ-250103/A-Set Massage Intensity from Seat

Sequence Diagram



2.4 MCSv2-FUN-REQ-237619/A-Set Lumbar

2.4.1 Use Cases

2.4.1.1 MCS-UC-REQ-240862/C-Adjust Front Seat Bladder Pressure from HMI

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions Met
Scenario Description	User Selects Upper, Middle, or Lower < Adjust Bladder Pressure > via HMI
Post-conditions	HMI indicates {mode and pressure updates}
List of Exception Use Cases	
Interfaces	G-HMI & vehicle system
Links to Referenced Use Cases	NA

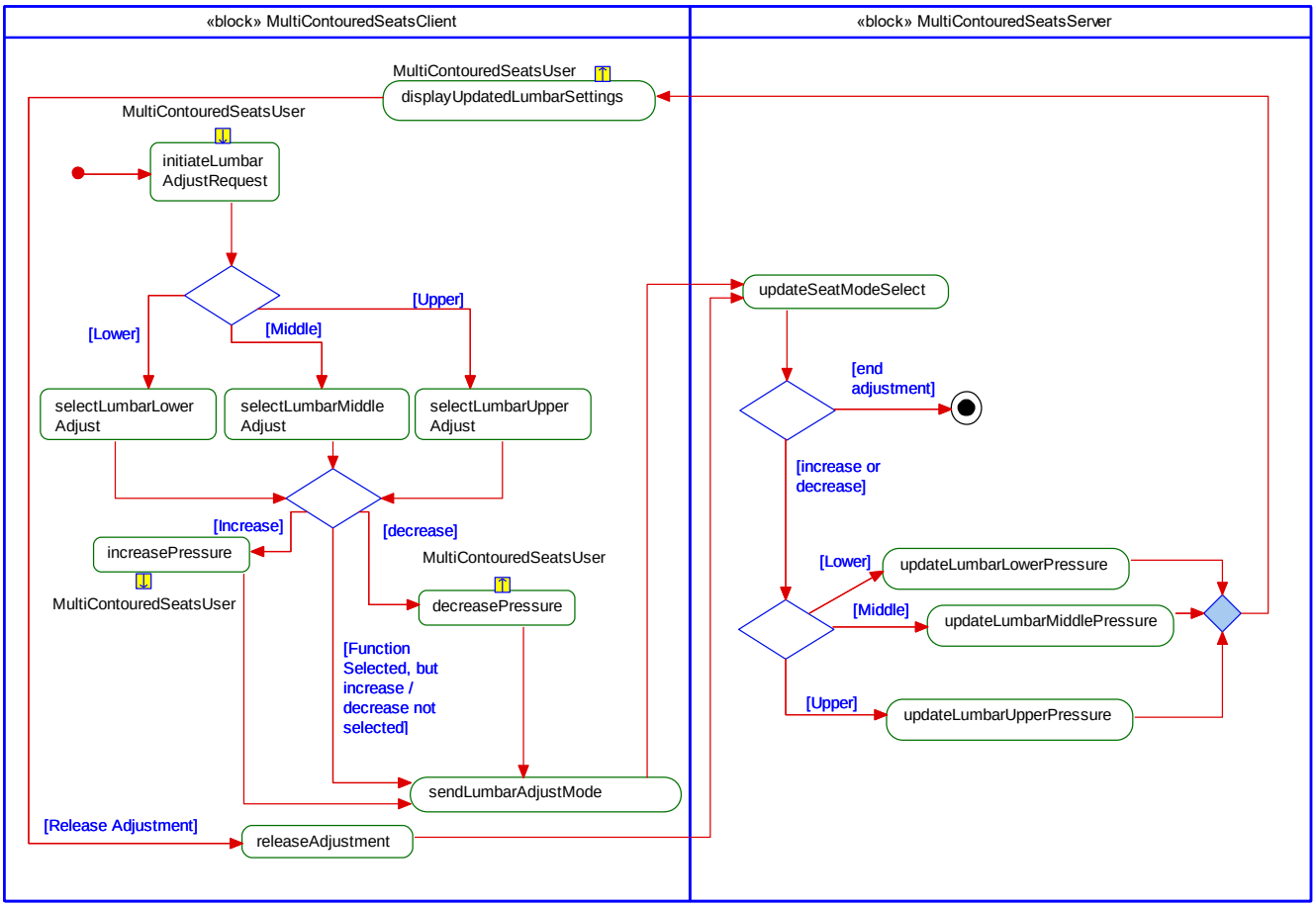
2.4.1.2 MCS-UC-REQ-021336/D-Adjust Front Seat Bladder Pressure from Seat (TcSE ROIN-291759)

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions Met
Scenario Description	User Selects Upper, Middle, or Lower <Adjust Bladder Pressure> via seat module
Post-conditions	HMI indicates {mode and pressure updates}
List of Exception Use Cases	
Interfaces	G-HMI & vehicle system
Links to Referenced Use Cases	NA

2.4.2 White Box View

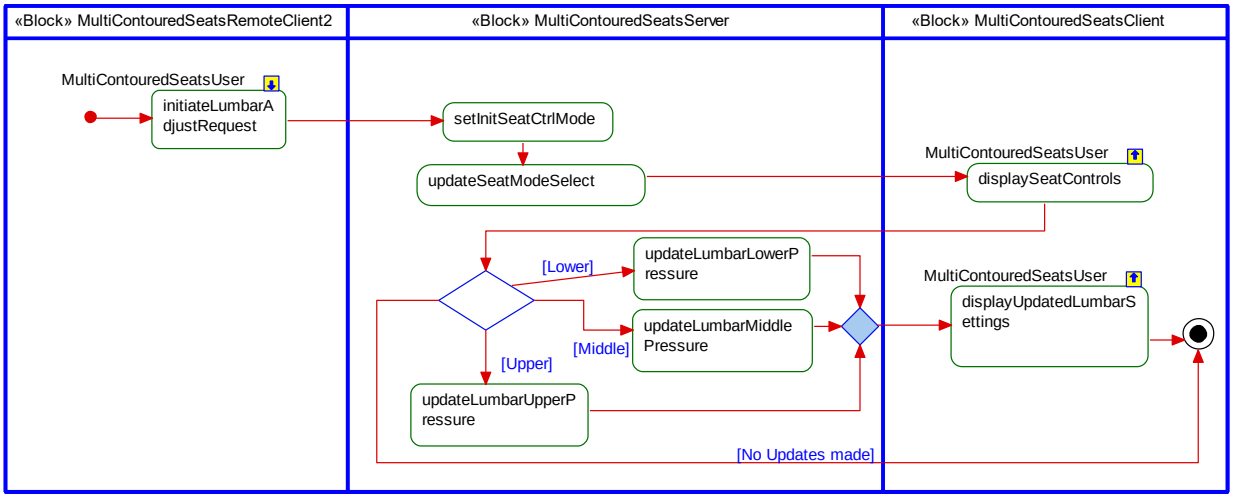
2.4.2.1 MCS-ACT-REQ-021324/A-Set Lumbar - Display Initiated (TcSE ROIN-198769-1)

Activity Diagram



2.4.2.2 MCS-ACT-REQ-250048/A-Set Lumbar - Seat Initiated

Activity Diagram



2.4.2.3 MCS-SD-REQ-021337/C-Select Lumbar Middle Bladder at Touch Screen - No pressure updates (TcSE ROIN-200149-1)

Scenarios

Normal Usage

User <selects Set Lumbar Middle Bladder> via touchscreen HMI, but does not make any changes to the actual pressure.

Constraints

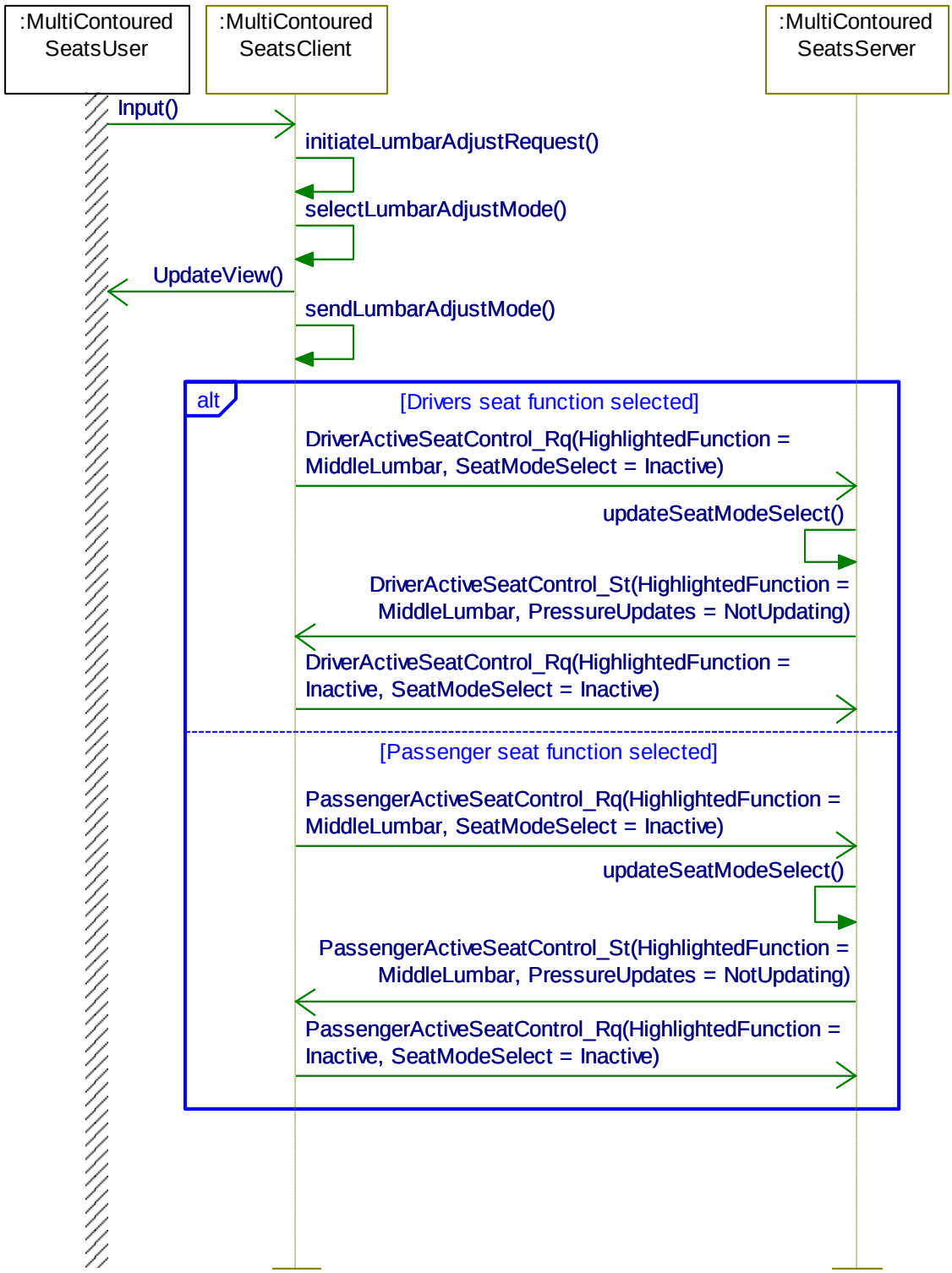
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {changes to Lumbar Adjust Mode}

Sequence Diagram



2.4.2.4 MCS-SD-REQ-021338/C-Select Lumbar Upper Bladder at Touch Screen - No pressure updates (TcSE ROIN-200156-1)

Scenarios

Normal Usage

User <selects Set Lumbar Upper Bladder> via touchscreen HMI, but does not make any changes to the actual pressure.

