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Road vehicles — Automotive multimedia interface —

Part 2:
Use cases

Véhicules routiers — Interface multimédia pour l'automobile —

Partie 2: Cas d'utilisation

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Contents

Foreword

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ISO 22902-2 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

ISO 22902 consists of the following parts, under the general title *Road vehicles — Automotive multimedia interface*:

⎯ *Part 1: General technical overview*

⎯ *Part 2: Use cases*

⎯ *Part 3: System requirements*

⎯ *Part 4: Network protocol requirements for vehicle interface access*

⎯ *Part 5: Common message set*

⎯ *Part 6: Vehicle interface requirements*

⎯ *Part 7: Physical specification*

Road vehicles — Automotive multimedia interface —

Part 2:
Use cases

1   Scope

This part of the standard is a representative example of possible customer experiences in terms of in-vehicle multimedia functions and features. These functions and features will be enabled by implementations of foreseeable technologies.

This document covers representative use cases in categories of commerce (abbreviated as COMM), customer relationship management (CUST), emergency (EMER), entertainment (ENTE), fleet management (FLEE), guidance (GUID), home automation (HOME), information (INFO), messaging (MESS), mobile devices (MOBI), customer preferences (PREF), productivity (PROD), security (SECU), service and maintenance (SERV), user interface (USER), safety (SAFE), Bluetooth (BLUE), intelligent transportation systems (ITS) and combination use cases (COMB).

Each of the use case categories has at least one high-level use case, which describes customer experiences in a more generic fashion. A high-level use case is denoted by CASE x, where CASE is the four-letter abbreviation of the category and x is a natural number.

A use case category may have low-level use cases. A low-level use case has more information about specific ways of rendering functions and features than the corresponding high-level use case. A low-level use case is denoted by CASE x.x.

This document does not cover all possible use cases.

2 Use cases

The use cases begin on the following page.

2.1 COMB

2.1.1 COMB 1: Multimedia passenger van

Category:	Combination use cases
Description:	This use case shows concurrent use of AMI-C components, by six-occupants in a seven-seat passenger mini van. It combines multiple multimedia applications, including navigation, FM radio, video game, DVD player and hands-free phone operation.
Required devices:	• An on-board navigation system, providing a graphical map and audio turn-by-turn instructions • A DVD player • FM radio tuner • An AMI-C integrated video game player • An AMI-C integrated mobile phone, providing hands-free operation • Graphics display screen on the console and Video display in the seat backs • HMI (human machine interface) input device • Customer ports
Required services	
Prior conditions:	
Flow of events	
1)	Using the HMI (human machine interface) input device, the driver specifies the n address. The driver requests that the navigation system provide turn-by-turn information as the trip progresses. The navigation system updates a map on the Graphic display showing the current vehicle location.
2)	The driver then selects the FM radio option. The graphics display shows the FM radio. The driver chooses a station using pre-sets channels. The FM radio plays over the vehicle speakers. After a period of time, the navigation map display is returned to the graphics display.
3)	Passengers in the two middle seats decide to play a two-player video game. They use their Video display and local controls to select the game. Audio output is sent to their local headphone jacks. Their game controllers are plugged into nearby customer ports.
4)	A passenger in one of the two backseats decides to watch a DVD movie. The passenger selects the DVD player application by using the HMI input device. The passenger pushes PLAY and watches the movie. The audio output is automatically routed to her nearby headphone jack, based on pre-set preferences for the application and occupant location in the vehicle.

Category:	Combination use cases
5)	A passenger in the back seat decides to watch the DVD movie. The passenger plugs his headphones into a nearby headphone jack and selects the DVD player application using the HMI input device. The video screen indicates that a DVD is currently playing and provides the option to jointly watch it. The passenger selects the option to watch the DVD movie and the audio output is automatically routed to a nearby headphone jack, based on pre-set preferences for the application and occupant location in the vehicle.
6)	The navigation system notifies the driver as a turn is approaching. The vehicle system mutes the FM radio, and the navigation system announces the turn through the vehicle speakers. After the announcement, the FM radio volume is restored to the original level. This type of interaction occurs throughout the trip.
7)	A friend of one of the middle-seat passengers calls. The call is forwarded from the home to the vehicle (using standard call forwarding). The vehicle mutes the FM radio and announces that a phone call using the audio system. The vehicle uses the Graphics display to indicate any caller ID information associated with the incoming call.
8)	The front seat passenger uses the vehicle's hands-free phone, speakers, and microphone to answer the call. The front seat passenger determines that the call is for one of the middle seat passengers and pushes the HMI input device to route the phone call to the appropriate seat. The vehicle system resumes playing the FM radio audio on the vehicle speakers.
9)	The middle seat passenger receives an indication on his Video display that there is a phone call. He pauses the video game, and switches to the phone application screen. The phone call is routed to his headphones and back seat microphone. When the call is complete, he terminates the phone call and returns to playing the video game.
10)	The vehicle detects a low fuel level and turns on the low fuel indicator on the instrument panel
11)	The navigation system lists nearby service stations based on current vehicle position and user brand preferences on the Graphics display. The navigation system indicates on the instrument panel that the service station information is available.
12)	The driver selects one service station from the list. The navigation system adds the service station as a way-point in the trip route, recalculates the route, and provides turn-by-turn directions to the service station.
13)	The driver pulls the vehicle into the service station. The driver turns the engine off. This shuts the radio, video game and DVD operation. (Power down). The driver re-fuels the vehicle.

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Not for Resale

Category:	Combination use cases

14) The driver re-starts the vehicle and the following occurs:

- The FM radio starts playing as it did before the refueling stop (station, volume, speaker selection, etc.).

- The video display associated with the DVD player shows the movie paused at the point before the re-fueling stop. A back-seat passenger presses PLAY on the DVD player to resume watching the movie.

- The Video display associated with the video game player shows the screen paused at the point before the re-fueling stop. The middle-seat passenger resumes the game.

- The navigation system provides turn-by-turn audio directions from the service station to the final destination.

15) The DVD movie ends and a back seat passenger selects the navigation application to display the vehicle current location on their video display.

16) The other back seat passenger selects the video game application and watches the game played by the middle-seat passengers.

17) The driver arrives at the final destination, turns off the vehicle and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X		Navigation system

Support information:	

NOTE   Turn-by-turn information needs to be heard by the driver in time to make the turn. This may imply that its priority may increase as the turn comes closer.

2.1.2 COMB 1.1: CD audio, mobile phone and audio navigation interaction

Category:	Combination use cases
Description:	Driver makes a hands-free phone call while CD audio is playing. This use case demonstrates how audio resource conflicts may be resolved using different speakers in the vehicle.
Required devices:	• CD player • An AMI-C integrated mobile phone, providing hands-free operation
Required services	
Prior conditions:	• CD audio is playing over all vehicle speakers. • Navigation system has been set up to provide audio turn-by-turn directions.

Flow of events
1) This use case starts when the driver selects the hands-free mobile phone.
2) The vehicle system determines that the driver has selected the hands-free mobile phone and mutes the CD audio volume to the front driver side speaker.
3) The hands-free mobile phone output is routed to the front driver side speaker, with the phone output volume adjusted appropriately.
4) The driver proceeds to place a call using the hands-free phone.
5) While the phone call is in progress, the navigation system determines that it must notify the driver that a turn is approaching. The CD audio output in the front passenger speaker is muted, and the navigation system uses the front passenger speaker to announce the turn. Once the turn announcement is made, the CD audio output volume on the passenger front speaker is restored to the original level.
6) The driver finishes the hands-free call and de-selects the hands-free phone function.
7) The CD audio output volume to the driver front speaker is restored to the appropriate volume and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X		

Support information:	

NOTE   The CD output level may be manually adjusted during the hands-free call. At the end of the use case, the front driver speaker should be restored to the new volume level, not the original one.

2.1.3 COMB 1.2: CD and phone mixed audio

Category:	Combination use cases
Description:	This use case demonstrates mixing of audio sources over particular vehicle speakers.
Required devices:	An AMI-C integrated mobile phone, providing hands-free operation
Required services:	
Prior conditions:	CD audio is playing through vehicle speakers.

Flow of events
1) The use case starts when the driver selects the hands-free phone.
2) The vehicle system determines that the driver has selected the hands-free phone function and reduces the CD audio volume to the front driver side speaker.
3) The hands-free phone output is mixed with the CD audio output on the front driver side speaker. The phone output volume adjusts appropriately so that it can be heard over the CD audio background audio.
4) The driver places a call using the hands-free phone.
5) The driver finishes the hands-free call and de-selects the hands-free phone function.
6) The CD audio output volume to the driver front speaker is restored to the appropriate volume and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X		

Support information:	

2.1.4 COMB 1.3: Shared display example

Category:	Combination use cases
Description:	This use case provides an example of a shared display configuration displaying: • A background "layer" showing the navigation system map • Area showing navigation turn-by-turn display • Area showing current weather information • Area showing HVAC status and controls
Required devices:	Graphical display/touch tone screen
Required services	
Prior conditions:	Graphical display on console is a touch screen.

<table>
<tr><th colspan="2">Flow of events</th></tr>
<tr><td>1)</td><td>This use case starts when the driver selects the navigation application and programs in the destination and display options.</td></tr>
<tr><td>2)</td><td>The graphical display shows the navigation map with an insert indicating turn-by-turn directions.</td></tr>
<tr><td>3)</td><td>The driver selects the HVAC system application, which causes the HVAC display to overlay on a portion of the graphical display (on top of the navigation display).</td></tr>
<tr><td>4)</td><td>The driver uses the touch screen to adjust the vehicle climate control.</td></tr>
<tr><td>5)</td><td>While driving, a weather alert is received. The vehicle system displays the alert in an insert window on top of the navigation display.</td></tr>
<tr><td>6)</td><td>The driver touches the weather alert display on the touch screen and is given an option to see more information or to dismiss the alert.</td></tr>
<tr><td>7)</td><td>The driver selects "more information" and the weather alert displays on the entire display.</td></tr>
<tr><td>8)</td><td>The driver dismisses the weather alert and the display returns to its default position. (HVAC display over navigation) and this use case ends.</td></tr>
</table>

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X		

Support information:	

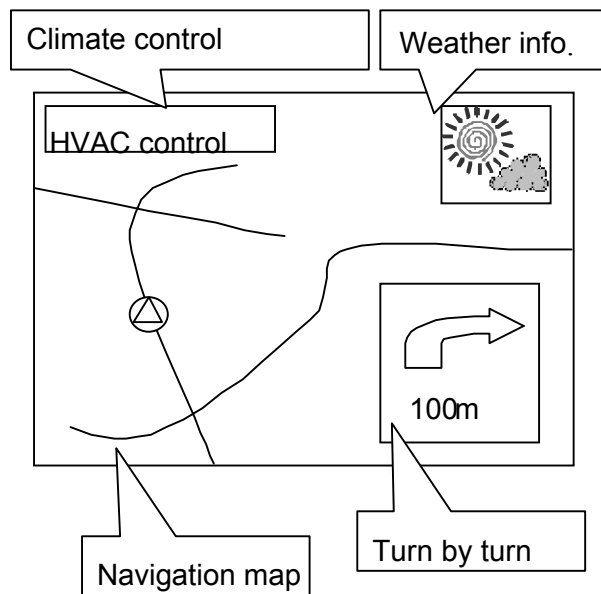NOTE   Weather alerts may be received in multiple ways: Internet connection, radio sub-carrier, pager, etc.