Constraints

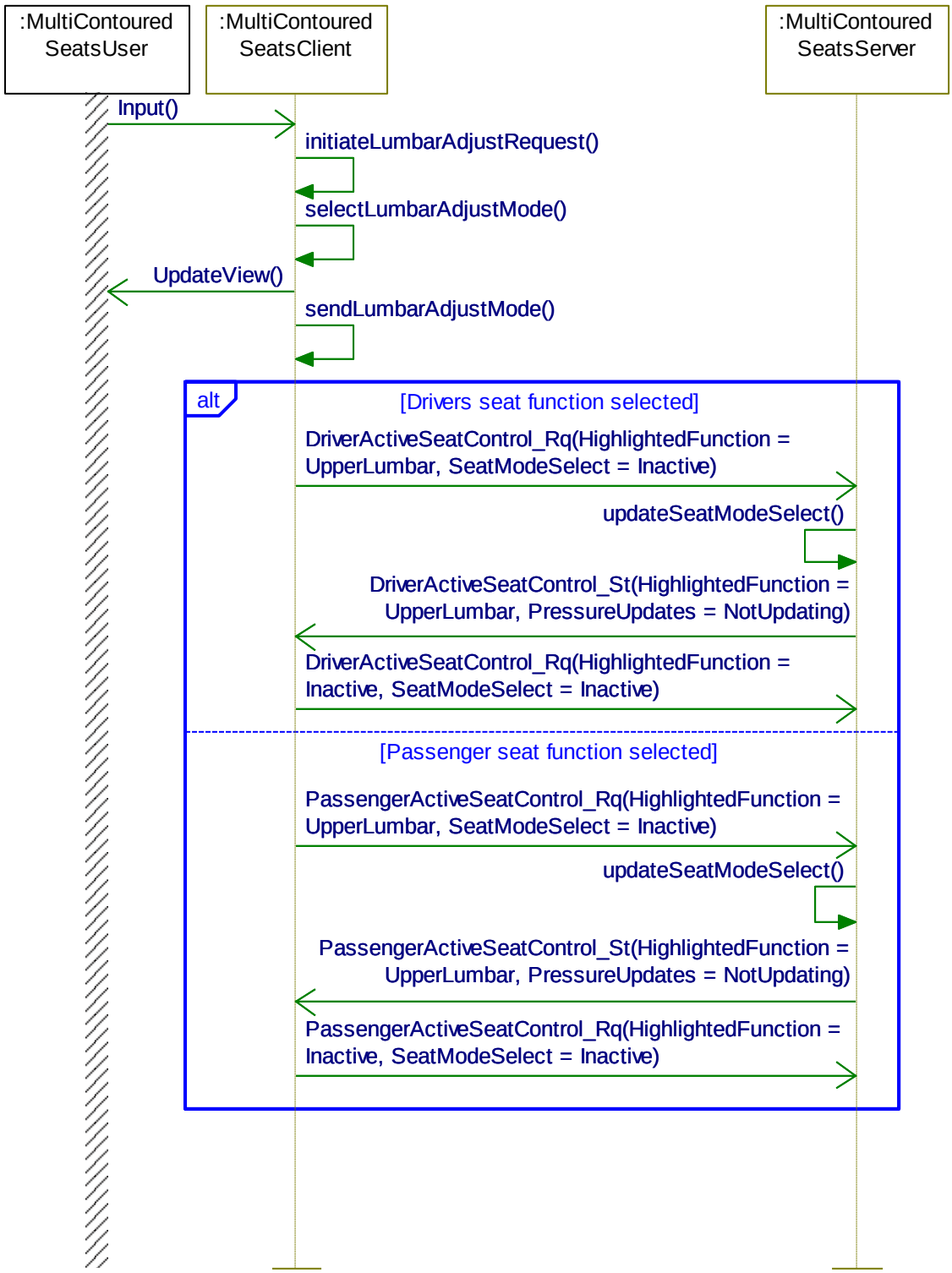
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {changes to Lumbar Adjust Mode}

Sequence Diagram



2.4.2.5 MCS-SD-REQ-021340/C-Select Lumbar Lower Bladder at Touch Screen - No pressure updates (TcSE ROIN-200170-1)

Scenarios

Normal Usage

User <selects Set Lumbar Lower Bladder> via touch screen HMI, but does not make any changes to the actual pressure.

Constraints

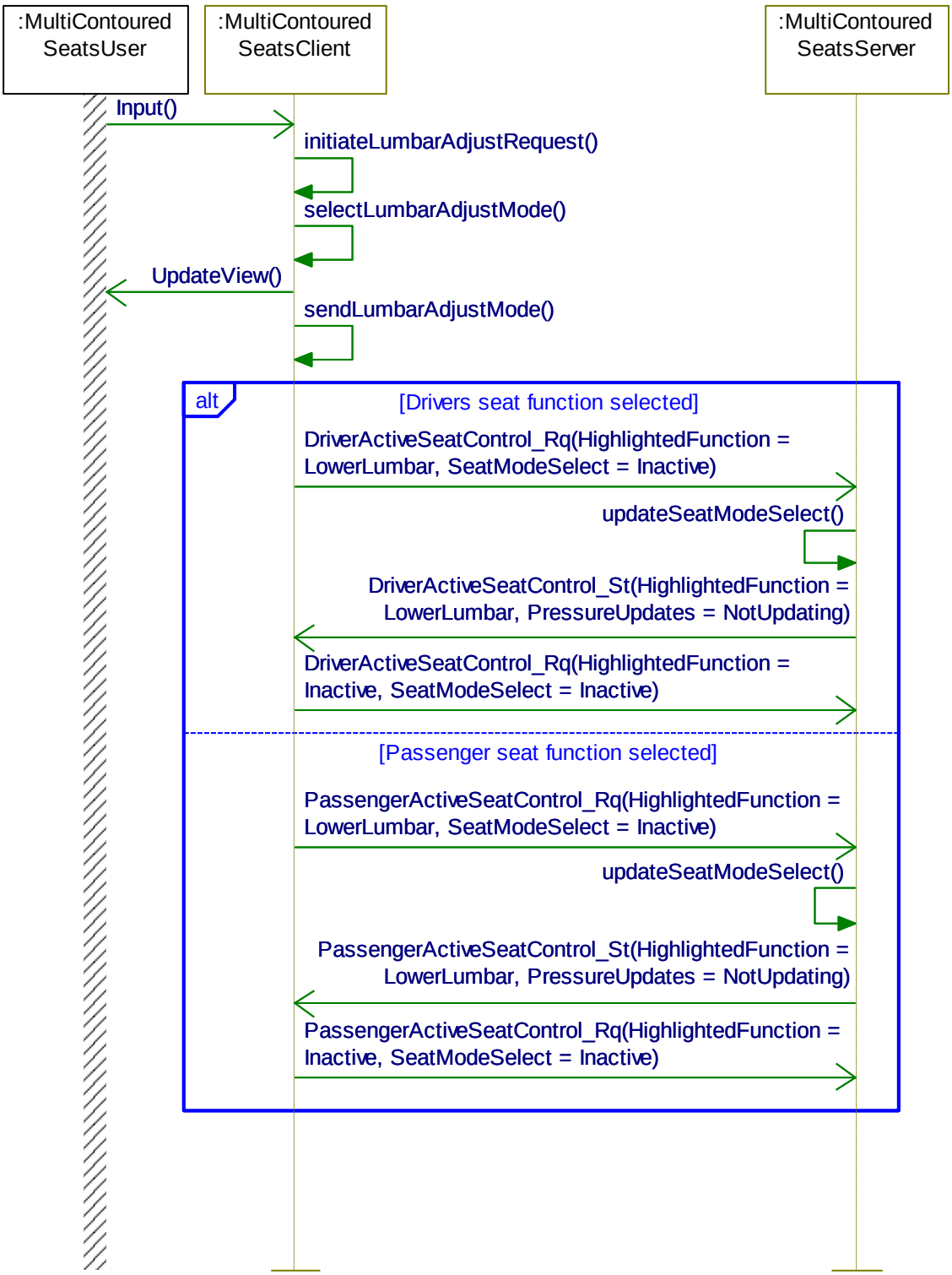
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {changes to Lumbar Adjust Mode}

Sequence Diagram



2.4.2.6 MCS-SD-REQ-021341/D-Decrease Lumbar Lower Bladder from Touch Screen (TcSE ROIN-200773-1)

Scenarios

Normal Usage

User <selects decrease Lumbar Lower Bladder> via touch screen HMI.

Constraints

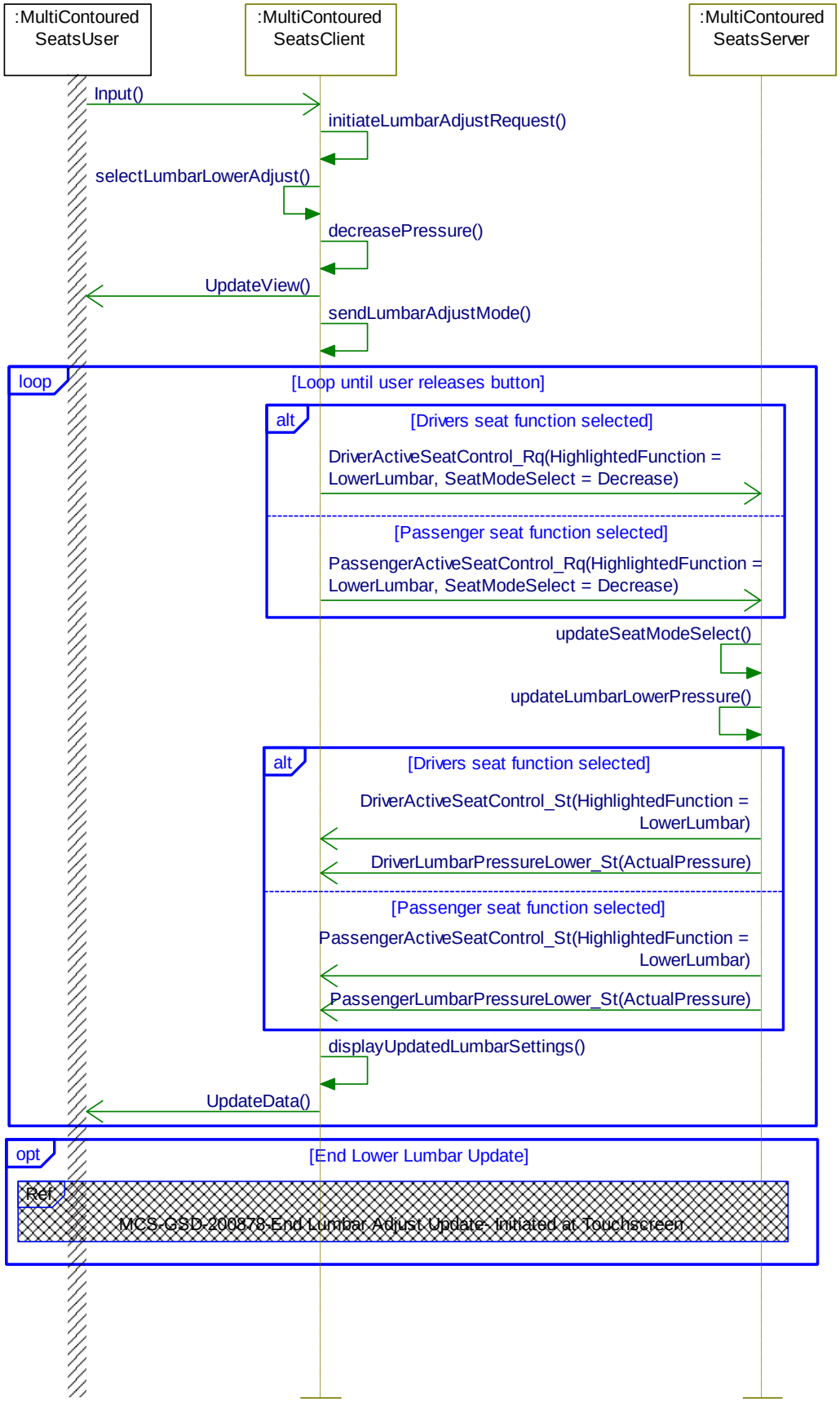
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {change Actual Pressure Settings as Seat Bladder pressure changes}

Sequence Diagram



2.4.2.7 MCS-SD-REQ-021342/D-Decrease Lumbar Middle Bladder from Touch Screen (TcSE ROIN-200780-1)

Scenarios

Normal Usage

User <selects decrease Lumbar Middle Bladder> via touch screen HMI.

Constraints

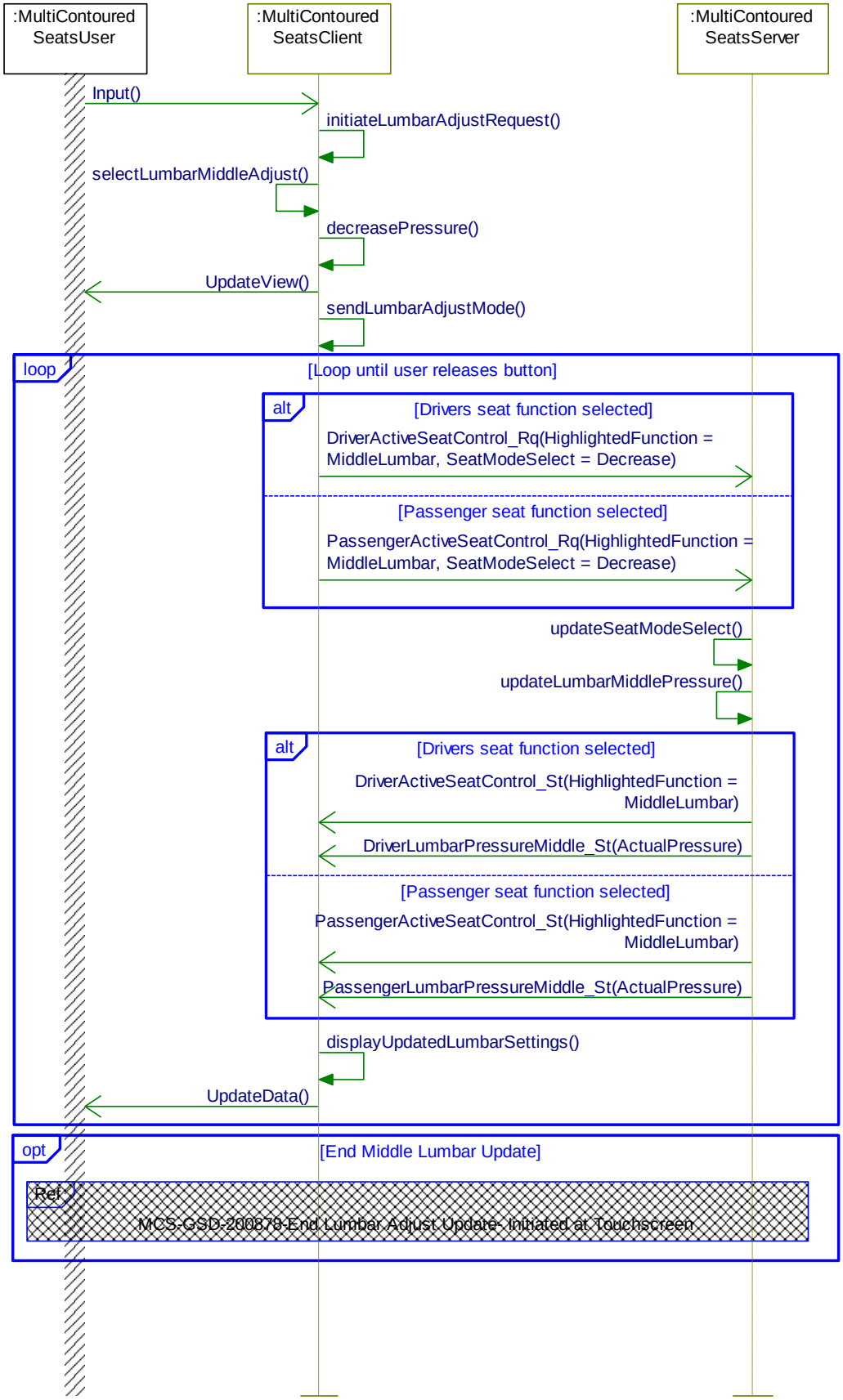
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {change Actual Pressure Settings as Seat Bladder pressure changes}

Sequence Diagram



2.4.2.8 MCS-SD-REQ-021343/D-Decrease Lumbar Upper Bladder from Touch Screen (TcSE ROIN-200787-1)

Scenarios

Normal Usage

User <selects decrease Lumbar Upper Bladder> via touch screen HMI.

Constraints

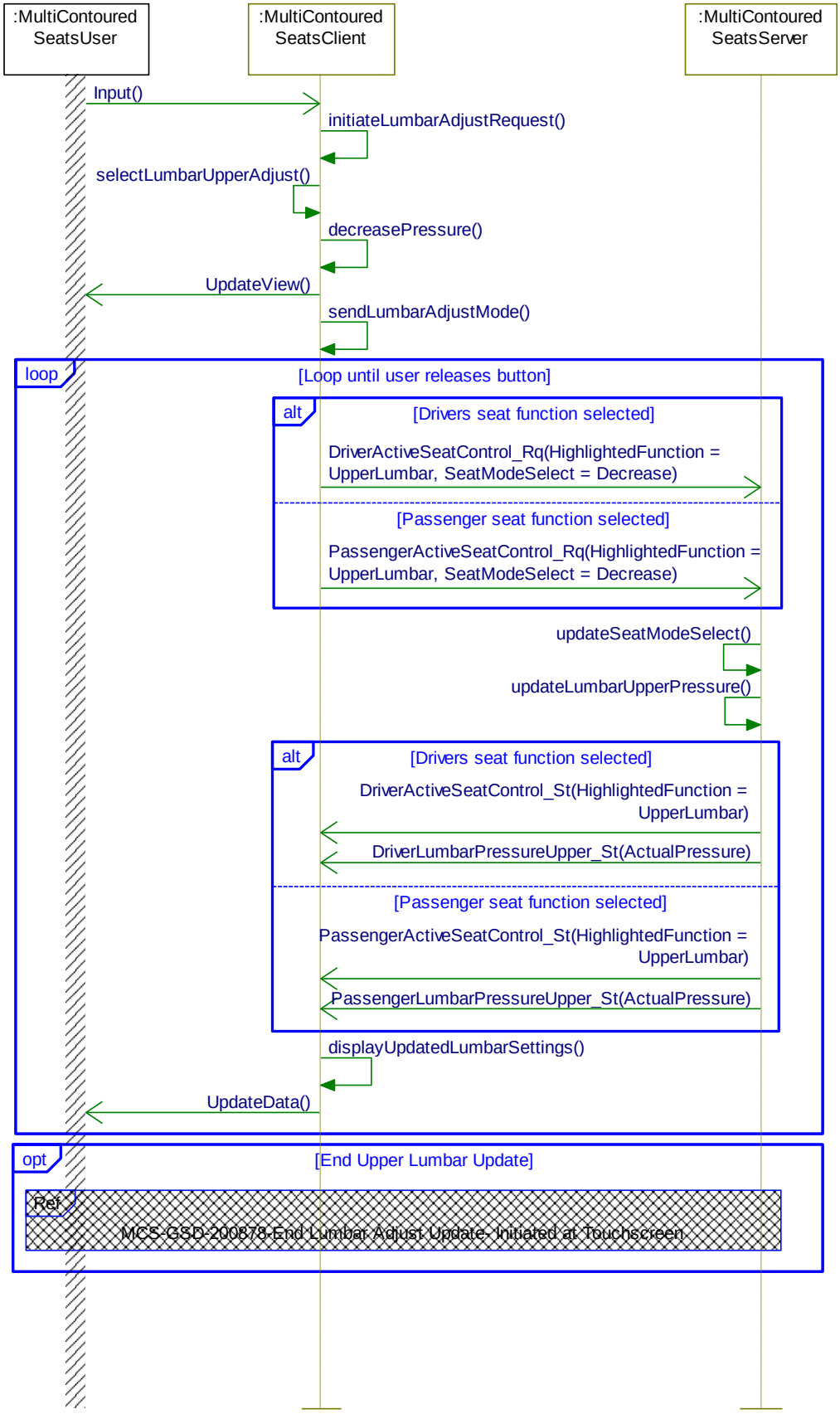
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {change Actual Pressure Settings as Seat Bladder pressure changes}

Sequence Diagram



2.4.2.9 MCS-SD-REQ-021344/D-Increase Lumbar Lower Bladder from Touch Screen (TcSE ROIN-200794-1)

Scenarios

Normal Usage

User <selects increrase Lumbar Lower Bladder> via touch screen HMI.

Constraints

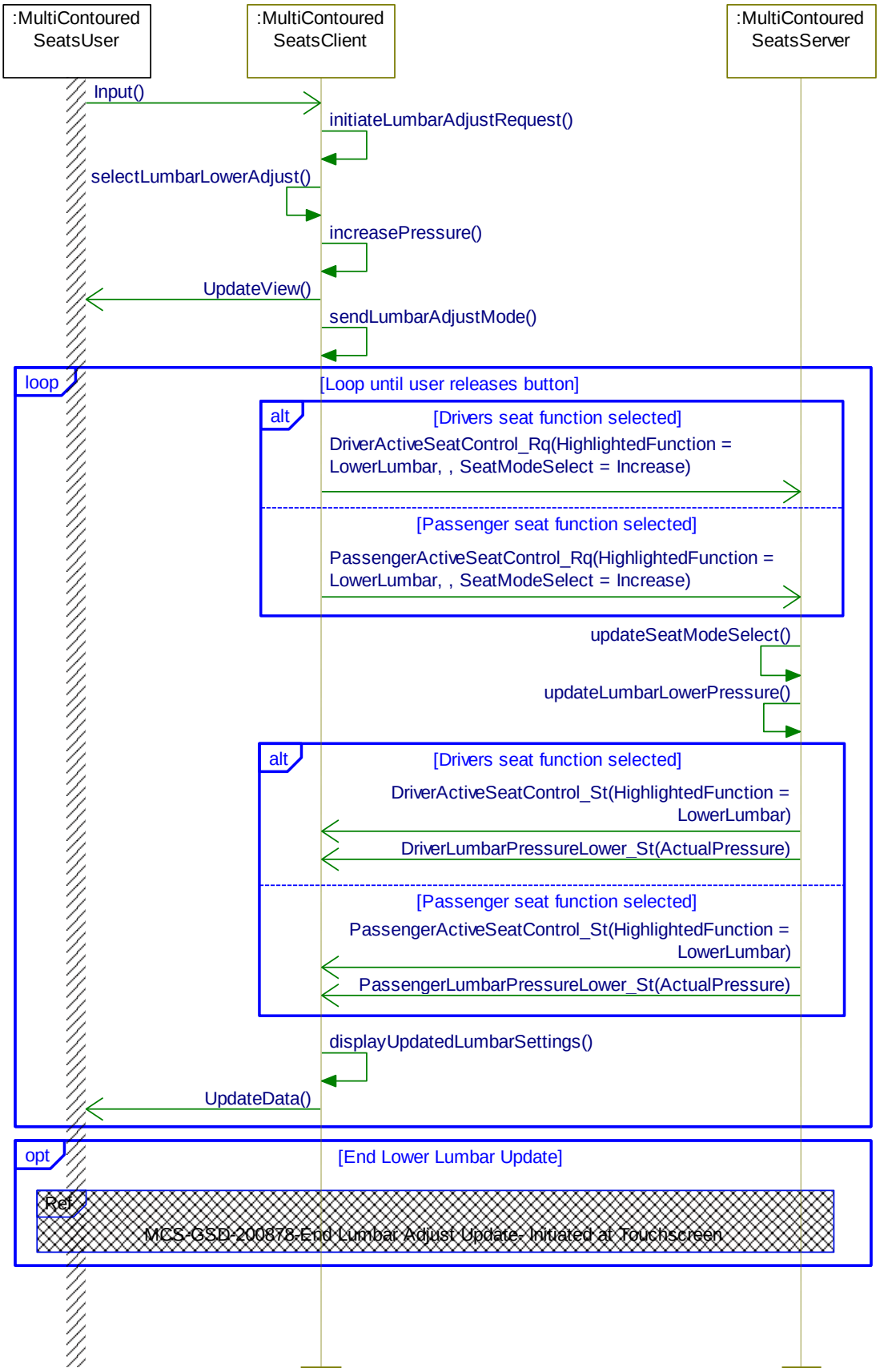
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {change Actual Pressure Settings as Seat Bladder pressure changes}

Sequence Diagram



2.4.2.10 MCS-SD-REQ-021345/D-Increase Lumbar Middle Bladder from Touch Screen (TcSE ROIN-200801-1)

Scenarios

Normal Usage

User <selects increase Lumbar Middle Bladder> via touch screen HMI.

Constraints

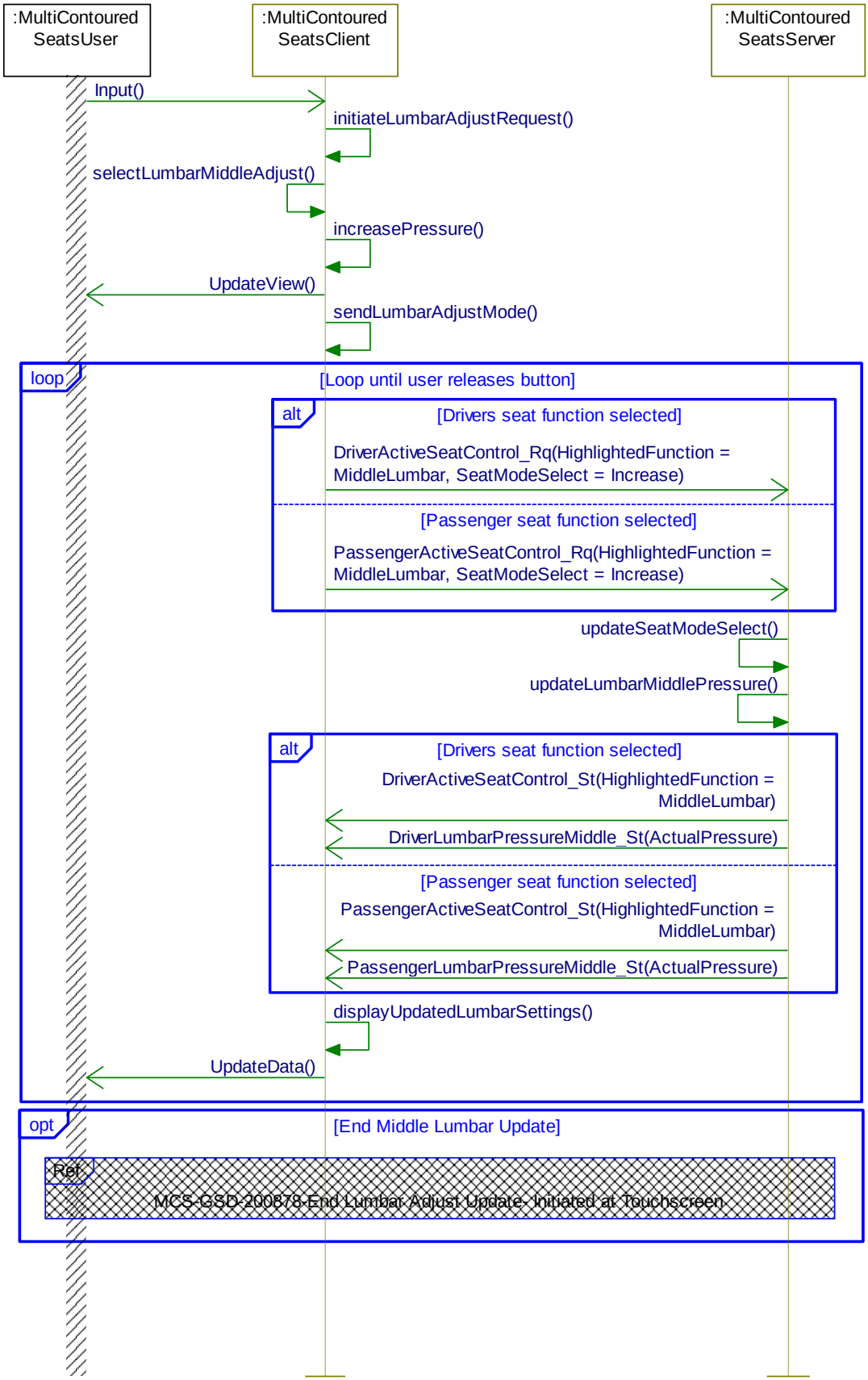
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {change Actual Pressure Settings as Seat Bladder pressure changes}

Sequence Diagram



2.4.2.11 MCS-SD-REQ-021346/D-Increase Lumbar Upper Bladder from Touch Screen (TcSE ROIN-200808-1)

Scenarios

Normal Usage

User <selects increase Lumbar Upper Bladder> via touch screen HMI.