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EXAMPLE

Figure 1 — Display screen

2.2 COMM

2.2.1 COMM 1: Parking garage fee payment

Feature:	Parking Garage Fee Payment
Category:	Commerce
Description:	Vehicle interacts with an intelligent parking garage.
Required devices:	• Proximity wireless two-way or 1- way digital low-speed communications (< 30 m, <~ 100 kbps) • Bluetooth • VIN data • Date/time • Service provider
Required services:	
Prior conditions:	

Flow of events
1) This use case starts when the driver steers into the parking garage entrance.
2) The parking garage detects the vehicle presence, interrogates the vehicle for its type, and displays parking rates for that vehicle on a graphical display.
3) The driver enters the parking garage. The time of vehicle entry and the vehicle identity is noted
4) The driver parks the vehicle.
5) The driver returns to the vehicle, starts it and drives to parking garage exit.
6) The parking garage computes elapsed time and parking fee for vehicle and sends it to vehicle for payment authorization.
7) The driver views and authorizes payment through an HMI device.
8) The vehicle sends the payment to parking garage.
9) The parking garage sends a signed receipt to the vehicle.
10) The driver exits the parking garage and this use case ends.

Optional devices:	• Graphical display • Color video display • Alphanumeric display • Touch screen	• Keypad • Digital Cash • Mass storage		
Secondary scenarios:	• Parking meter • Various payment mechanisms (digital cash, SmartCard, credit card, debit account, conventional bill) • PG guides vehicle to best available parking space • Reserve parking space ahead of time			
Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X			Intelligent Parking Garage
Support information:					

2.2.1.1 COMM 1.1: Parking garage fee payment using Bluetooth technology

Category:	Commerce
Description:	Vehicle interacts with an intelligent parking garage using likely technology.
Required devices:	• Bluetooth wireless interface external to vehicle • Alphanumeric capable display • Non-volatile storage for credit card information
Required services	
Prior conditions:	

Flow of events
1) This use case starts when the driver steers into the parking garage entrance.
2) The parking garage system detects the vehicle's presence using a Bluetooth wireless interface.
3) Using the Bluetooth connection, the parking garage system interrogates vehicle for its type.
4) The parking garage system verifies if an appropriate size parking space is available. The parking garage computes the parking rates for that type of vehicle and sends them to the vehicle system using the wireless link.
5) The vehicle system displays parking rates on an alphanumeric capable display.
6) The parking garage notes the time of the vehicle entry and vehicle identity and sends parking instructions to the vehicle.
7) Vehicle system displays parking instructions; driver parks vehicle.
8) Driver returns to vehicle, starts it and drives to the exit of the parking garage.
9) The parking garage computes elapsed time and a parking fee for the vehicle and sends it to the vehicle for payment.
10) Driver chooses to pay by credit card and instructs vehicle to send credit card information to the parking garage.
11) The parking garage verifies credit and sends a signed receipt to the vehicle. Driver exits the parking garage and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
			X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X			Intelligent Parking Garage

Support Information	

NOTE   Protocol / technologies are needed for all payment technologies.

2.2.2   COMM 2: Toll road payment in transit

Category:	Commerce
Description:	Toll Road management system (TRMS) computes toll and retrieves payment as vehicle exits toll road exit.
Required devices:	Method of vehicle payment.
Required services	TRMS
Prior conditions:	• TRMS with sensors at all entrances and exits • Vehicle's toll road classification can be determined from its VIN.

Flow of events
1) This use case starts when the vehicle drives into the toll road entrance.
2) The Toll Road management system (TRMS) interrogates vehicle for VIN and stores point of entry data in its database.
3) Vehicle passes through a toll road exit. (Vehicle stops at exit booth.)
4) TRMS interrogates vehicle for VIN.
5) TRMS computes toll based on entry point data and vehicle type
6) TRMS sends request for payment of toll to vehicle system
7) Vehicle system sends toll payment to TRMS.
8) The vehicle exits the toll road and this use case ends.

Optional devices:	
Secondary scenarios:	• Various payment mechanisms (digital cash, SmartCard, credit card, debit account, conventional bill) • Calculation of best route to minimize tolls • TRMS cannot exchange toll information because of vehicle moving too fast

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X				Toll Road Mgmt. system (TRMS)

Support information:	

NOTE   A toll bridge system might have just one entrance and exit in each direction.

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2.2.2.1 COMM 2.1: Road toll payment while vehicle is moving using likely technology

Category:	Commerce
Description:	Toll Road management system (TRMS) computes toll and gets payment as vehicle exits toll road, using likely technology.
Required devices	• Standard toll road wireless communication system. • Vehicle gateway.
Required services	
Prior conditions:	Driver has an established vehicle account.

Flow of events	
1)	This use case starts as the vehicle enters the toll road entrance.
2)	The Toll Road management system (TRMS) detects the presence of the vehicle. It uses the standard toll road wireless communications medium to interrogate the vehicle for its VIN.
3)	The vehicle system receives the VIN inquiry and passes the request to the vehicle gateway. The vehicle system receives the inquiry and passes the requested information back to the TRMS.
4)	The TRMS stores the vehicle information and point of entry in its database.
5)	The vehicle travels until it reaches a toll road exit.
6)	TRMS interrogates the vehicle for its VIN as in steps 2 and 3.
7)	TRMS computes the toll, based on entry point and vehicle type.
8)	TRMS deducts the fee from the driver's established vehicle account.
9)	The vehicle exits the toll road and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
			X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X				Toll Road management system (TRMS)

Support information	

NOTE   The standard wireless toll road communication technology may not be suitable for this use case since it may involve higher data rates than it is designed to support. Also the toll road authorities may find it beneficial to use a suitable future standard technology, such as HomeRF, when it becomes available.

2.2.3 COMM 3: Interactive payment authorization for goods / services

Feature:	Interactive payment authorization for goods / services
Category:	Commerce
Description:	Vehicle occupant performs general retail transaction from vehicle.
Required devices:	
Required services	
Prior conditions	

Flow of events	
1)	This use case starts when the purchaser (occupant) enters the domain of an AMI-C compatible retail outlet (RO).
2)	The RO displays a menu of available goods / services.
3)	The purchaser selects items for purchase.
4)	The RO computes the bill and sends it to the vehicle for approval.
5)	The purchaser approves payment.
6)	The RO generates a signed digital receipt and sends it to the purchaser.
7)	The RO delivers the selected goods / services and this use case ends.

Secondary scenarios:	• Retail "domain" could be a web site or direct wireless connection to a business. • Goods / services could be gasoline, video rental, oil change, fast food, etc. • Various payment mechanisms (digital cash, SmartCard, credit card, debit account, conventional bill) can be used. • The retailer is presumably local, but could be located anywhere on the Internet. • The RO or vehicle can display the menu of choices. • The purchaser selects items via cursor input, touch screen or a voice recognition system. • Instead of prepayment, the RO can check for the ability to pay before delivery of goods / services or waive such checks if purchaser has already established good credit.
Optional devices:	

Actors:	Vehicle system	Occupant		Service provider	Other: (specify)
		Driver	Passenger		
	X	X			AMI-C compatible retail outlet (RO)
Support information:					

2.2.4 COMM 4: Food discovery and purchase

Category:	Commerce
Description:	A traveler asks for restaurant information for a particular area, chooses a restaurant and orders a meal.
Required devices:	• Wireless connection • Human machine interface
Required services:	Restaurant Locator Service
Prior conditions	

Flow of events
1) This use case starts when the traveler requests a restaurant locator service.
2) Vehicle connects to restaurant locator service.
3) The traveler provides the type of food, restaurant and time constraints to the restaurant locator service.
4) The vehicle provides location and travel information to the restaurant locator service.
5) The locator service provides an ordered list of restaurants.
6) The traveler selects a restaurant from the list.
7) The connection is switched from the restaurant locator service to the restaurant.
8) The traveler requests a food menu from the selected restaurant.
9) The restaurant provides a food menu.
10) The traveler selects items from the food menu and sends the order to the restaurant.
11) The restaurant provides a bill to the traveler.
12) The traveler pays for the meal electronically.
13) The wireless link is disconnected from the vehicle to the restaurant.
14) The traveler arrives at the restaurant, eats and this use case ends.

Secondary scenarios:	• The first scenario is an on-board location service with the food order processed through a direct connection from the vehicle to the restaurant. • The second scenario is a total wireless solution with the location service being provided by the restaurant location service. The food order is implemented with a second wireless link between the vehicle and the restaurant. • The third scenario it a total wireless solution, where the restaurant locator service handles all services, with the only wireless link being between the vehicle and the restaurant.
Optional devices:	

Actors:	Vehicle system	Occupant		Service provider	Other: (specify)
		Driver	**Passenger**		
	X		X	Restaurant Locator Service	Restaurant

Support information:	

NOTE   The restaurant locator service could be a commercial service provider, sponsored by a local organization such as a chamber of commerce or an Internet site. This use case can be generalized to include other products and services.

2.2.5   COMM 5: DVD movie rental at a service station

Feature:	DVD Movie Rental While Fueling
Category:	Commerce
Description:	While fueling, an occupant chooses and rents a digital video to view either in the vehicle or at home.
Required devices:	• Graphical display • Human machine interface (HMI) • On-board mass storage
Required services:	
Prior conditions:	Service station capable of high-speed communications link
Flow of events	

1)	This use case starts when the vehicle stops at a service station offering gasoline and digital movie rentals.
2)	The vehicle establishes a high-speed communications link with the service station.
3)	The service station obtains fuel payment and user authorization information.
4)	The occupant starts the fueling process and browses through the available digital movies, by browsing film clips or trailers.
5)	The occupant chooses a movie and approves payment through an HMI.
6)	The vehicle's on-board mass storage receives the digital movie download using a high-speed, short-range wireless link.
7)	Fueling and download finish.
8)	The occupant drives away and this use case ends.
9) Optional devices:	

Secondary scenarios:	• Various payment mechanisms (digital cash, SmartCard, credit card, debit account, conventional bill) can be used. • Other drive-up retail establishments, such as fast food restaurants, may have short-range wireless communications.