Constraints

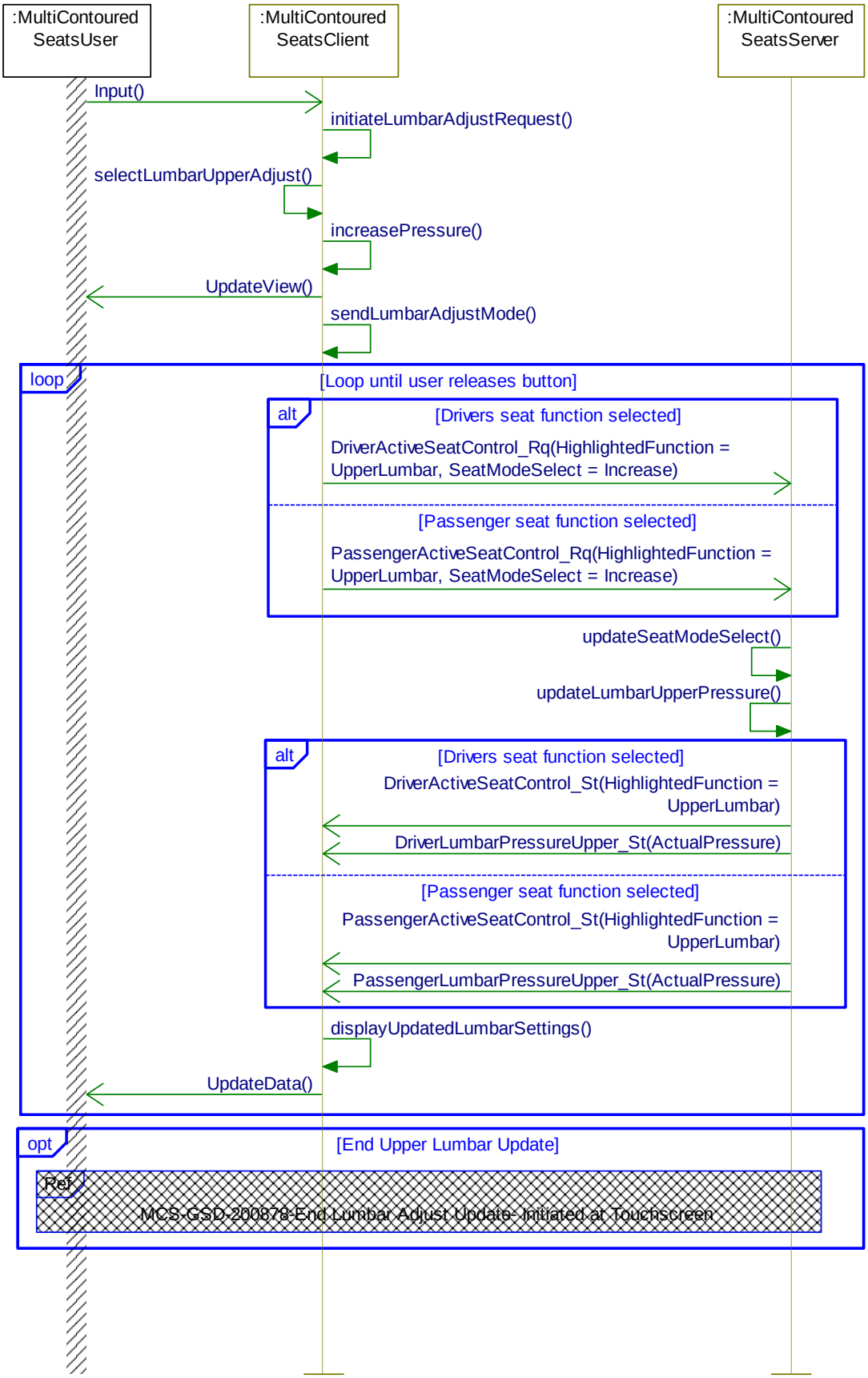
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {change Actual Pressure Settings as Seat Bladder pressure changes}

Sequence Diagram



2.4.2.12 MCS-SD-REQ-250049/C-Set Lumbar Bladder at Seat

Scenarios

Normal Usage

User Selects Upper, Middle, or Lower <Adjust Bladder Pressure> via seat module.

Constraints

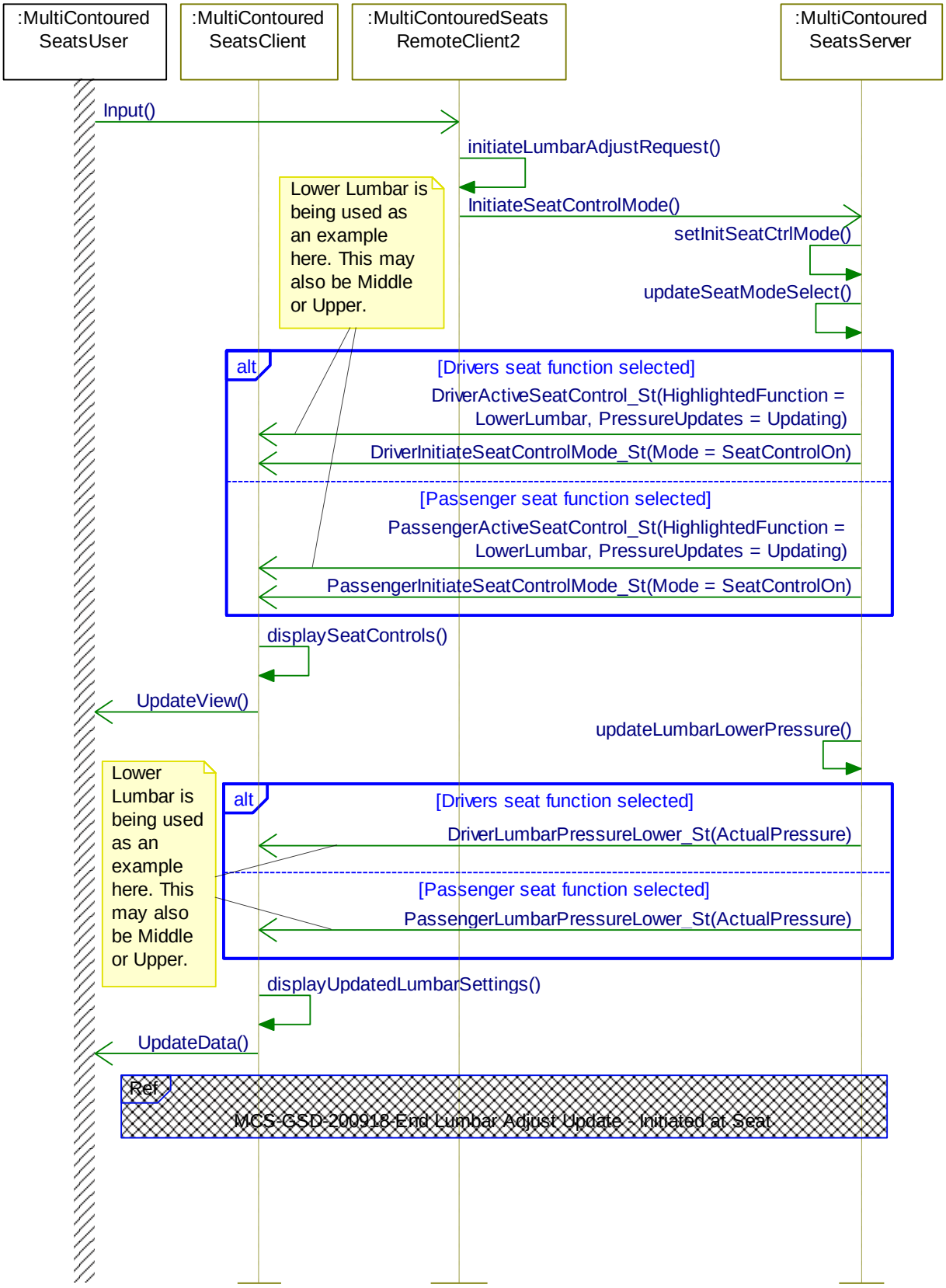
Pre-Condition

Powermode Conditions Met

Post-Condition

HMI indicates {mode and pressure updates}.

Sequence Diagram



2.4.2.13 MCS-SD-REQ-021350/A-End Lumbar Adjust Update- Initiated at Touchscreen (TcSE ROIN-200878-1)

Scenarios

Normal Usage

The user ends Lumbar Adjust Mode update.

Constraints

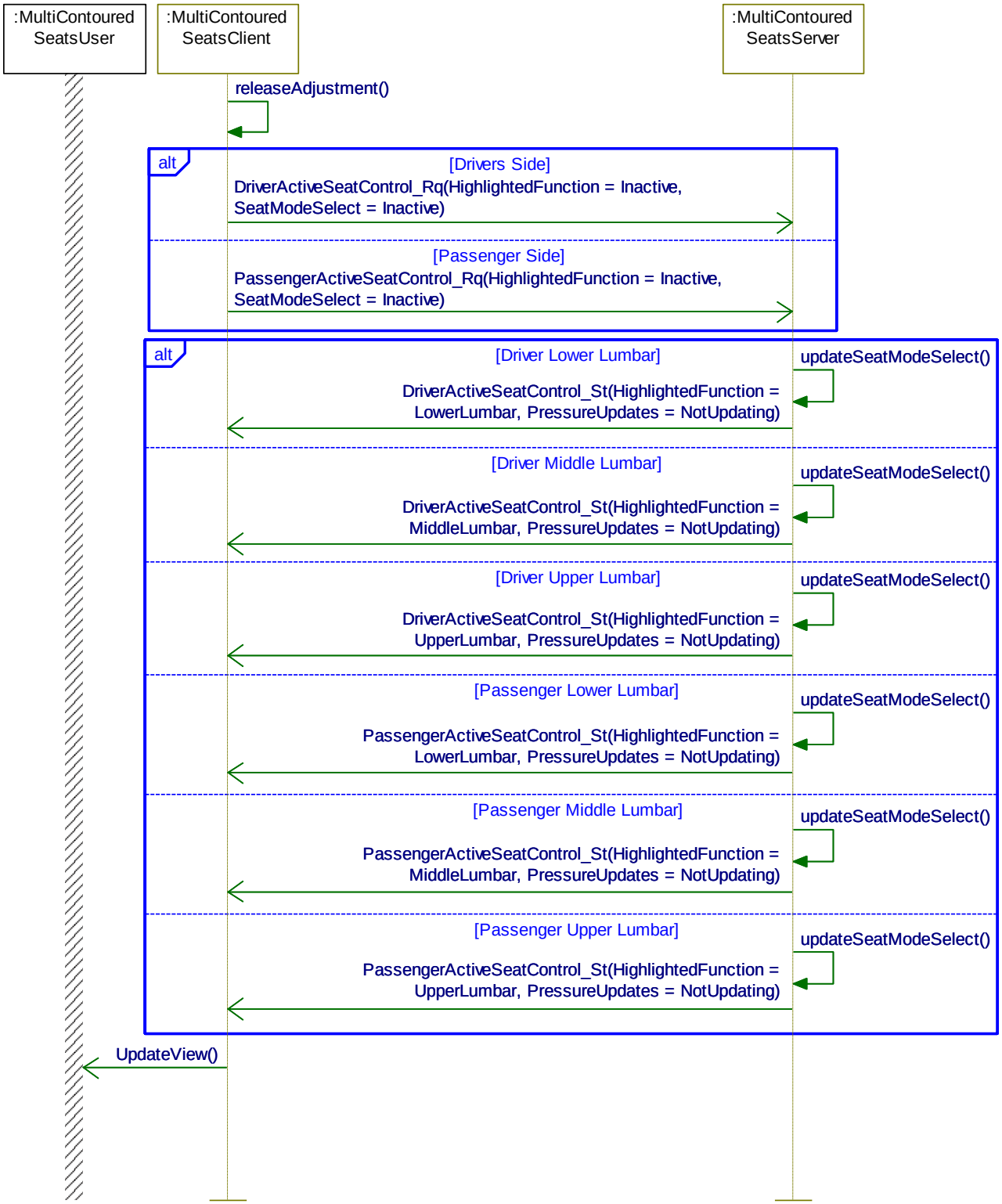
Pre-condition

Lumbar Adjust is currently being updated by the user via Touch screen HMI

Post-condition

Lumbar Adjust is no longer updated by the user via Touch screen HMI

Sequence Diagram



2.4.2.14 MCS-SD-REQ-021351/A-End Lumbar Adjust Update - Initiated at Seat (TcSE ROIN-200918-1)

Scenarios

Normal Usage

The user ends Lumbar Adjust Mode update.