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X		High-speed short range wireless link rlectronic payment system vehicle mass dtorage
Support information:					

2.2.6 COMM 6: In-route hotel reservations (new)

Feature:	In-Route hotel reservation
Category:	Commerce
Description:	The occupant makes in-route hotel reservations while traveling to a destination and gets an updated route and map via an off board Navigation system. The route has already been entered into the navigation system and the vehicle has a location system to identify where the vehicle is in the planned route.
Required devices:	• Wireless connection device (to a telematics vehicle service provider) • Vehicle location system • HMI graphics display
Prior conditions:	• Subscription to a telematics service center • Off board Navigation & Guidance Service

Flow of events
1) While in route, the occupant requests the Hotel Reservation function from a list of services, as presented by the HMI.
2) The occupant selects the hotel reservation application from the list presented by the HMI.
3) The occupant uses the HMI and selects the hotel reservations that are needed 3 hours into the present route.
4) The in-vehicle AMI-C system sends a request to the off-board navigation service along with his current position to get an updated route to the hotel.
5) The telematics service center returns the route information and graphics map file to the vehicle's AMI-C system.
6) The AMI-C system displays the map on the vehicle's graphic display and provides route guidance information to the occupant.
7) The occupant arrives at the hotel, the session ends and the use case ends

Optional devices						
Availability:	**IGN OFF**	**IGN ACC**	**IGN ON**	**WAKE UP**	**MOVING**	**STATIONARY**
		x	x		x	x

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	**Passenger**		
	x	x		x	

Support information:	

2.2.7 COMM 7: Location based shopping /advertising (new)

Feature:	Location Based Shopping/Advertising
Category:	Commerce
Description:	The occupant identifies items of interest and enables acceptance of advertisements for those items in a given location.
Required devices:	• Voice, text or graphics display • Vehicle location system • HMI input device (speech recognition or keyboard).
Required services:	
Prior conditions:	• Wireless connection device (to telematics service center) • An existing "Shopper Service" on the in-vehicle system

Flow of events

1) While driving, the occupant selects the "Shopper Service" from a list of telematics services, through the HMI.
2) The occupant selects the item(s) of interest to the Shopper Service.
3) The occupant identifies to the Shopper Service the location (either fixed locations or proximity to vehicle) where to search for such items.
4) The AMI-C system via the wireless connection to the telematics service center sends the request to the shopper service and enables the downloading of resulting advertisements.
5) The telematics service center sends the resulting advertisements to the vehicles AMI-C system.
6) The AMI-C system presents the advertisements to the occupant via the HMI system.
7) Once the occupant has received sufficient advertisements, the occupant ends the Shopper Service and acceptance of advertisements is disabled.
8) The AMI-C system terminates the wireless connection to the telematics service center and the use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		x	x		x	x

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	x	x		x	

Support information:	

2.3 CUST

2.3.1 CUST 1: Acquisition of customer data

Category:	Customer Relationship management
Description:	Vehicle service provider collects the status of each vehicle and reports the results to each vehicle service provider (VSP). The results are useful for examining customer preference, etc.
Required devices:	• Mobile phone • Broadcast, or Digital video broadcast • Human machine interface (HMI)
Required services	• Vehicle service provider (VSP) • Application service provider (ASP)
Prior conditions:	

Flow of events
1) The use case begins when the application service provider desiring the customer data downloads an application through the vehicle service provider to the vehicle.
2) The application asks the occupant if he/she wants to participate in a cooperation of research.
3) The occupant accepts request via an HMI.
4) The application collects the desired data from the vehicles AMI-C system and/or the occupant.
5) The application indicates to the occupant that the data retrieval is complete.
6) The application is uninstalled from the vehicle and this use case ends.

Optional devices:	• Voice recognition • VIN data • Audio output (speaker) • Voice output			
Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other**
		Driver	**Passenger**		**(specify)**
	X	X	X	X	Application service provider
Support information:	• Vehicle data, location data, radio tuner, TV tuner, digital audio • Date / time				

NOTE 1   TV tuner, digital audio broadcast or digital audio (MP3, WAVE, RealAudio, QuickTime, AU, PCM) can be used in place of the radio tuner.

NOTE 2   This use case could be extended to cover trip data.

2.3.1.1 CUST 1.1: Acquisition of customer's listening preferences

Category:	Customer Relationship management
Description:	Service provider collects the radio station or music information from each vehicle simultaneously and reports the results to each vehicle service provider a (VSP). The results are useful for examining customer preferences and for marketing purposes.
Required devices:	• Mobile phone • Radio tuner • Switches / buttons • Buttons or touch screen • Graphical display or alphanumeric display
Required services:	• Vehicle service provider (VSP) • Internet service provider (ISP)
Prior conditions:	

Flow of events

1) This use case begins when the application service provider (ASP) requests customer data by downloading an application through the VSP to the vehicle.
2) The application asks the occupant if he/she wants to participate in a cooperation of research.
3) The occupant agrees to participate in a cooperation of research by selecting an option via an HMI.
4) The application collects the requested data from the vehicle system and/or occupant.
5) The downloaded application calculates the percentage of each radio station from all collected data and sends the result to the vehicle.
6) The results are available via an HMI device and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X			X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X		X	Application service provider

Support information:	Date / time

2.3.2 CUST 2: Receiving vehicle advertisement from dealer

Category:	Customer Relationship management
Description:	The dealer to the customers transmits commercial information and its access software, related to new or used car and service. The customer can get more information with the access software if he/she desires.
Required devices:	• Mobile phone • Switches/buttons or touch screen • Graphical display • Audio output (speaker) • Voice output
Required services:	• Vehicle service provider (VSP) • Internet service provider (ISP)
Prior conditions:	• Internet connection between the car and the Internet service provider (ISP) has been established. • (or) Direct dialing from the dealer to the customer's car has been established.

Flow of events
1) The occupant selects the option "dealer's Information" from a menu via HMI.
2) The car dealer receives the request and transmits a menu of options to the vehicle system.
3) The occupant receives the information and then selects an option from the "dealer information" menu via an HMI.
4) The vehicle system outputs (display or sound) the selected dealer information. (New or used car's information is displayed and/or sounded.)
5) The occupant selects additional option(s) from the "dealer information " menu for more detailed information
6) The selected information is outputted (displayed and sounded).
7) The use case ends when the occupant selects other menu functions, stop or off.

Optional devices:	• Voice recognition				
Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other (specify)**
		Driver	**Passenger**		
	X	X		X	
Support information:	VIN data				

2.3.3 CUST 3: Sharing information between vehicles

Category:	Customer relationship management
Description:	Common information and control functions (software) between vehicles.
Required devices:	• VSP Wireless Interface • HMI (switches, touch screen, input)
Required services:	• Application service provider (ASP) for sharing information • Temporary storage for shared data • Vehicle service provider (VSP)
Prior conditions:	Internet connection between the car and the Internet service provider (ISP) has been established.

Flow of events
1) This use case begins when the occupant selects the "shared information" application from a menu
2) The occupant chooses "select input" from a menu of options.
3) The occupant selects which information to share, such as the calendar, contacts, his / her voice, memo and / or specified location.
4) The occupant selects the destination vehicle from a menu of options and the data transfer method.
5) The occupant selects the information to be shared through an HMI menu.
6) The information from the originating vehicle is sent by the selected transfer method to the destination vehicle.
7) The pre-selected destination vehicle receives the data.
8) The pre-selected destination vehicle can use the information.
9) When the occupant selects another application from the menu or key off, this use case ends.

Optional devices:	• Flash Card • Internet (Is this optional) • Voice recognition • Annunciator (chime / bell / tone)			
Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other (specify)**
		Driver	**Passenger**		
	X	X	X	X	
Support information:	Date / time Location data				

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2.3.3.1   CUST 3.1: Shared information between vehicles using flash memory device

Category:	Customer relationship management
Description:	Sharing common information and control functions (software) are easily set among family's vehicles. The data and software are shared by using portable storage (for example: flash card) or a service provider. The family's security key code is also used.
Required devices:	• Mobile phone and service provider or flash card • Human machine interface (HMI) (switches, touch screen, input)
Required services:	• Application services provider (ASP) for sharing information • Temporary storage • Vehicle services provider (VSP)
Prior conditions:	Shared information application on source destinations vehicle.

Flow of events
1) This use case begins when the occupant selects the "shared information" application from a menu displayed on a graphical screen in source vehicle
2) The occupant inserts the flash memory device into the source vehicle.
3) The occupant selects "data file" from the menu to transfer to the memory device.
4) The occupant selects the destination vehicle through an HMI.
5) The occupant selects "go" from the menu.
6) The occupant removes the memory device from the source vehicle and places it in the destination vehicle.
7) The occupant selects "input/shared information" from the HMI menu on the destination vehicle.
8) The shared information application takes the flash memory device files and makes them available to the AMI-C system in the destination vehicle.
9) The occupant in the destination vehicle selects the new profile and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other
		Driver	**Passenger**		**(specify)**
		X	X		

Support information:	Date / time

2.3.4 CUST 4: Shared information between vehicles using VSP

Category:	Customer Relationship management
Description:	Personal data and software in the multimedia system installed in the old car is easily moved to that of the new car.
Required devices:	• Mobile phone and service provider • Switches / buttons or touch screen • Graphical display or alphanumeric display • Annunciator (chime / bell / tone)
Required services:	• Vehicle service provider (VSP) • Internet service provider (ISP) • VIN data
Prior conditions:	• Internet connection between the car and the Internet service provider (ISP) has been established. • Vehicle has already been set with key code for security of accessing the data in the vehicle.

Flow of events
1) This use case begins when the occupant selects the shared information application.
2) The shared information application is downloaded to the source vehicle.
3) The occupant selects the destination vehicle. (Data is sent to vehicle services provider (VSP) and the VSP retains data until the driver requests from new car.)
4) The shared information application is downloaded to the second vehicle or is queued for future download. (A graphic display or voice output informs the driver of the transmitting status of the data.)
5) The occupant selects the data to be shared through the human machine interface (HMI) menu. (The first section of this use case ends when the sent data is sent.)
6) The shared information is send to the subsequent download to vehicle #2.
7) The application on the first vehicle can terminate.
8) The application service provider (ASP) notifies the occupant in the second vehicle that a download of preferences are pending.
9) The occupant accepts the download.
10) The ASP downloads the application and the shared data.
11) The application terminates and this use case ends.