Constraints

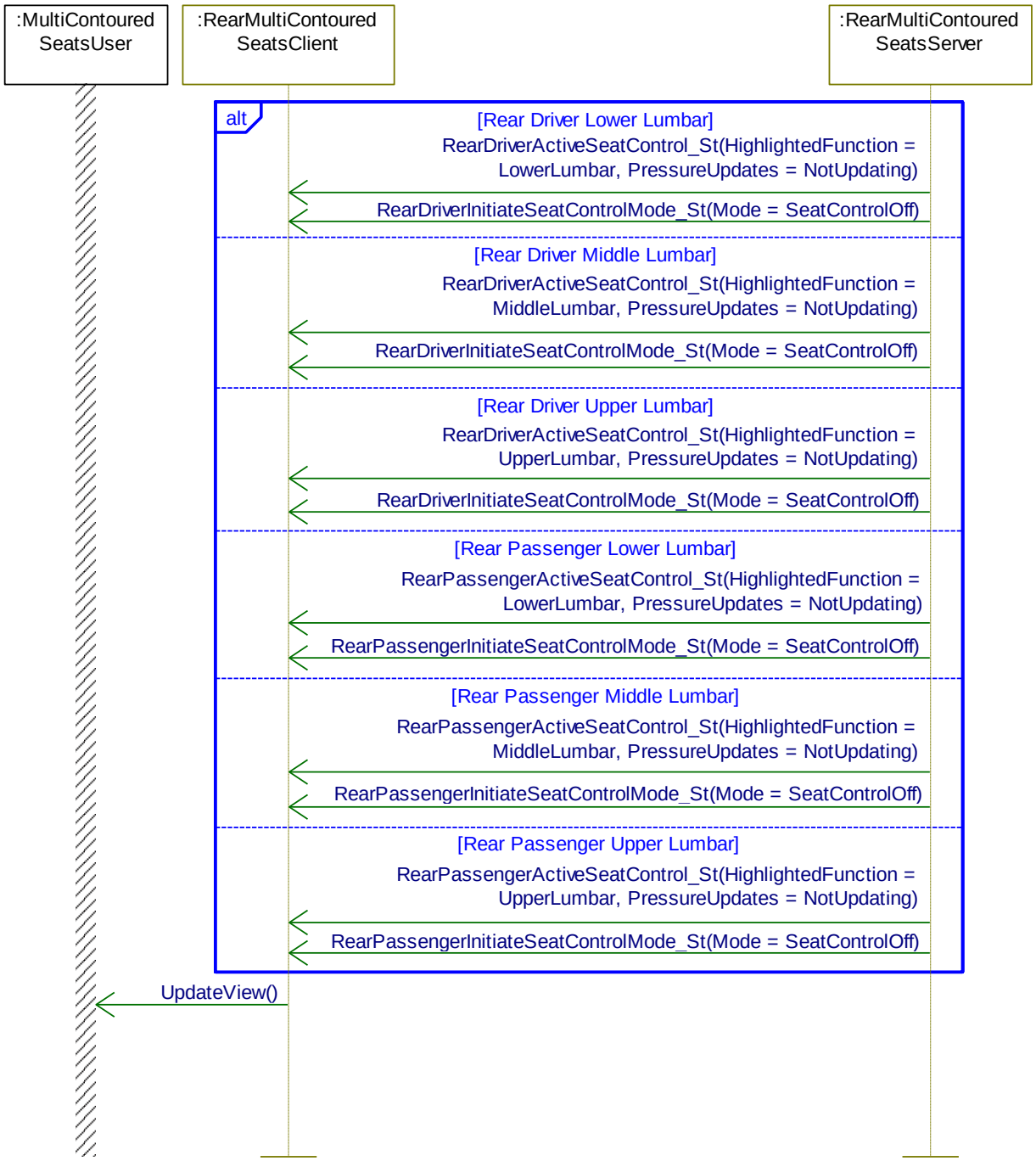
Pre-condition

Lumbar Adjust is currently being updated by the user via Seat HMI

Post-condition

Lumbar Adjust is no longer being updated by the user via Seat HMI

Sequence Diagram



2.5 MCSv2-FUN-REQ-237624/A-Set Bolster

2.5.1 Use Cases

2.5.1.1 MCS-UC-REQ-240863/C-Adjust Front Seat Bolster Bladder from HMI

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions Met
Scenario Description	User Selects Upper or Lower < Adjust Bolster Pressure> via HMI
Post-conditions	HMI indicates (Mode & Intensity}
List of Exception Use Cases	NA
Interfaces	G-HMI & vehicle system
Links to Referenced Use Cases	NA

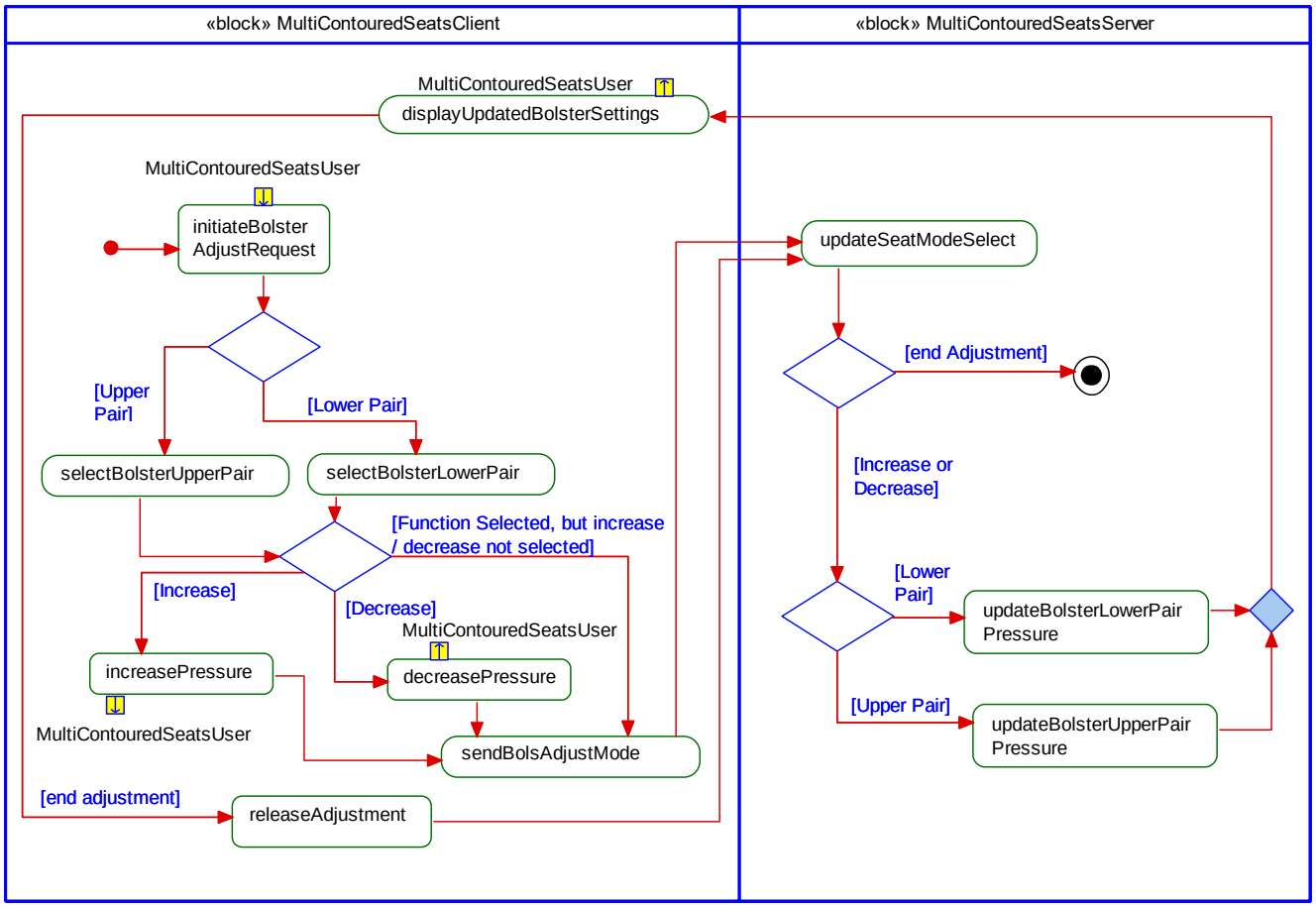
2.5.1.2 MCS-UC-REQ-021369/D-Adjust Front Seat Bolster Bladder from Seat (TcSE ROIN-293589)

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions Met
Scenario Description	User Selects Upper or Lower < Adjust Bolster Pressure> via seat module
Post-conditions	HMI indicates (Mode & Intensity}
List of Exception Use Cases	NA
Interfaces	G-HMI & vehicle system
Links to Referenced Use Cases	NA

2.5.2 White Box View

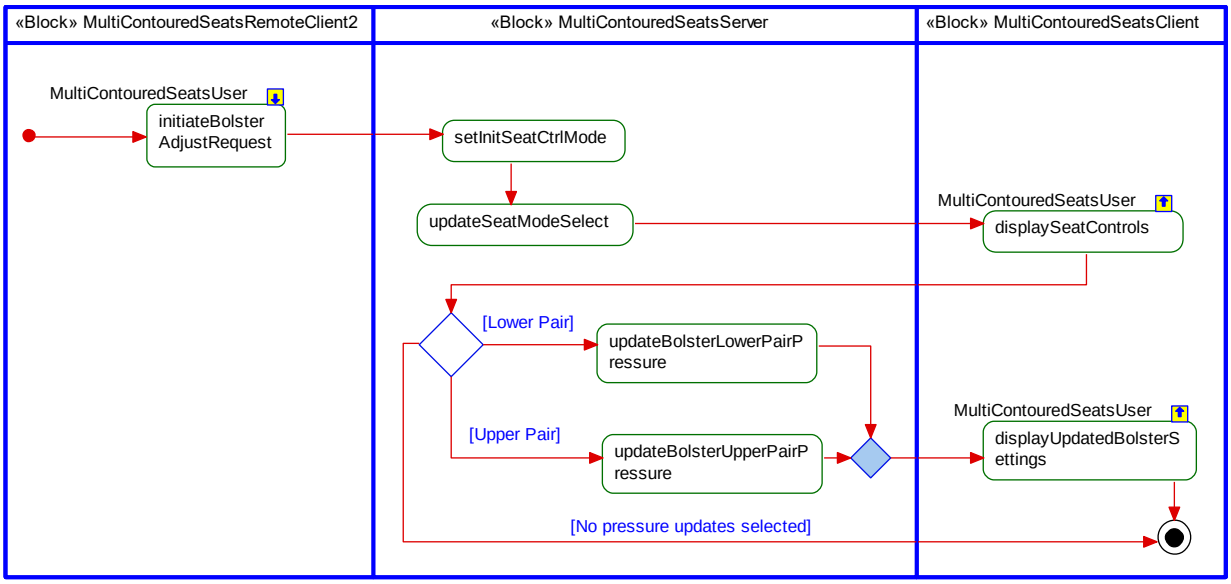
2.5.2.1 MCS-ACT-REQ-021326/A-Set Bolster - Display Initiated (TcSE ROIN-198835-1)