Optional devices:	• Mass storage • Voice recognition • Audio output (speaker) • Voice output

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X		X	

Support information:	

2.3.4.1   CUST 4.1: Transferring personal data / software to new vehicle using mobile phone and a service provider.

Category:	Customer relationship management
Description:	Personal data and function (software) in the multimedia system installed in the old car are moved to that of the new car by using a mobile phone and a service provider.
Required devices:	• Mobile phone • Switches / buttons or touch screen • Graphical display or alphanumeric display • Annunciator (Chime / Bell / Tone)
Required services	• Vehicle service provider (VSP) • Number service
Prior conditions:	

Flow of events
1) This use case begins when the driver selects "send data" from the menu via the human machine interface (HMI)
2) The driver inputs key code by using an HMI.
3) Data is sent to vehicle services provider (VSP) and the VSP retains data until the driver requests from new car.
4) Graphic display or voice output informs the driver of the "send data" status.
5) The first half of this use case ends when the "send data" process is finished.
6) The driver is located in new car and through an HMI selects the option "get data."
7) The driver inputs a key code by using an HMI.
8) The vehicle system informs the owner of the "get data" status by using a graphic display or voice output and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	*	*	

Support information:	

2.3.5 CUST 5: Distribution and gathering of questionnaires

Category:	Customer Relationship management
Description:	Many cars in a wide area cooperate with loaded same questionnaire functions (soft).
Required devices:	• Mobile phone • Switches / buttons or touch screen • Graphical display • Audio output (speaker) • Voice output
Required services:	• Vehicle service provider (VSP) • Internet • Number service • Vehicle data • Location data
Prior conditions:	

Flow of events
1) This use case begins when the vehicle services provider (VSP) sends a request to the occupant to complete a questionnaire for pre-defined amount of digital cash.
2) The occupant agrees to receive the questionnaires.
3) Vehicle system sends approval to the service provider.
4) The vehicle service provider sends the questionnaires (soft) by mobile.
5) Vehicle system downloads software containing the questionnaire and runs it.
6) The occupant inputs answers to the questionnaire.
7) The occupant sends the completed questionnaire via an HMI device to the vehicle services provider.
8) The VSP receives the completed questionnaire.
9) The VSP sends the digital cash to the occupant's account and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X	X	X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	

Support information:	Date / time

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2.3.6 CUST 6: Stolen vehicle tracking

Category:	Customer relationship management				
Description:	Cars in a wide area cooperate by using an application that displays and / or voices a warning and information about the stolen vehicle to the occupant.				
Required devices:	• Mobile phone • Switches / buttons or touch screen • Graphical display • Audio output (speaker) • Voice output • Annunciator (chime / bell / tone)				
Required services:	• Vehicle service provider • Internet service provider • VIN data • Vehicle data • Location data				
Prior conditions:					
Flow of events					
1) This use case begins when the vehicle service provider sends information about stolen vehicle via wireless technology.					
2) The vehicle system receives the information and displays it on an HMI.					
3) If an occupant finds the stolen vehicle, he/she selects the option, "Find."					
4) Vehicle system sends the location, time / date to the service provider by wireless technology and this use case ends.					
Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X	X	X	X

Actors:	Vehicle system	Occupant		Service provider	Other
		Driver	Passenger		(specify)
	X	X	X	X	

Support information:	Date / time

2.3.7 CUST 7: Accepting local advertising

Category:	Customer Relationship management
Description:	Cars in a specific area get the same commercial. The occupants can request more information and can go to the sponsoring shop by selecting "go." Selecting "go" prompts the vehicle system to automatically provide navigation.
Required devices:	• Mobile phone • Switches / buttons or touch screen • Graphical display • Audio output (speaker) • Voice output
Required services:	• Vehicle service provider • Internet • VIN data • Vehicle data • Location data
Prior conditions:	

Flow of events
1) This use case begins when the occupant selects the "Accept Commercial" option from the menu via the HMI
2) This information is sent to the vehicle service provider with the VIN number and location data.
3) The vehicle service provider searches for a restaurant or shop in the same area as the vehicle.
4) The vehicle service provider sends the corresponding restaurant or shop commercial to the vehicle.
5) The vehicle system displays the commercial on the graphic display or by voice through the audio system.
6) The occupant selects the "Go" option to select a restaurant or shop.
7) The vehicle service provider displays the route to the destination and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X	X	X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	

Support information:	Date / time

2.4 EMER

2.4.1 EMER 1: Automatic vehicle accident notification

Category:	Emergency
Description:	An automated vehicle accident management system goes into effect when an accident occurs.
Required devices:	• Long-range, two-way or 1-way, digital, low-speed communications (> 2km) • Voice recognition input • Audio input (microphone) • Audio output (speaker) • Switches / buttons • GPS
Required services:	• Vehicle air bag data • Location data • Service provider
Prior conditions:	• There is a method to keep track of the vehicle's coordinates while vehicle is in operation. • There is a vehicle accident management system and it is still operational after the accident.

Flow of events
1) This use case starts when the vehicle is involved in an accident.
2) The vehicle accident management system determines the severity of the accident.
3) The vehicle accident management system tries to communicate with the occupants of the vehicle.
4) If there is no response, vehicle accident management system establishes contact with an emergency center and relays the vehicle coordinates to the emergency center personnel.
5) Emergency center personnel process the information from the vehicle accident management system and call the proper authorities.
6) The emergency center personnel notify the vehicle system that help is coming.
7) Help is dispatched and this use case ends.

Optional devices:	• Medium range 1-way (broadcast) wireless (< 2 KM) • Mobile phone • VIN data • Vehicle data • Diagnostic data • Graphical display

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X		X	Vehicle accident management system
Support information:					

2.4.1.1   EMER 1.1: Automatic airbag deployment notification

Category:	Emergency
Description:	Vehicle is in involved in an accident. The airbag is deployed, resulting in an automated call to an emergency services call operator. The operator tries to establish verbal contact with the driver of vehicle and, if unsuccessful, places a call to the appropriate emergency service.
Required devices:	- Long range 2 way or 1 way digital low-speed communications (> 2km) - Voice recognition input - Audio input (microphone) - Audio output (speaker) - Switches/buttons - GPS
Required services:	- Vehicle air bag data - Location data - Service provider
Prior conditions:	

Flow of events	
1)	This use case begins when the vehicle is in involved in an accident.
2)	An airbag is deployed due to the force of the impact.
3)	The vehicle accident management system sends out a signal to the service provider, indicating the deployment of the airbag. The location of vehicle is also transmitted to the service provider. (Highest priority in system)
4)	The service provider operator tries to establish contact with the occupants of the vehicle.
5)	The operator receives no response from the vehicle's occupants. They contact the appropriate emergency services and relay the location of the vehicle.
6)	Operator ends link when background sounds indicate that emergency personnel have arrived and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X	X	X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X			Vehicle accident management system

Support information:	

2.4.2 EMER 2: Emergency call with vehicle diagnostics

Category:	Emergency
Description:	The driver notices a vehicle failure. An engine fault is determined by the automatic system and a call is made to the service provider to help resolve the problem. The vehicle owner needs to authenticate identity.
Required devices:	• Long-range, two-way or 1-way, digital, low-speed communications (> 2km) • Graphical display • Voice recognition input • Audio input (microphone) • Audio output (speaker) • Switches / buttons • Service provider • Diagnostic tool • GPS
Required services:	• Vehicle data • Diagnostic data • Location data
Prior conditions:	

Flow of events
1) This use case begins when the vehicle stalls while in operation.
2) Driver activates automatic diagnostic system by pressing a button.
3) Automatic diagnostic system attempts to diagnose vehicle fault.
4) Automatic diagnostic system determines fault location in engine control module and informs driver by displaying the appropriate icon on graphical display.
5) Driver establishes verbal link to service provider operator by pressing a button and speaking into microphone.
6) Driver authenticates identity to operator.
7) Driver informs operator of results from the diagnostic system.
8) Operator extracts diagnostic, type (description) and location information from the automatic diagnostic system.
9) Operator contacts closest service center of vehicle type, relays all relevant information and requests roadside service for vehicle.
10) Driver ends communication with operator by pressing button and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X	X	X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X		X	Automatic Diagnostic system

Support information:	

NOTE   Authentication is a security process.

2.4.3   EMER 3: User-initiated emergency call

Category:	Emergency
Description:	Provides occupants of vehicle with a quick way to report an emergency situation.
Required devices:	- Long-range, two-way or 1-way, digital, low-speed communications (> 2km) - Voice recognition input - Audio input (microphone) - Audio output (speaker) - Switches / buttons - GPS
Required services:	- Location data - Emergency center (service provider)
Prior conditions:	There is a method to keep track of vehicle coordinates.

<table>
<tr><td colspan="2" align="center">Flow of events</td></tr>
<tr><td>1)</td><td>This use case starts with the vehicle in operation.</td></tr>
<tr><td>2)</td><td>The driver encounters or witnesses an emergency situation.</td></tr>
<tr><td>3)</td><td>The driver activates the vehicle accident management system through an HMI, which establishes verbal link to service provider emergency center.</td></tr>
<tr><td>4)</td><td>The driver communicates the emergency to the center personnel, while the vehicle coordinates are relayed automatically to the emergency center.</td></tr>
<tr><td>5)</td><td>Emergency personnel take appropriate action (for example, call the police).</td></tr>
<tr><td>6)</td><td>The driver terminates the link and this use case ends.</td></tr>
</table>

Optional devices:	- Mobile phone - VIN data - Graphical display

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X		X	

Support Information:	

2.5 ENTE

2.5.1 ENTE 1: Receiving continuous feed Internet audio

Category:	Entertainment
Description:	Occupant selects Internet audio source and listens to programming on vehicle audio system. The audio content is played as it is received.
Required devices:	• Long-range, two-way or 1-way, digital, low-speed communications (> 2km) • Mobile phone • Steering wheel switches • Digital audio formats (MP3, WAVE, RealAudio, QuickTime, AU, PCM, etc.) • Audio system control, audio mixer control, audio equalizer (bass, treble)
Required services:	• Service provider • Internet
Prior conditions:	• Necessary Internet services are available to the occupant. • Audio system is installed in vehicle.

Flow of events
1) This use case begins when the occupant selects Internet audio through an HMI
2) The occupant selects an audio source from pre-configured options.
3) The vehicle audio system informs the occupant of any ramifications, such as mobile phone charges and loss of phone availability.
4) The vehicle system establishes the connection to the Internet audio source, and informs the user of progress.
5) The audio data is sent to the vehicle system.
6) The vehicle system receives the audio data. The audio data is then played on vehicle audio system.
7) The occupant adjusts volume of the vehicle audio system.
8) The occupant indicates he / she is done listening to the Internet audio by turning it off.
9) Once the radio stops playing and the connection to the Internet audio source is broken, this use case ends.

Optional devices:	• Voice output (text-to-speech converter) • Alphanumeric display • Headphone • Switches / buttons • Haptic dial				
Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other (specify)**
		Driver	**Passenger**		
	X	X	X	X	
Support information:					

NOTE 1   Occupant may have preferences as to whether incoming phone calls should take priority over Internet radio.

NOTE 2   This use case assumes that the audio content is (real time) played as it is received (with suitable buffering), so that the whole segment is not downloaded and then played.

NOTE 3   Authorization to use the Internet service would likely be needed (user ID, password) and must somehow be configured and stored.

2.5.1.1 ENTE 1.1: Continuous feed Internet audio using voice input

Category:	Entertainment low-level use case
Description:	Occupant selects Internet audio source from pre-set options using voice input. The audio is played using the vehicle audio system, allowing the user to adjust the volume and other audio properties using steering wheel controls. The audio content is played as it is received.
Required devices:	• Long-range wireless / mobile phone • Voice recognition input • Digital audio formats • Audio system control • Audio mixer control • Audio equalizer
Required services:	• Service provider (VSP) • Internet service provider (ISP)
Prior conditions:	• Necessary Internet services are available to the occupant. • An audio system is installed in the vehicle.

Flow of events
1) This use case starts when the occupant uses voice commands to select a pre-set Internet audio source.
2) The vehicle system acknowledges that the request is being processed.
3) The vehicle audio system informs the occupant of any ramifications, such as mobile phone charges and loss of phone availability.
4) The vehicle system establishes a connection to the Internet.
5) The vehicle system contacts the specified Internet service provider and requests the selected audio source.
6) The vehicle system decodes the audio stream and it is played on the vehicle audio system.
7) The occupant uses voice commands to adjust the volume of the playback.
8) The occupant uses a voice command to stop the audio selection.
9) The audio stops playing.
10) The vehicle system asks the user if the connection to the Internet should be terminated.
11) The user responds with a voice command that the connection should be dropped. (Connection is dropped if there is no user response in 30 seconds.)
12) The vehicle system drops the Internet connection and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	Vehicle Audio system

Support information:	

NOTE 1   Occupant may have preferences as to whether incoming phone calls should take priority over Internet radio.

NOTE 2   This use case assumes that the audio content is played as it is received (with suitable buffering), so that the whole segment is not downloaded then played.

NOTE 3   Different audio formats could be RealAudio, MP3, WAVE, QuickTime, AU, PCM, etc.

NOTE 4   Authorization to use the Internet service would likely be needed (user ID, password) and must somehow be configured and stored.

NOTE 5   If the connection to the Internet is lost, the system will inform the user and attempt to re-connect.

NOTE 6   If network congestion causes the audio to pause, the user will be notified of the progress in restoring the audio stream.

2.5.2 ENTE 2: Receiving continuous feed Internet video and audio

Category:	Entertainment high-level use case
Description:	Occupant selects an Internet video with audio source and views programming on the vehicle video and audio systems. The video / audio content is played as it is received.
Required devices:	• Long-range, two-way or 1-way, digital, low-speed communications (> 2km) • Mobile phone • Graphical display • Touch screen • Audio system control, audio mixer control, audio equalizer (bass, treble)
Required services:	• Service provider • Internet service provider (ISP) • Digital audio formats (MP3, WAVE, RealAudio, QuickTime, AU, PCM, etc.) • Digital video formats (MPEG, QuickTime, AVI, MOV, GIF, JPEG, PNG, BMP)
Prior conditions:	• Vehicle is equipped with Internet capable communications. • Internet communications have sufficient bandwidth. • Occupant has re-configured / set up any needed Internet services. • Vehicle is equipped for video display.

Flow of events
1) This use case starts when the occupant selects an Internet site through an HMI input device.
2) The vehicle system initiates a connection to the Internet indicating progress and successful connection (connection status).
3) The occupant interacts with the Internet service prompts and selects a video stream.
4) The vehicle services provider downloads the video stream to the vehicle system.
5) The video stream is displayed on an occupant-selected graphic display.
6) The occupant controls the video by pausing and resuming the playback.
7) The occupant adjusts the video (contrast, brightness) and audio (volume) settings.
8) The occupant stops the video playback.
9) The occupant interacts with the Internet service provider to select other video streams.
10) The occupant indicates that they are done using the Internet service by using an HMI input device.
11) The vehicle system terminates the connection to the Internet and this use case ends.

Optional devices:	Headphone				
Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
			X	X	
Support information:					

NOTE 1   Video formats include MPEG, RealVideo, QuickTime, AVI, MOV, etc.

NOTE 2   This use case assumes that the content is played as it is received (with suitable buffering), so that the whole segment is not downloaded then played.

NOTE 3   Multiple user interaction methods are possible (touch screen, voice, menus, etc.).

NOTE 4   It may be desirable to prohibit the display of this information on a screen visible to the driver while the vehicle is in motion.

2.5.2.1 ENTE 2.1: Continuous feed Internet audio and video using touch screen

Category:	Entertainment low-level use case
Description:	Occupant selects Internet video source from pre-set options using a touch screen for input and headphone jack for output. The video and audio are played using the vehicle audio and video systems, allowing the user to adjust audio and video properties (e.g. volume, brightness) using the touch screen. The video and audio content is played as it is received.
Required devices:	• Long-range wireless / mobile phone • Color video display • Voice recognition input • Audio system control • Touch screen • Audio mixer control • Graphical display • Audio equalizer • Storage
Required services:	• Digital video formats • Service provider • Internet • Digital audio formats
Prior conditions:	• Vehicle is equipped with Internet capable communications. • Internet communications have sufficient bandwidth. • Occupant has re-configured / set up any needed Internet services • Vehicle is equipped for video display.
Flow of events	

1) This use case starts when the occupant uses a touch screen to navigate and to start the Internet audio / video application.

2) The vehicle allocates screen space and displays a list of pre-set Internet video sources through a graphical display.

3) The occupant touches the desired video from the menu on the touch screen.

4) The vehicle informs the occupant of any ramifications, such as mobile phone charges, loss of phone availability, and potential impact on other applications by displaying a message on the graphical display.

5) The occupant touches the appropriate place on the touch screen to continue the audio / video.

6) The vehicle system establishes a connection to the Internet.

7) The vehicle system establishes a connection to the audio / video source and starts "the transfer."

8) The vehicle system determines the characteristics of the video stream and re-sizes / allocates screen space, as necessary, and sets up the appropriate format conversions, filters and buffering to display the video on the selected color video display.

9) The vehicle system determines the characteristics of the audio stream and sets up the appropriate format conversions, filters, and buffering to output the video to the selected output port (speakers, headphones, etc).

10) The vehicle plays the audio and video as it is downloaded from the Internet. A graphical display will show errors or buffering problems

11) The occupant touches the screen to display playback and other controls (e.g., volume, output port selection, etc.). The occupant is able to change settings, pause the play back, etc., using the touch screen.

12) The occupant uses the touch screen to stop the current playback and return to the video selection screen.

13) The touch screen displays the video selection information.

14) The occupant touches the screen in the appropriate place to stop viewing the Internet audio/ audio content.

15) The touch screen displays a message, asking if the occupant would like to terminate the Internet connection.

Category:	Entertainment low-level use case					
16) The occupant touches the screen in the appropriate place to indicate that the Internet connection should be terminated.						
17) The vehicle drops the Internet connection, de-allocates the screen space and this use case ends.						
Availability:	**IGN OFF**	**IGN ACC**	**IGN ON**	**WAKE UP**	**MOVING**	**STATIONARY**
		X	X		X	X
Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other (specify)**	
		Driver	**Passenger**			
	X			X		
Support information:						

NOTE 1   Video formats include MPEG, Real Video, QuickTime, AVI, MOV, etc.

NOTE 2   This use case assumes that the content is played as it is received (with suitable buffering), so that the whole segment is not downloaded then played.

NOTE 3   Touch screen would provide controls (e.g., pause, fast forward, etc.) as an overlay on the video display.

NOTE 4   Internet connection could be manually initiated before this application is available, or could be totally transparent to the user.

NOTE 5   The user interface should provide, at least, initial feedback to the occupant indicating that a button push, for example, has occurred.

NOTE 6   Audio feedback, similar to key-click, might be desirable.

2.5.2.2 ENTE 2.2: Audio streaming from a portable device to vehicle audio system

Feature:	**Bluetooth AV profiles implementation**				
Category:	Entertainment				
Description:	Audio of streaming from a portable device to vehicle audio system over Bluetooth link				
Required devices:	Embedded Bluetooth device Graphical display or (GUI)				
Required services:					
Prior conditions:					
Flow of events					
1)	This use case starts when the portable device is brought into range of the vehicle-embedded Bluetooth device.				
2)	The vehicle accesses the portable device and identifies it as an audio/video source that can be interfaced with the car multi-media system.				
3)	The car multi-media system displays the portable device display on its own Graphical User Interface.				
4)	The occupant selects the portable device as the source (or destination) of an audio/video channel and selects another embedded or portable device as the destination (or source) for the same audio/video channel.				
5)	The streaming audio/video then starts.				
6)	This use case ends when the user selects to terminate the source/destination channel that he set up, when the vehicle is turned off, or when the portable device is no longer accessible (i.e., the user has taken the device out of the car).				

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X			

Support information:					

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2.5.3 ENTE 3: Web browsing

Category:	Entertainment high-level use case			
Description:	Occupant browses the web from the vehicle.			
Required devices:	• Long-range, two-way or 1-way, digital, low-speed communications (> 2km) • Mobile phone • Color video display • Touch screen • Internet			
Required services:	Service provider			
Prior conditions:	Vehicle is equipped with Internet connectivity.			
Flow of events				
1)	This use case starts when the occupant selects the web browsing application.			
2)	The vehicle establishes a connection to the Internet.			
3)	The vehicle displays the web browser output on the color video display.			
4)	The user interacts with the Internet using an HMI input device to browse the web.			
5)	The user quits the web browser application.			
6)	The vehicle drops the Internet connection and this use case ends.			
Optional devices:	• Digital audio formats (MP3, WAVE, RealAudio, QuickTime, AU, PCM, etc.) • Digital video formats (MPEG, QuickTime, AVI, MOV, GIF, JPEG, PNG, BMP) • Audio system control, audio mixer control, audio equalizer (bass, treble)			
Actors:	Vehicle system	Occupant	Service provider	Other (specify)
		Driver	Passenger		
			X	X	
Support information:				

2.5.3.1 ENTE 3.1: Web browsing using a touch screen

Category:	Entertainment low-level use case
Description:	Occupant browses the web using a video display and touch screen for input.
Required devices:	• Long-range wireless / mobile phone • Graphical display • Color video display • Touch screen
Required services:	• Service provider • Internet
Prior conditions:	Vehicle is equipped with Internet connectivity.

Flow of events
1) This use case starts when the occupant selects the web browsing function using a touch screen.
2) The vehicle establishes a connection to the Internet and indicates the connection progress on the graphical display.
3) The vehicle allocates screen space for the web browser display and generates the occupant's home page.
4) The occupant uses the touch screen for mouse functionality (e.g., to scroll panes and tap to select hot links).
5) The occupant uses a "pop up" touch screen keyboard to enter text where necessary.
6) The occupant browses the web.
7) The occupant touches the close / quit button on the web browser.
8) The vehicle de-allocates the screen space, closes the connection to the Internet and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X		X	X	

Support information:	

NOTE   The occupant may use the touch screen to cancel or retry the connection, if necessary.

2.5.4   ENTE 4: Receiving broadcast analog / digital audio

Category:	Entertainment high-level use case
Description:	Occupant selects a broadcast digital / analog audio station and listens to programming on the car audio system.
Required devices:	• Graphical display • Audio output (speaker) • Switches / buttons • Radio tuner • Audio system control, audio mixer control, audio equalizer (bass, treble)
Required services:	
Prior conditions:	Vehicle is equipped with the appropriate tuner device to receive broadcast digital audio.
Flow of events	
1)	This use case starts when the occupant selects the "vehicle audio system" via an HMI.
2)	The occupant selects the desired channel/programming from the vehicle audio system menu by using an HMI.
3)	The audio output from the audio receiver is routed to the user selected output device.
4)	Occupant listens to the audio output and is able to control audio settings, such as volume, treble, base, balance, etc.
5)	Occupant changes the selected channel / programming.
6)	Occupant stops audio programming.
7)	The audio output stops and this use case ends.
Optional devices:	• Satellite Radio • Alphanumeric display • Headphone • Steering wheel • Switches • Haptic dial • Digital audio formats (MP3, WAVE, RealAudio, QuickTime, AU, PCM, etc.) • Digital audio broadcast, surround sound (stereo, Dolby® technologies, etc.)

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X		

Support information:	

NOTE 1   The audio receiver may be digital or audio.