Activity Diagram



2.5.2.2 MCS-ACT-REQ-250054/A-Set Bolster - Seat Initiated

Activity Diagram



2.5.2.3 MCS-SD-REQ-021375/D-Increase Bolster Upper Bladders from Touch Screen (TcSE ROIN-199118-1)

Scenarios

Normal Usage

User <selects increase Bolster Upper Pair of Bladders> via touch screen HMI

Constraints

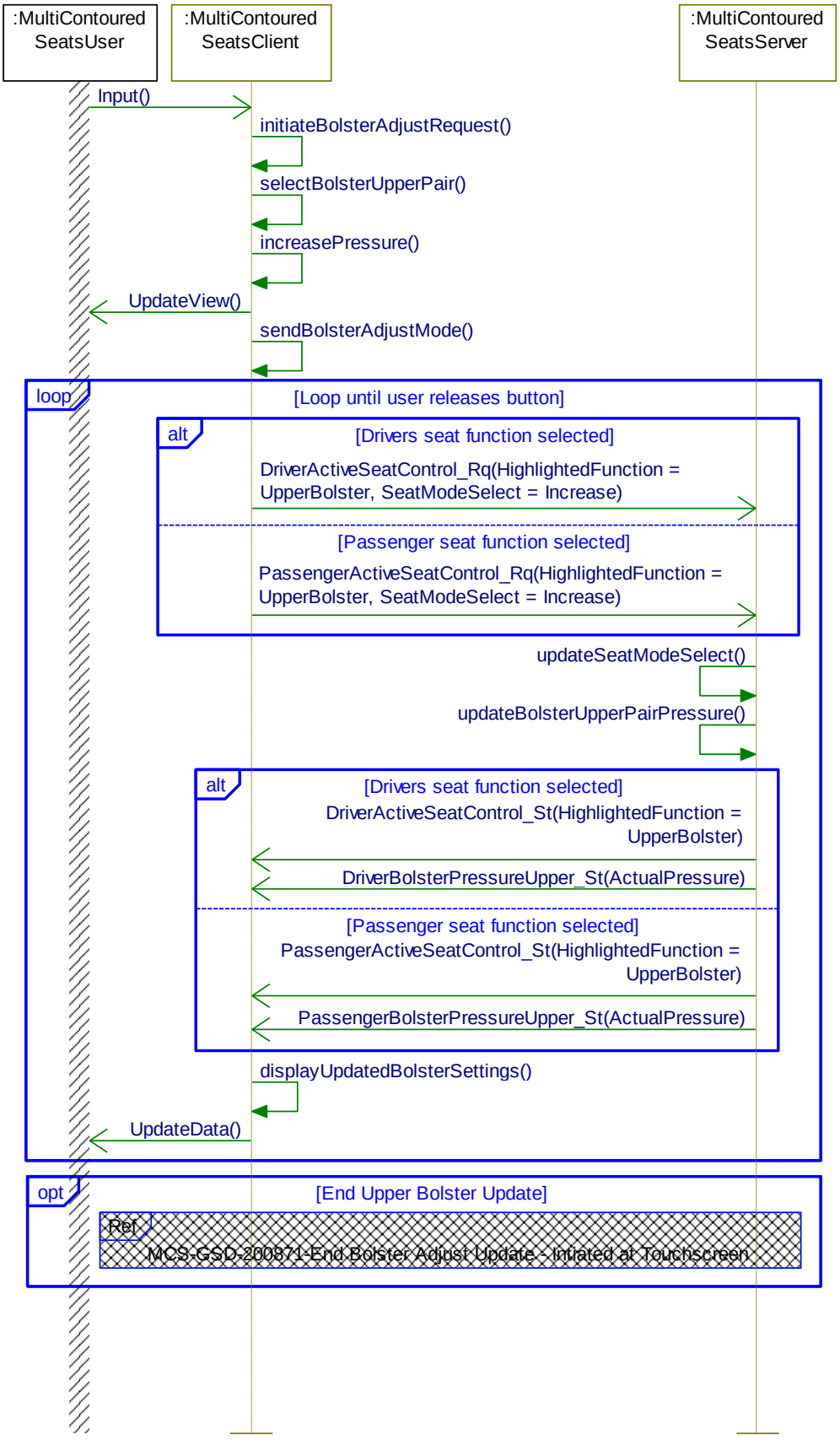
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {change Actual Pressure Settings as Seat Bladder pressure changes}

Sequence Diagram



2.5.2.4 MCS-SD-REQ-021371/D-Increase Bolster Lower Bladders from Touch Screen (TcSE ROIN-199090-1)

Scenarios

Normal Usage

User <selects increase Bolster Lower Pair of Bladders> via touch screen HMI

Constraints

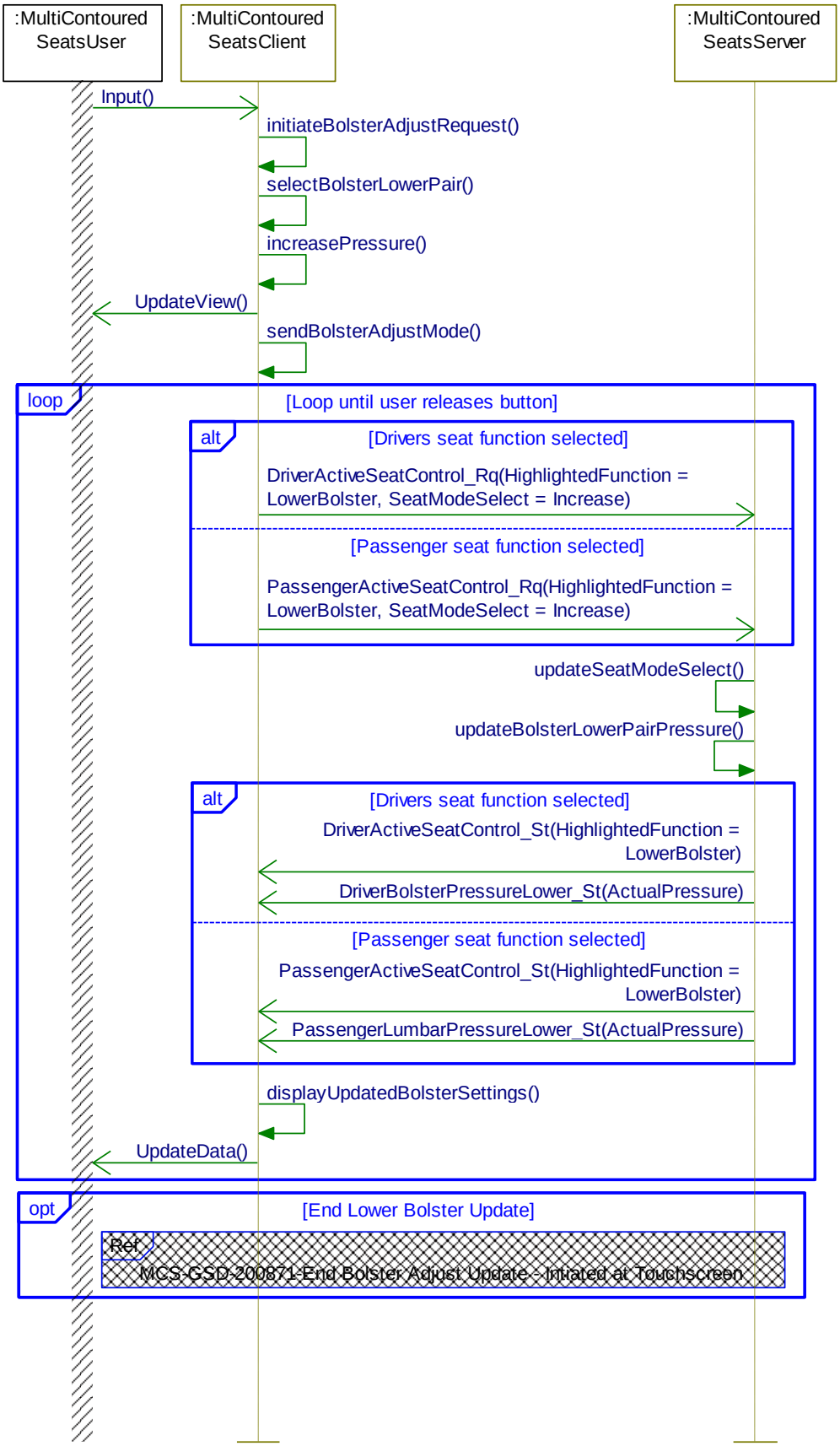
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {change Actual Pressure Settings as Seat Bladder pressure changes}

Sequence Diagram



2.5.2.5 MCS-SD-REQ-021372/D-Decrease Bolster Upper Bladders from Touch Screen (TcSE ROIN-199097-1)

Scenarios

Normal Usage

User <selects decrease Bolster Upper Pair of Bladders> via touch screen HMI

Constraints

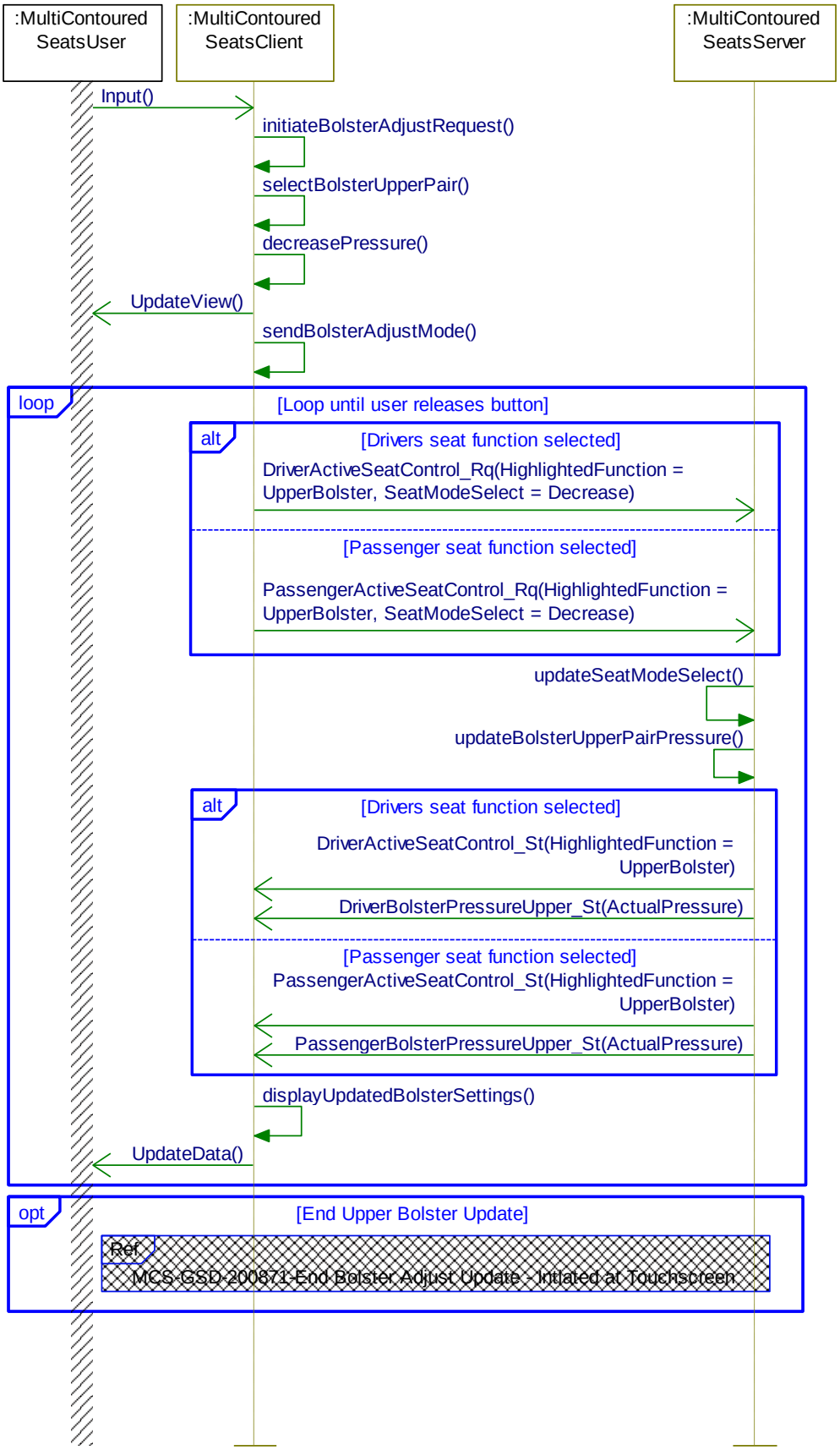
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {change Actual Pressure Settings as Seat Bladder pressure changes}

Sequence Diagram



2.5.2.6 MCS-SD-REQ-021373/D-Decrease Bolster Lower Bladders from Touch Screen (TcSE ROIN-199104-1)

Scenarios

Normal Usage

User <selects decrease Bolster Lower Pair of Bladders> via touch screen HMI

Constraints

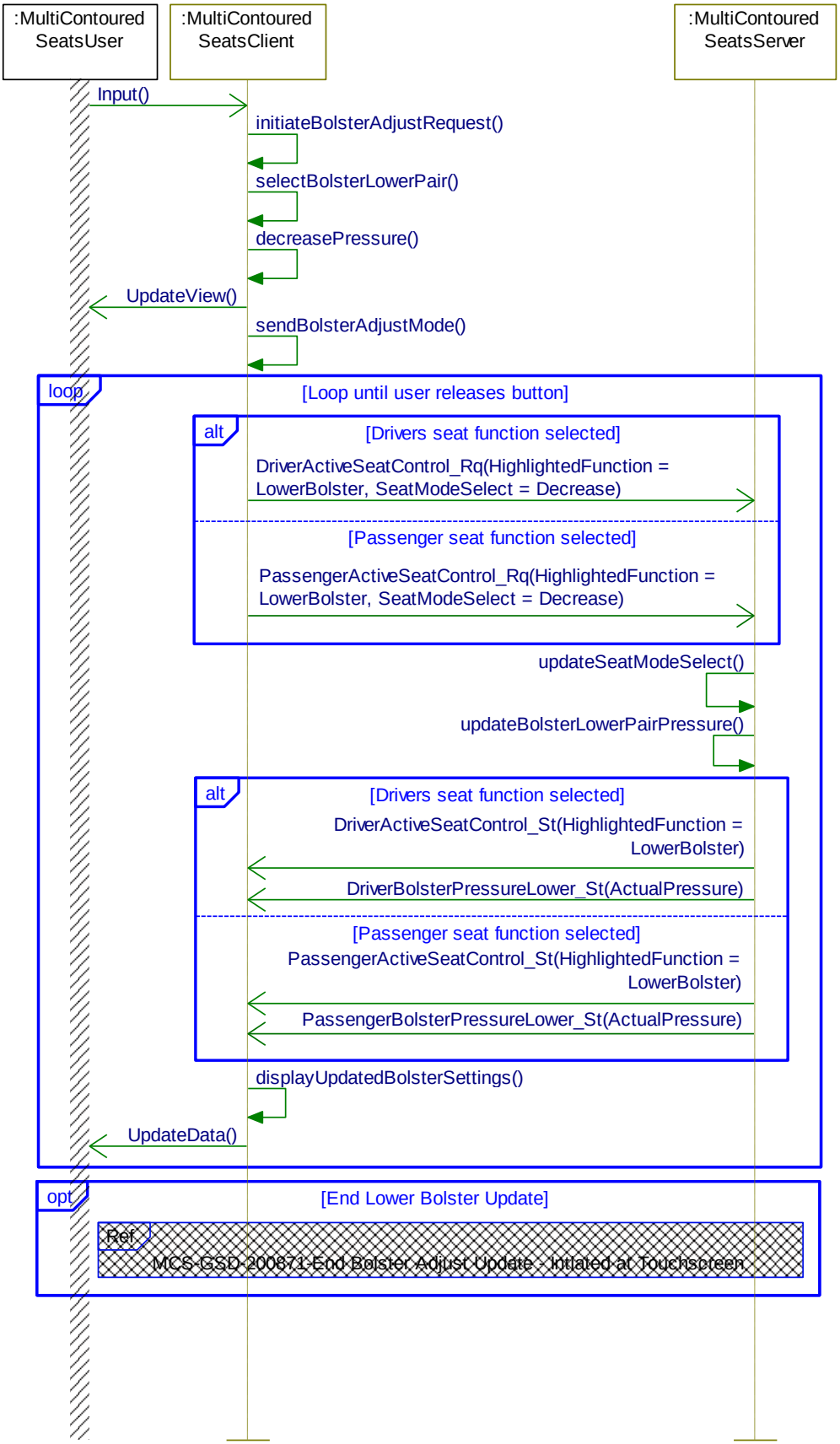
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {change Actual Pressure Settings as Seat Bladder pressure changes}