NOTE 2   The user output device could be determined by user interaction, stored preferences, and / or occupant location in the vehicle.

NOTE 3   Specific supported devices and digital audio formats need to be identified.

NOTE 4   Interaction with a higher priority audio source (e.g., incoming mobile phone call) needs to be addressed.

2.5.4.1 ENTE 4.1: Receiving digital / analog audio with remote switches

Category:	Entertainment low-level use case
Description:	The tuner (possibly a vehicle manufacturer tuner) is controlled by a passenger in the vehicle using remote switches and an alphanumeric display. The audio is played through the vehicle speakers. Information is displayed on an alphanumeric display, and input is provided using switches / buttons.
Required devices:	• Alphanumeric display • Audio system control • Audio output (speaker) • Audio mixer control • Switches / buttons • Audio equalizer • Radio tuner
Required services:	
Prior conditions:	• Vehicle is equipped with the appropriate tuner device to receive broadcast digital audio. • Occupant is able to control tuner settings remotely.

Flow of events
1) This use case starts when a rear seat occupant uses buttons and an alphanumeric display to select radio functionality control.
2) The vehicle updates the alphanumeric display to indicate the radio specific functionality assigned to the associated buttons.
3) Occupant selects the desired channel using buttons for presets or a dial to manually scan channels. Buttons may also be provided to scan channels, etc.
4) Once the user selects a channel, the display and associated buttons allow for the adjustment of audio properties (volume, bass, treble etc.).
5) Occupant listens to the radio.
6) Occupant pushes the off button.
7) The vehicle stops the audio output, updates the display to indicate initial function selection buttons and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X		X	X	

Support information:					

NOTE 1   The audio receiver may be digital or audio. This may imply that AMI-C needs to support analog audio or that the audio is digitized before AMI-C is able to use it.

NOTE 2   This use case assumes that the alphanumeric display is positioned such that the display can be used to provide labels for the various buttons' functionality.

NOTE 3   The choice of features available in step 1 will depend on configuration and preferences.

2.5.5   ENTE 5: Audio media player (cassette, DVD, CD)

Category:	Entertainment high-level use case
Description:	Occupant plays audio media (cassette, CD, DVD) in the vehicle.
Required devices:	• Alphanumeric display • Audio output (speaker) • Switches / buttons • CD • Jukebox (CD, DVD) • Surround sound (stereo, Dolby® technologies)
Required services:	
Prior conditions:	• Vehicle has media player installed. • Audio system is installed in the vehicle.
Flow of events	

1)	This use case starts when the occupant selects media and inserts it into the media player.
2)	The occupant configures (adjust) the media player for playback options and output selection.
3)	The media player starts playing the media.
4)	The occupant can continuously interact with audio settings and controls, such as volume, balance, fade, etc.
5)	The occupant can control media player functions, such as play, stop, rewind, fast-forward, etc.
6)	When the media stops playing, this use case ends.

Optional devices:	• Jukebox media changer may be present. • Graphical display • Color video display • Touch screen • Headphone • Steering wheel switches • Haptic dial

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X		Media player

Support information:	

NOTE 1   Some occupants' ability to control the media and vehicle setting and controls can be constrained or overridden (e.g., a parent may limit the volume).

NOTE 2   The degree of interaction with the media player will depend on the specific media player.

NOTE 3   Step 2 should have default settings, possibly by user and / or location in vehicle.

NOTE 4   Media player may reside in the cockpit or other location (e.g. trunk for a jukebox).

NOTE 5   Audio formats (mono, stereo, surround sound) will determine bandwidth requirements.

NOTE 6   Output could be routed to headphones or vehicle speakers.

NOTE 7   Devices could include consumer HAVi devices.

NOTE 8   Output selection means speaker / head phone routing, stereo vs. surround sound, etc.

2.5.5.1   ENTE 5.1: Audio CD jukebox

Category:	Entertainment low-level use case
Description:	Occupant selects a CD from a CD jukebox and plays selected tracks using the vehicle speakers.
Required devices:	• Alphanumeric display • Audio output • Switches / buttons • CD • Jukebox • Audio system control • Audio mixer control • Audio equalizer
Required services:	
Prior conditions:	• Vehicle has media player installed. • Audio system is installed in the vehicle.

Flow of events
1)   This use case starts when the occupant uses buttons and an alphanumeric display to select CD player functionality.
2)   The vehicle updates the alphanumeric display to indicate the CD specific functionality assigned to the associated buttons. A button is present to allow the user to select a (different) CD from the jukebox.
3)   The occupant selects the jukebox functionality and the vehicle updates the display with CD selection information.
4)   The occupant selects a CD and presses the play button.
5)   The CD audio starts playing over the vehicle speakers.
6)   The occupant listens to the CD.
7)   The occupant pushes the off button.
8)   The vehicle stops the audio output, updates the display to indicate initial function selection buttons and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	

Support information:	

NOTE   Other media players have similar flows of events.

2.5.6 ENTE 6: Receiving broadcast analog / digital video

Category:	Entertainment high-level use case	
Description:	Receiving analog or digital video displayed in the vehicle.	
Required devices:	• Graphical display • Color video display • Headphone	• Switches / buttons • TV tuner • Audio system control, audio mixer control, audio equalizer (bass, treble)
Required services:		
Prior conditions:	• Vehicle is equipped with the appropriate tuner device to receive broadcast television. • Vehicle is equipped with necessary video distribution and displays.	
Flow of events		
1) This use case starts when the occupant selects the TV Tuner via an HMI.		
2) The occupant selects the desired channel/ programming from the TV Tuner screen via a graphical display.		
3) The video (and audio) output from the tuner is routed to the user selected output device.		
4) The occupant watches the video.		
5) The occupant controls audio characteristics, such as volume, treble, base, balance, etc.		
6) The occupant controls video characteristics, such as brightness, contrast, etc.		
7) The occupant changes the channel selection.		
8) The occupant shuts off the TV Tuner indicates that they are done with broadcast video.		
9) The video and audio outputs stop and this use case ends.		
Optional devices:	• Keypad • Audio output (speaker) • Haptic dial	• Digital audio broadcast (DAB) • Digital video broadcast (DVB)

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	**Passenger**		
			X		
Support information:					

NOTE 1   The user output device could be determined by user interaction, stored preferences, and / or occupant location in the vehicle.

NOTE 2   Analog receiver type (PAL, NTSC, SECAM) will vary, based on geography.

NOTE 3   HDTV (in US) will affect digital capabilities and bus bandwidth requirements.

NOTE 4   Some regions (e.g., UK) require the owner to purchase an annual television license. The "television tuner" in such regions might prompt for license details annually.

NOTE 5   Interaction with a higher priority audio / video source (e.g., incoming cell phone call) needs to be determined.

NOTE 6   Output may be routed to headphones or the car speakers.

NOTE 7   This functionality might be disallowed on a display that is visible to the driver, while the vehicle is moving.

2.5.6.1 ENTE 6.1: Receiving analog digital video with remote switches

Category:	Entertainment low-level use case
Description:	An occupant selects an analog or digital video broadcast (TV) for a rear seat display with headphones. Control is done using remote switches.
Required devices:	• Graphical display • Color video display • Headphone • Switches / buttons • TV tuner • Digital video tuner • Audio system control • Audio mixer • Audio equalizer
Required services:	
Prior conditions:	• Vehicle is equipped with the appropriate tuner device to receive broadcast television. • Vehicle is equipped with necessary video distribution and displays.

Flow of events
1) This use case starts when the occupant uses buttons and a color video / graphic display to select video control.
2) The vehicle system updates the graphic display indicating that the specific video receiver functionality is assigned to the associated buttons.
3) By using the buttons, the occupant specifies that the audio output be directed to the nearby headphone jack.
4) The occupant uses the buttons to select a broadcast video channel.
5) The vehicle system shows the selected channel on the graphical display.
6) The button / control labels are displayed as an overlay on the graphic display. After a short period of time, they are removed from the screen.
7) When the occupant presses any button the display screen returns with the original button/control labels as an overlay.
8) Occupant pushes the off button.
9) The vehicle stops the video and audio output, updates the display to indicate initial function selection buttons and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	

Support information:	

NOTE 1   Analog video input must be displayed on an AMI-C display. This would seem to imply that either: a) the analog signal is converted to digital for transmission and display within the vehicle, or b) the analog display can be connected to the tuner and directly display the analog signal.

NOTE 2   Different analog broadcast formats are possible: NTSC, PAL, SECAM, etc.

NOTE 3   Different digital video formats are possible DVB, MPEG, HDTV, etc.

• This use case assumes the buttons are arranged around the display, such that the display can be used to label button functionality.

2.5.7 ENTE 7: Video media player (DVD, VCR)

Category:	Entertainment high-level use case			
Description:	Occupant plays video media (DVD, VCR) in the vehicle.			
Required devices:	• HMI, switches / buttons • Media player			
Prior conditions:	• Vehicle has video media player installed • Audio system installed in the vehicle • Video system installed in the vehicle			
Flow of events				
1)	This use case starts when an occupant inserts media into the media player.			
2)	The occupant selects the vehicle's audio system to configure playback options and output selection.			
3)	The media player, plays selected item.			
4)	The occupant can continuously select media player settings and controls, such as volume, balance, fade, etc.			
5)	The occupant controls media player functions, such as play, stop, rewind, fast forward, etc.			
6)	Occupant controls display settings, such as contrast, brightness, etc.			
7)	When the media player stops playing, this use case ends.			
Optional devices:	• Graphical display • Color video display • Touch screen • Audio output (speaker) • Headphone • Digital video formats • Steering wheel switches • Haptic dial		• MPEG, QuickTime, AVI, MOV, GIF, JPEG, PNG, BMP, DVD • Surround sound (stereo, Dolby®, etc.) • Audio system control, audio mixer control, audio equalizer (bass, treble) • VCR • Jukebox (CD, DVD)	

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
			X		

Support information:					

NOTE 1   Some occupants' ability to control the media and vehicle setting and controls can be constrained or overridden (e.g., a parent may limit the volume).

NOTE 2   Degree of interaction with the media player will depend on the specific media player.

NOTE 3   Step 2 should have default settings, possibly by user and / or location in the vehicle.

NOTE 4   Media player may reside in the cockpit or other location (e.g. trunk for a jukebox).

NOTE 5   Audio and video formats (mono, stereo, surround sound, screen size) will determine bandwidth requirements.

NOTE 6   Output could be routed to headphones or vehicle speakers.

NOTE 7   Devices could include consumer HAVi devices.

2.5.7.1   ENTE 7.1: DVD player

Feature:	DVD Movie Player
Category:	Entertainment low-level use case
Description:	Multiple occupants watch a DVD movie in the vehicle. Each occupant has the ability to control the DVD playback (pause, fast forward, etc.) and individual audio level via a touch- tone screen.
Required devices:	• Graphical display • Color video display • Touch screen • Audio output • Headphone • Digital video formats • DVD audio system controls • Audio mixer • Audio equalizer
Required services:	
Prior conditions:	• Vehicle has video media player installed. • Audio system in the vehicle. • Video system in the vehicle. • DVD movie already in DVD player.

Flow of events
1) This use case starts when passenger 1 uses a touch screen to select the DVD player function.
2) The vehicle displays the DVD controls on the screen (e.g., play, pause, skip, etc.), to select audio output and level.
3) Passenger 1 uses the touch screen to specify the audio output be directed to a nearby headphone jack.
4) Passenger 1 selects PLAY from the touch screen to watch the DVD
5) Passenger 2 uses the touch screen to select the DVD Player function.
6) The vehicle displays the movie on the rear back graphic display.
7) Both passengers have the ability to control playback (e.g., pause, fast forward, skip, etc.)
8) Each passenger controls individual audio volumes.
9) Passenger 1 uses the touch screen to stop viewing the movie and return to main control screen. Passenger 2 continues to watch the video.
10) Passenger 2 uses the touch screen to stop viewing the movie and return to the main control screen.
11) The vehicle stops playing the movie and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X			X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X		X	X	

Support information:	

NOTE   The default audio output for a rear seat display should probably be a nearby headphone jack. Other stored video devices (VCR, stored MPG, etc.) would have a similar flow of events.

2.5.8 ENTE 8: Video game player

Category:	Entertainment high-level use case	
Description:	Vehicle occupants play video games using an AMI-C device.	
Required devices:	• Customer port • Color video display • Headphone • Game pad / controller • Audio system control	• Audio mixer control • Audio equalizer (bass, treble) • Line input (jack) • Video game. • HMI input device
Required services:		
Prior conditions:	• Game system is available in vehicle. • Video system is available in vehicle. • Audio system is available in vehicle.	
Flow of events		
1) This use case starts when a passenger selects the video game function.		
2) The passenger selects the desired video game.		
3) The video game output is routed to the user-selected color video display.		
4) The video game audio is routed to the user selected audio output.		
5) The passenger's video game control pad is connected / enabled.		
6) The passenger plays the video game.		
7) The passenger shuts the video game off through an HMI input device.		
8) The vehicle removes the video game output from the selected color video display and this use case ends.		
Optional devices:	VR Helmet	

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
			X		

Support information:	

NOTE 1   Control pad could be done through AMI-C or via hardwired connection to video game controller. This decision will probably be dependent on the decision to support standard (off the shelf) video game controllers or not.

NOTE 2   Game selection may involve selecting a game from some storage device, or physically plugging a game cartridge / CD into the video game console.

NOTE 3   Video and audio control – usual brightness, contrast, volume and balance are adjustable by the user.

NOTE 4   Specific video game technologies and / or vendors to be supported need to be identified.

NOTE 5   Video games need some type of access policy (shared / exclusive), possibly depending on the game.

2.5.8.1   ENTE 8.1: Embedded game console

Category:	Entertainment low-level use case
Description:	Back seat occupants use a fully AMI-C integrated video game console to play a two-player game. Each occupant can view the game with a graphical display. The audio is available via headphone jacks and the game controllers plug into the customer port, using a protocol adapter.
Required devices:	• Customer port • Audio system control • Graphical display • Audio mixer • Headphone • Audio equalizer • Game pad / controller • Video games • HMI input device • Protocol adapter
Required services:	
Prior conditions:	• Game system is available in vehicle. • Video system is available in vehicle. • Audio system is available in vehicle.

Flow of events
1) This use case starts when passenger 1 inserts the desired two-player video game / CD into the game console.
2) Passenger 1 and passenger 2 plug their game controllers into the customer port(s). (A protocol adapter may be required to plug-in the game controller)
3) Passenger 1 and passenger 2 select the video game application, using an HMI input device to navigate the on-screen menus.
4) Passenger 1 and Passenger 2 set the audio output to the nearby headphone jacks and adjust the volume.
5) Both passengers play the video game, with the video output being shown on each of their color video displays.
6) Passengers 1 and 2 use the HMI input device to quit playing the video game.
7) The vehicle system returns the color video displays back to initial control screen and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle System	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X		X	X	

Support information:	

NOTE 1   Game console is integrated such that the video and audio output are available to the AMI-C device. The video can be shown on displays in the vehicle and the audio can be routed to system speakers or (selected) headphone jacks.

NOTE 2   The game console is still accessible to the user for the purpose of changing the game cartridge/CD.

NOTE 3   This example assumes that the game controllers connect to the customer port. Other options are possible and may be more desirable.

2.5.8.2   ENTE 8.2: External game console

Category:	Entertainment low-level use case
Description:	Back seat passenger uses an external video game, using the AMI-C system to display the game and route audio to headphone jacks. The external video game provides video and audio input to the AMI-C system.
Required devices:	• Color video display • Audio mixer • Headphone • Audio equalizer • Game pad • Line input jack • Controller • Video games • Audio system control • HMI input device • Video game console
Required services:	
Prior conditions:	• Game system is available in vehicle. • Video system is available in vehicle. • Audio system is available in vehicle.

Flow of events
1) This use case starts when the occupant plugs an external video game console into the customer port. (A protocol adapter may be required to plug in the video game console.)
2) The occupant plugs the game controller directly into the game console.
3) The AMI-C system recognizes that a device has been plugged into the customer port and adds it to the AMI-C control menu.
4) The occupant selects the customer port video / audio source for display on the graphical display.
5) The occupant selects a nearby headphone jack for audio output.
6) Vehicle displays the game console video output on the selected color video display and routes the audio to the selected audio jack.
7) The occupant plays the video game.
8) The occupant unplugs the video game from the customer port.
9) The vehicle detects the removal of the device from the customer port and removes the device from the AMI-C control menu.
10) The vehicle displays the AMI-C control menu on the screen and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X		X	X	

Support information:	

NOTE 1   The game controllers in this use case connect directly to the game console.

NOTE 2   The game console provides video and stereo audio output to the AMI-C system.

NOTE 3   The connection from the video game console to the AMI-C system could be via the customer port, with the appropriate adapter or dedicated video and audio inputs.

NOTE 4   Power for the game console is an issue that is not covered here.

2.6 FLEE

2.6.1 FLEE 1: Submitting vehicle transit data

Category:	Fleet management – high-level use case
Description:	The vehicle system provides tracking logs, service information, vehicle use data, etc., to commercial fleets, car rentals and other commercial businesses purposes to the service facility upon request. The initiating request originates from one of two sources: 1) Regularly scheduled maintenance cycle events generated from within the vehicle, based on time or mileage. The return data can be delivered via a paging service or a mobile phone. The request is received as an ad hoc request from the service facility. This request can be received via a wireless mechanism (proximity device, short-range wireless, medium range wireless, IrDA, Bluetooth, etc.), where it is desired to request the data remotely. 2) Additionally, the request can originate from a direct-wired mechanism (via the customer port), where the vehicle is sitting in a service bay. 3) In both cases, it is assumed that the data will be returned via the same delivery system as the requesting event.
Required devices:	GPS
Required services:	• VIN data • Vehicle data • Diagnostic data • Location data • Service provider
Prior conditions:	A "vehicle status request" has been received by the vehicle. This request can originate from within the vehicle (i.e. the result of a regularly scheduled maintenance cycle) or as the result of an ad hoc request received by the vehicle.

Flow of events
1) This use case starts when the vehicle receives a request to provide vehicle status.
2) The vehicle and service facility authenticate themselves to each other.
3) Vehicle compiles the appropriate data.
4) Vehicle initiates a secure communication link to the service facility.
5) The data is transmitted to the service facility.
6) The connection link is terminated and this use case ends.

Optional devices:	Proximity wireless, long-range two-way wireless, medium-range two-way wireless, Short-range two-way wireless, two-way pager, Satellite two-way wireless, Bluetooth, customer port, IrDA, SMS Messaging, WAP.

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X			X	

Support information:	Date / time

NOTE   A number of different communication technologies could be used to implement these use cases, including paging, mobile phone, proximity device, short-range wireless, medium-range wireless, long-range wireless, satellite wireless, IrDA, Bluetooth or customer port.

2.6.1.1 FLEE 1.1: Providing mileage and time when prompted by an event

Feature:	Vehicle status information, as the result of a scheduled event, is provided to a service facility via a mobile phone.
Category:	Fleet management – low-level use case
Description:	The vehicle provides tracking logs, service information, vehicle use data, etc., to the service facility, based on an event generated from within the vehicle. The data is delivered from the vehicle to the service facility via a mobile phone. It is assumed that the vehicle-generated event is based on time or mileage.
Required devices:	• Mobile phone • GPS
Required services:	• VIN data • Vehicle data • Diagnostic data • Location data • Date / time • Service provider
Prior conditions:	A vehicle status request is received by the vehicle system.

Flow of events
1) This use case starts when an event is generated, by exceeding a preset mileage or time limit.
2) The vehicle initiates a secure connection to the service facility using the mobile phone.
3) The vehicle and service facility authenticate themselves to each other.
4) The vehicle sends logged data to the service facility.
5) The service facility may send information to the vehicle, indicating the next time the vehicle should send status information.
6) The vehicle drops the mobile phone connection and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X	X	X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X			X	

Support information:	

NOTE 1   The event that causes the connection to the service facility may occur as soon as the pre-set trigger (mileage / time) is reached or may be designed such that the vehicle waits until it is otherwise idle (e.g., at night).

NOTE 2   Other communication technologies could be used for connection to the service facility (e.g., proximity wireless, long-range two-way wireless, medium-range two-way wireless, short-range two-way wireless, two-way pager, satellite two-way wireless, Bluetooth, customer port, IrDA, SMS messaging, WAP, etc.).

2.6.1.2 FLEE 1.2: Providing the service log upon request

Category:	Fleet management – low-level use case
Description:	The vehicle provides tracking logs, service information, vehicle use data, etc., to the service facility, based on an ad hoc event received from a proximity device. This mechanism could be useful for obtaining service information while the vehicle sits in a service facility or as it enters or leaves its housing compound. It is assumed that the data is returned through the proximity device.
Required devices:	• Proximity wireless • Vehicle data • Diagnostic data • Location data • Date / time • GPS
Required services:	Service provider
Prior conditions:	

Flow of events
1) This use case starts when the vehicle enters a service facility and comes within range of a proximity wireless service.
2) The service facility is notified that the vehicle is now reachable, via the proximity device.
3) The service facility authenticates itself to the vehicle.
4) The service log and other data from the vehicle are transferred to the service facility.
5) The service facility informs the vehicle that the conversation is complete and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X	X	X	X

Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
	X			X	

Support information:	VIN data

NOTE 1   Other communication technologies could be used for connection to the service facility (e.g., long-range two-way wireless, medium-range two-way wireless, short-range two-way wireless, two-way pager, satellite two-way wireless, Bluetooth, customer port, IrDA, SMS messaging, WAP, RS232, etc.)

NOTE 2   Some types of vehicle status requests may have the capability to wake up the vehicle when it is in an off state.