Sequence Diagram



2.5.2.7 MCS-SD-REQ-021376/C-Select Bolster Upper Bladders at Touch Screen - No pressure updates (TcSE ROIN-200177-1)

Scenarios

Normal Usage

User <selects Set Bolster Upper Bladders> via touchscreen HMI, but does not make any changes to the actual pressure

Constraints

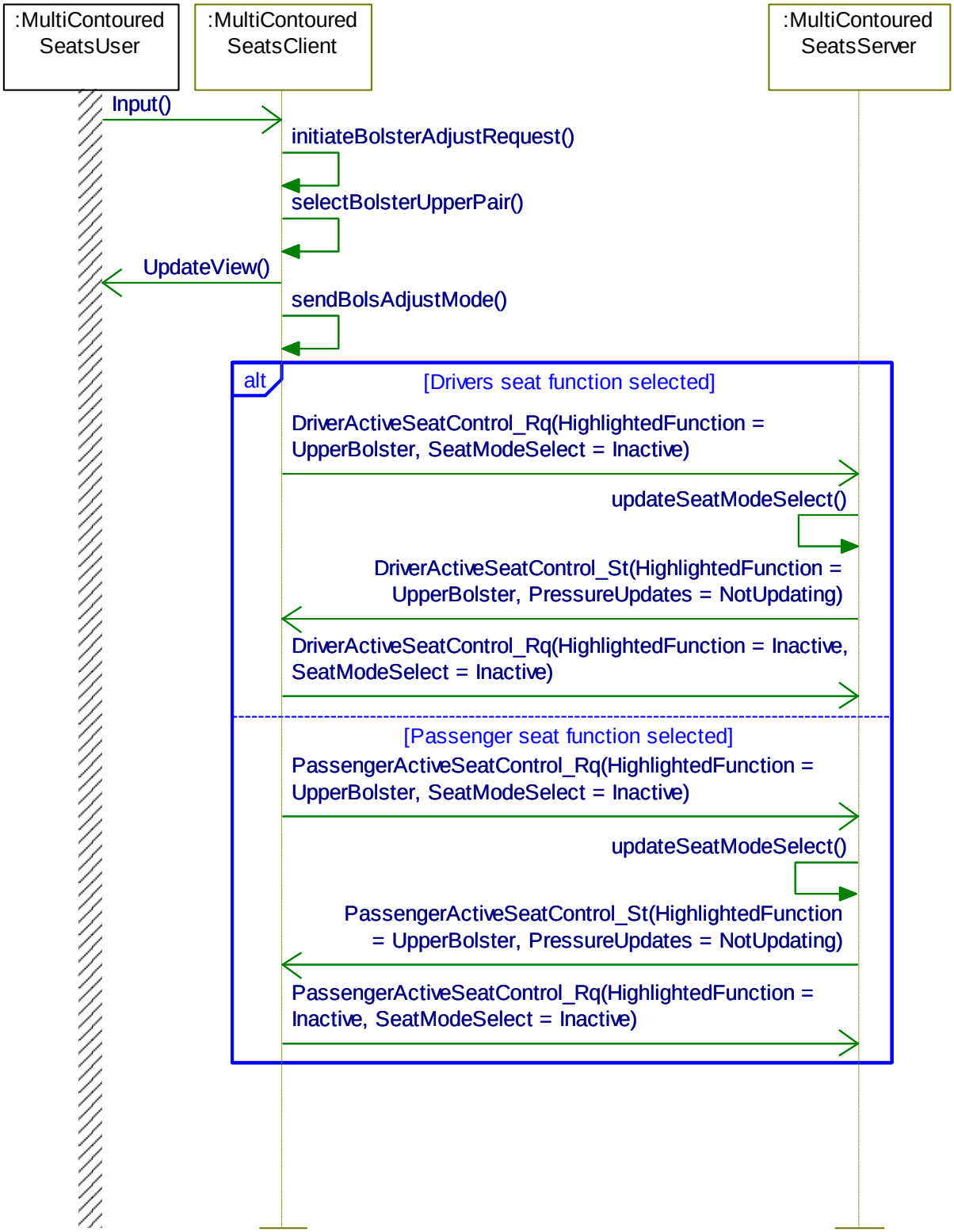
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {changes to Bolster Adjust Mode}

Sequence Diagram



2.5.2.8 MCS-SD-REQ-021378/C-Select Bolster Lower Bladders at Touch Screen - No pressure updates (TcSE ROIN-200815-1)

Scenarios

Normal Usage

User <selects Set Bolster Lower Bladders> via touchscreen HMI, but does not make any changes to the actual pressure

Constraints

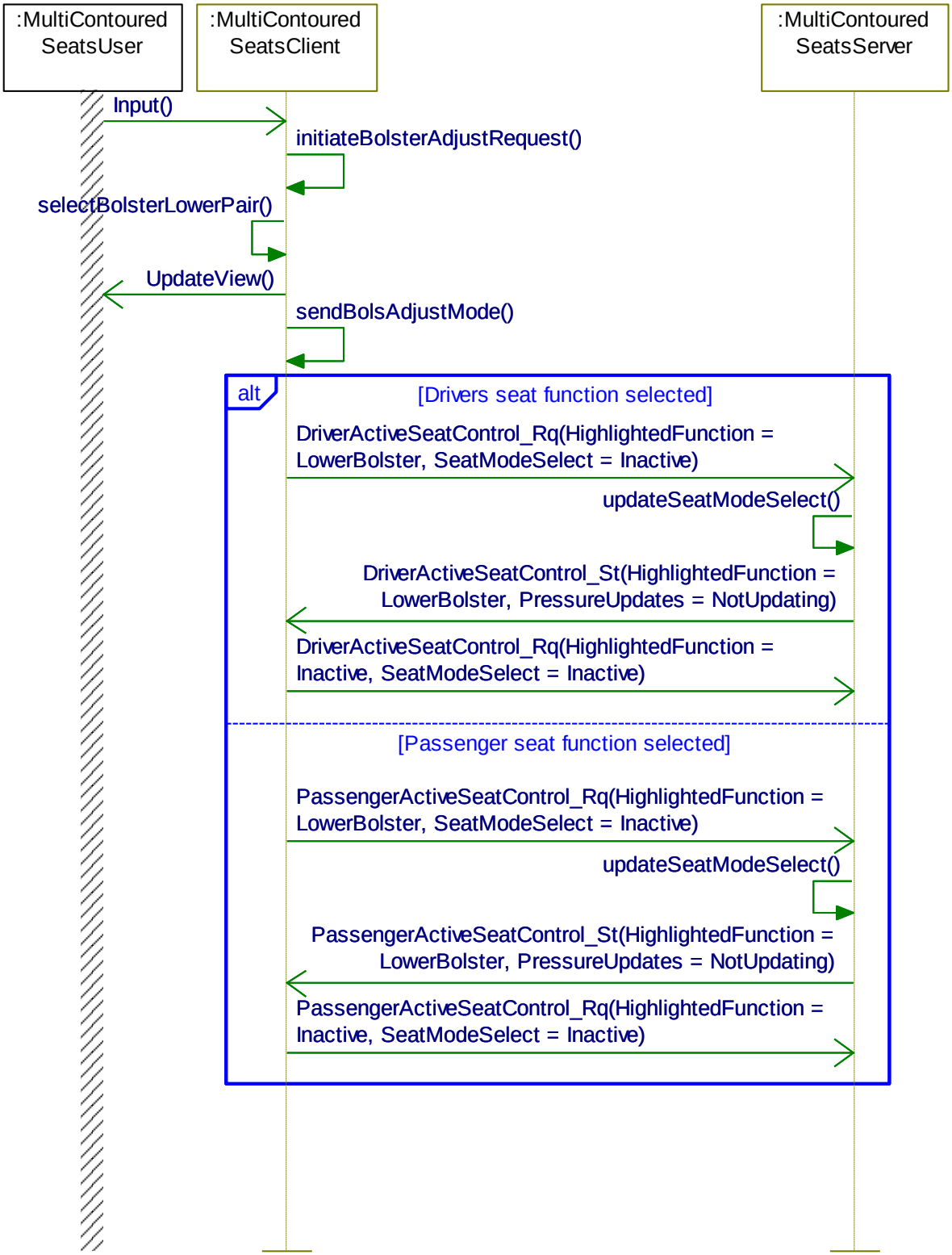
Pre-condition

Powermode Conditions Met

Post-condition

HMI indicates {changes to Bolster Adjust Mode}

Sequence Diagram



2.5.2.9 MCS-SD-REQ-250055/C-Initiate Bolster Adjust at Seat - No pressure updates

Scenarios

Normal Usage

User <selects Set Bolster Lower or Upper Bladders> via seat HMI, but does not make any changes to the actual pressure.

Constraints

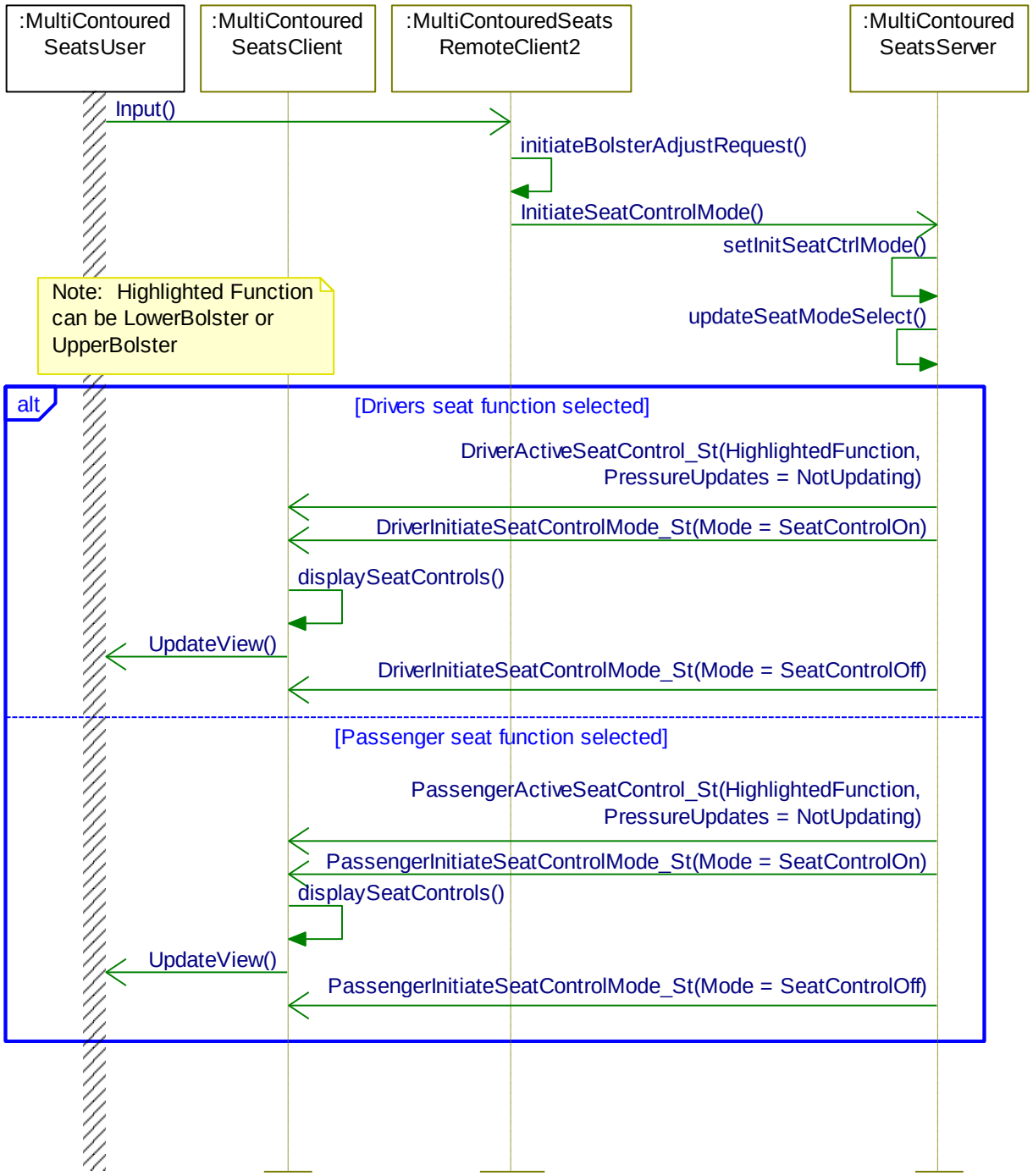
Pre-Condition

Powermode Conditions Met

Post-Condition

HMI indicates {changes to Bolster Adjust Mode}

Sequence Diagram



2.5.2.10 MCS-SD-REQ-250092/C-Set Bolster at Seat

Scenarios

Normal Usage

User <selects Set Bolster Lower or Upper Pair of Bladders> via seat HMI.

Constraints

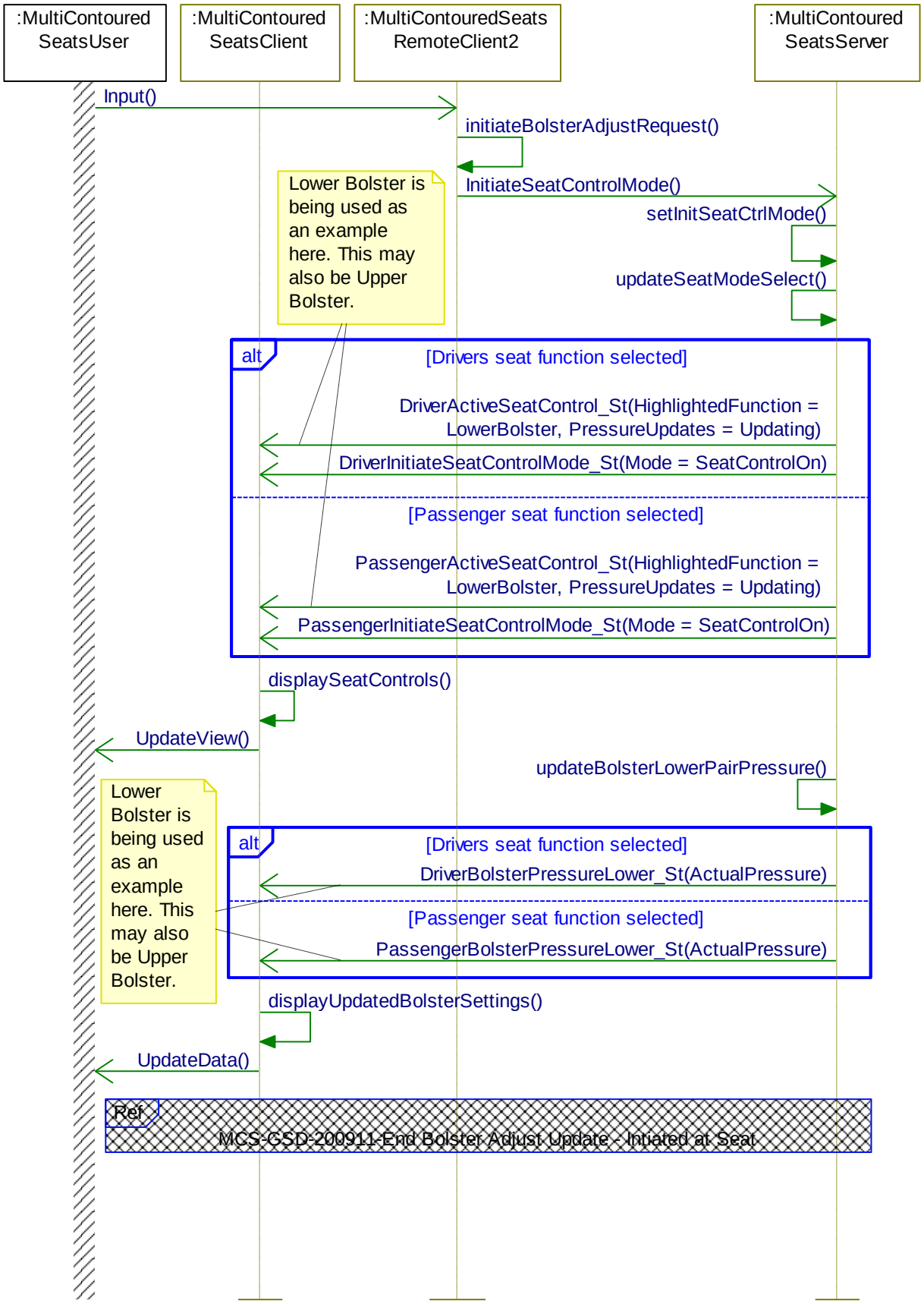
Pre-Condition

Powermode Conditions Met

Post-Condition

HMI indicates {change Actual Pressure Settings as Seat Bladder pressure changes}

Sequence Diagram



2.5.2.11 MCS-SD-REQ-021379/A-End Bolster Adjust Update - Intiated at Touchscreen (TcSE ROIN-200871-1)

Scenarios

Normal Usage

The user ends Bolster Adjust Mode update.

Constraints

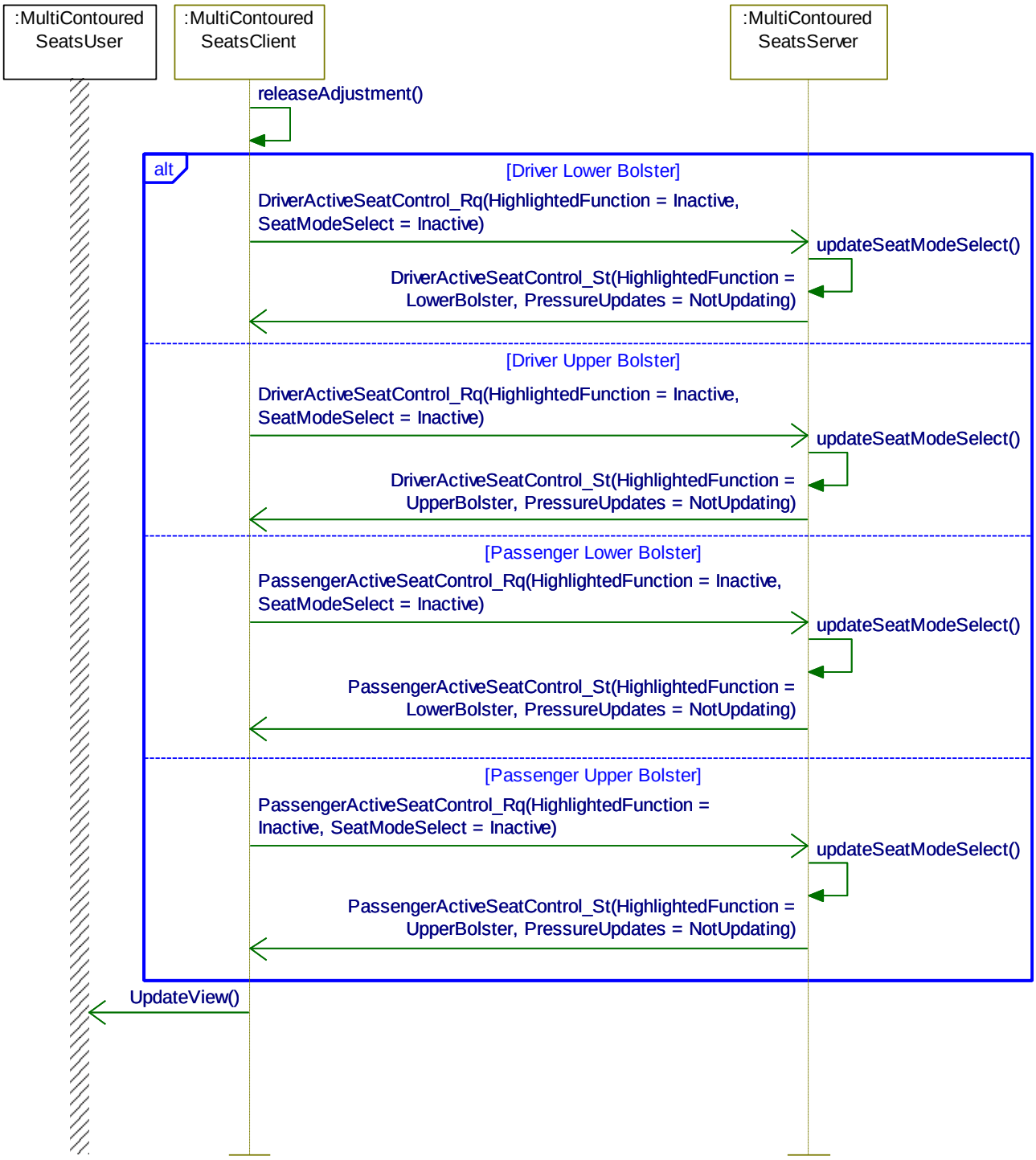
Pre-condition

Bolster Adjust is currently being updated by the user via the touchscreen HMI

Post-condition

Bolster Adjust is no longer being updated by the user via the touchscreen HMI

Sequence Diagram



2.5.2.12 MCS-SD-REQ-021380/A-End Bolster Adjust Update - Intiated at Seat (TcSE ROIN-200911-1)

Scenarios

Normal Usage

The user ends Bolster Adjust Mode update.

Constraints

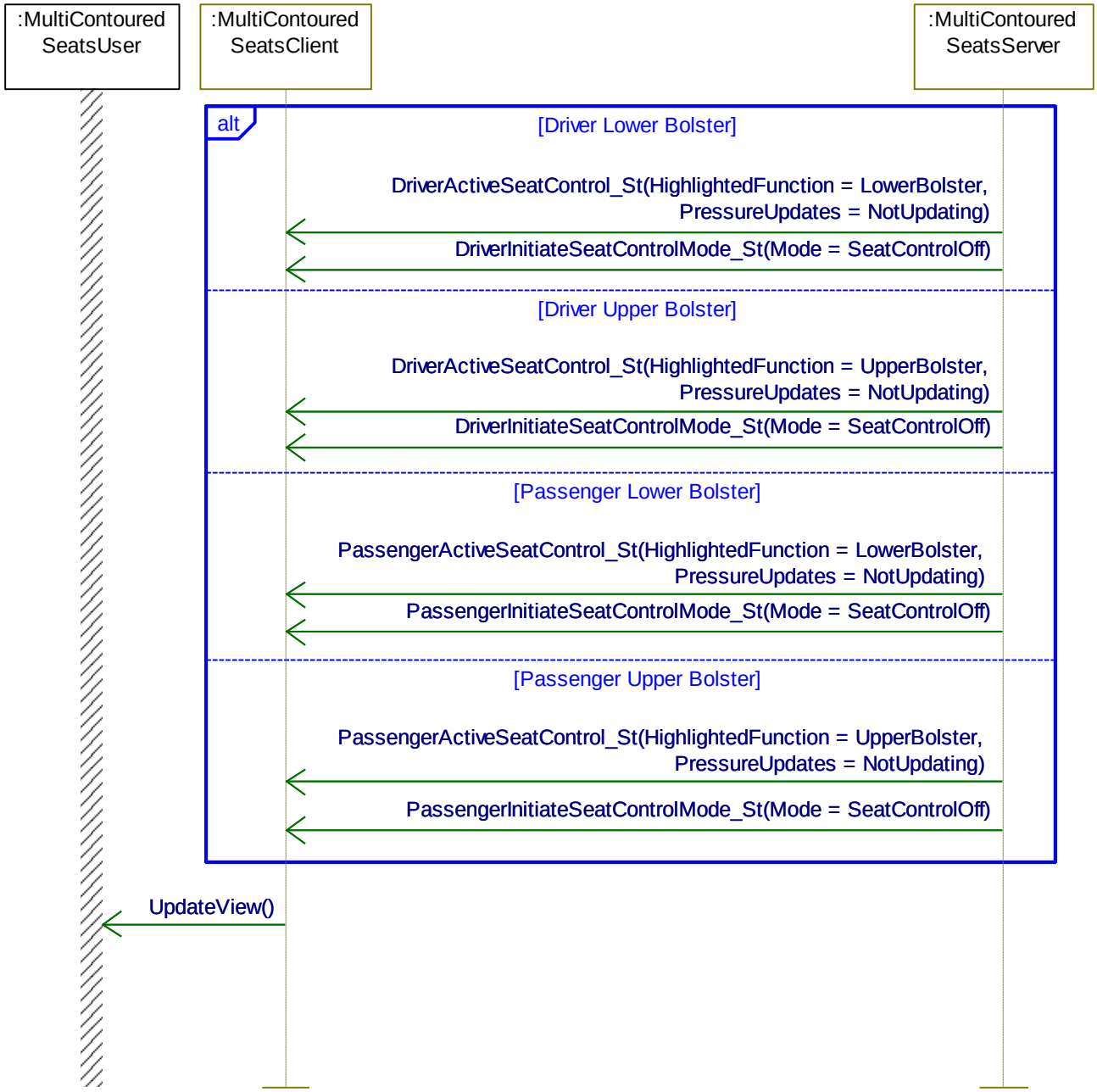
Pre-condition

Bolster Adjust is currently being updated by the user via Seat HMI

Post-condition

Bolster Adjust no longer being updated by the user via Seat HMI.

Sequence Diagram



3 Appendix: Reference Documents

Reference #	Document Title
1	Related HMI specification: H74a-Seat Controls Shortcut Key
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	