2.6.1.3 FLEE 1.3: Submitting travel-related data via dedicated short range communication

Feature:	Acquisition of travel-related information via dedicated short-range communication (DSRC).
Category:	Fleet management
Description:	The vehicle's on-board unit sends the vehicle identification, traveling time from previous point, and tracking logs, etc., to a service center through the roadside unit (DSRC). The communication between the vehicle and the roadside unit is accomplished by using dedicated short-range communication or infrared beacons.
Required devices:	• On-Board Equipment (OBE) Audio output • Graphical display • Switches • General purpose processor (GPP) or special purpose processor (SPP)
Required services:	
Prior conditions:	• On-board equipment is equipped in the vehicle. • A roadside network infrastructure with roadside units is required.

Flow of events	
1)	This use case starts with the occupant drives into the communication zone.
2)	The on-board unit receives a signal from the roadside unit, and transmits the vehicle identification and / or other information to the service center through the roadside unit.
3)	The roadside unit returns the message as confirmation and includes the required data list.'
4)	The vehicle compiles the appropriate data and sends the data contents to the roadside unit.
5)	The roadside unit will send the received data to service center.
6)	When the transfer of all required data is finished or the communication is disconnected this use case ends.

Availability:	IGN OFF		IGN ACC		IGN ON	WAKE UP	MOVING	STATIONARY
					X		X	X

Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
	X	X			X

Support information:	

NOTE 1   Communication between the vehicle and the roadside unit is established via dedicated short-range communication or infrared beacons.

NOTE 2   The roadside unit might be facilitated along the road with appropriate distance between each other.

NOTE 3   Communication between the roadside unit and service center may be established with any communication media (i.e. satellite, fiber optics or cable).

2.6.2 FLEE 2: Installing fleet management software

Feature:	Service facility installs fleet management software on the vehicle.				
Category:	Fleet management – high-level use case				
Description:	A service provider loads the fleet management software onto the vehicle. The software load can either be an initial software load or an upgrade to an existing software package. Additionally, the connection between the vehicle and the fleet management environment can be either a physical connection or a remote / wireless connection.				
Required devices:	• Discovery protocol • Mass storage • Laptop mobile device				
Required services:	Service provider				
Prior conditions:	A two-way communication path has been established between the vehicle and the fleet management environment. This communication mechanism can be either a hard-wired physical connection between the vehicle and the fleet management environment or a remote / wireless connection.				
Flow of events					
1) This use case starts when the vehicle connects to a secure fleet management service provider.					
2) The fleet management service provider downloads and configures the appropriate software.					
3) The vehicle receives the fleet management software.					
4) The connection is terminated and this use case ends.					
Optional Devices:	• Bluetooth • Customer port				
Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X			X	
Support information:	Date/time				

NOTE   The low-level use cases for software installation and upgrade are covered in the "Service" use cases.

2.6.3 FLEE 3: Mission downloading

Feature:	A fleet operator plans and downloads mission data to the vehicle.
Category:	Fleet management – high-level use case
Description:	A fleet operator plans and downloads mission data to the vehicle. This mission data provides the driver of the vehicle with a set of schedules, objectives or assignments defining mission planning for the vehicle. The downloaded mission plan can cover a complete assignment period (i.e. initial load of the plan) or be an update or modification to an existing plan. Additionally, the connection between the vehicle and the fleet management environment can be either a physical connection or a remote / wireless connection.
Required devices:	• Discovery Protocol • Mass storage
Required services:	• Date / time • Service provider
Prior conditions:	• Fleet operator has assembled a mission plan and converted it to the appropriate format. • Vehicle must accept mission plan data in a key off mode. • A two-way communication path has been established between the vehicle and the fleet management environment. This communication mechanism can be either a hard-wired physical connection between the vehicle and the fleet management environment or a remote / wireless connection.
Flow of events
This use case starts when the fleet management service provider connects to the vehicle.
b) The fleet management service provider downloads the appropriate mission plan.
c) The connection is terminated and this use case ends.
Optional devices:	• Proximity wireless • Long-range two-way wireless • Medium-range two-way wireless • Short-range two-way wireless • Mobile phone • Satellite two-way wireless • Bluetooth • Customer port • IrDA • WAP

Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
	X			X	

Support information:	

NOTE 1   Different communication technologies can be used to upload the mission plan, including customer port, mobile phone, proximity device, short-range wireless, medium-range wireless, long-range wireless, satellite wireless, IrDA, Bluetooth, etc.

NOTE 2   Low-level use cases for this category are covered in the "Guidance" section.

2.6.4 FLEE 4: Mission reporting

Feature:	Mission status information is transmitted from the vehicle to the fleet management environment.
Category:	Fleet management – high-level use case
Description:	The vehicle provides status on each task within the mission plan upon request. The initiating request originates from one of the following sources: 1) Regularly scheduled event generated from within the vehicle, based on time or mileage. 2) The request is received as an ad hoc request from the service facility. 3) The driver of the vehicle initiates the request. In either case, the high-level flow of events is identical.
Required devices:	Mass storage
Required services:	• Vehicle data • Service provider
Prior conditions:	The vehicle receives a "mission status request." The vehicle can initiate this request by the vehicle itself, based on specific interval (i.e. time of day), an ad hoc request received by the vehicle or a request initiated by the driver.

Flow of events
This use case starts when the vehicle system generates an event or receives a request to provide mission status.
d) The vehicle system compiles the appropriate data.
e) The vehicle system initiates a secure communication path to the fleet management service provider.
f) The data is transmitted to the fleet management service provider
g) The connection is terminated and this use case ends.

Optional devices	• Proximity wireless • Long-range two-way wireless • Medium-range two-way wireless • Short-range two-way wireless • Mobile phone • Two-way pager • Satellite two-way wireless • Bluetooth • Customer port • IrDA • WAP • SMS messaging

Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	**Passenger**		
	X			X	

Support information:	• Date / time • VIN data

2.6.5 FLEE 5: Commercial route management

Feature:	Route guidance information is presented to the driver of a commercial vehicle to aid in the execution of the mission plan.			
Category:	Fleet management – high-level use case			
Description:	A commercial vehicle uses a software application to provide its drivers with route guidance. The application references the mission plan, optimizes the route, informs the driver of the next task to be executed, and sends supporting guidance information (directions) needed to carry out that task.			
Required devices:	• Vehicle data • Date / time • Graphical display • Mass storage • GPS			
Required services:				
Prior conditions:	The mission plan defining the activities for the task period is loaded and functioning within the vehicle.			
Flow of events				
1)	This use case starts with the driver interacting with the mission plan through a graphical user interface - HMI.			
2)	The mission plan displays the next task to be accomplished (i.e. next delivery, etc).			
3)	The driver interacts with the graphical user interface to request guidance information.			
4)	The guidance application identifies the vehicle's current position and computes the route. It is displayed on the graphical user interface (HMI).			
5)	The driver reviews the plan and uses it to reach the destination.			
6)	Steps 1 through 5 are repeated until the mission plan is complete then this use case ends.			
Optional devices:	• Voice output (text to speech) • Dedicated ISO display			
Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
	X	X			
Support information:				

NOTE   Low-level use cases are covered under the "Guidance" category and are not duplicated here. The following items are covered within the Guidance use cases:

— Visual Guidance;

— Visual and Voice Guidance;

— Alternate Route.

2.6.5.1 FLEE 5.1: Downloading data to support public transportation

Feature:	Display of public transport vehicle information via Dedicated Short-Range Communication (DSRC).
Category:	Fleet management
Description:	Public transportation vehicles (i.e. buses, taxi cabs) receive information, including revisions to operation instructions; traffic conditions en route, and warning messages (i.e. traffic accident, work zone, emergency vehicle passing by, etc.). Buses or similar public transportation can also send their location data to the service center so that their expected arrival times can be displayed on the information board in bus stops.
Required devices:	• On-Board Equipment (OBE), • Audio output • Graphical display • Switches • General purpose processor (GPP) or • Special purpose processor (SPP)
Required services:	
Prior conditions:	• A roadside network system infrastructure with roadside units is required. • On-Board Equipment is present in the vehicle.

Flow of events
1) This use case starts with the public transport vehicle driving into the communication zone.
2) The On-Board Unit (OBU) in the public transport vehicle receives a message signal from a roadside unit, and transmits the received message to the general-purpose processor (GPP).
3) The GPP processes the message and displays it on the graphical display.
4) Vehicle identification and / or other information will be transmitted to the service center through the OBU and the roadside unit. The roadside unit will send the received data to the service center.
5) The service center will calculate the best operation schedule and send to the public transport vehicle, as needed via the roadside unit.
6) When all required data transmission is finished or the communication is disconnected, this use case ends.

Optional devices:						
Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
			X		X	X
Actors:	Vehicle system	Occupant		Service Provider	Other (specify)	
		Driver	Passenger			
	X	X			OBU Roadside Unit	
Support information:						

NOTE 1   Optionally, based on the management data of the service center, a real time operation schedule will be shown on information display at each bus stop.

NOTE 2   The communication between the vehicle and the roadside unit is established via DSRC.

NOTE 3   The roadside unit might be facilitated along the road with appropriate distance to each other.

NOTE 4   The communication between the roadside unit and service center, which is gathering needed information to be delivered, is established possibly with any communication media (i.e. satellites, fiber optics or wired).

2.7 GUID

2.7.1 GUID 1: On-board navigation system

Category:	Guidance
Description:	System offers navigation guidance service, based on on-board map data through a display unit and / or voice. The service provides vehicle location information, point of interest (POI) information, and / or route to destination.
Required devices:	• Audio output and / or display database (CD-ROM / DVD-ROM / HD). • Microphone (for voice recognition) and / or switches • General purpose processor (GPP) or special purpose processor (SPP) • Location system • Navigation database
Required services:	
Prior conditions:	The vehicle is equipped with a navigation system. The navigation guidance service has not been selected.

Flow of events
1) This use case begins when the driver selects the navigation function via an HMI.
2) The driver selects from a list of options on a menu and enters a destination.
3) The navigation system processes the commands and data and calculates the desired map position and / or route.
4) The information (map position) appears on the graphical display or, optionally, as a voice response and this use case ends.

Optional devices:	• Gyro / vehicle speed sensor. • GPS / DGPS position sensor. • Sound processor (text-to-speech / PCM sound). • Graphical display				
Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other (specify)**
		Driver	**Passenger**		
	X	X	X		Navigation system
Support information:					

NOTE 1   The positioning system is not mandatory for the navigation system if the customer requests the next direction after passing each turn.

NOTE 2   New information might occur as each waypoint is achieved.

NOTE 3   A missed turn might cause recalculation of route and display an update.

2.7.1.1 GUID 1.1: Displaying mavigation via on-board system

Category:	Guidance
Description:	The vehicle system offers navigation guidance service, based on on-board map data through one or more display units. Services might include vehicle location information and / or route to destination, verbal guidance, map display; map with the vehicle location icon and route; route planning (route search function); turn-by-turn route guidance; and, dynamic route correction caused by a missed turn en route to the destination.
Required devices	• On-board navigation system. • User input devices, such as keyboard / mouse / joy stick / pointing device. • A multi-function graphical display unit or simple display for turn-by-turn display • Map database (CD-ROM / DVD-ROM / HD). • Vehicle positioning system (dead reckoning). • GPS / DGPS / gyro / vehicle speed sensor.
Required services;	
Prior conditions:	• The vehicle is equipped with a navigation system • A navigation service has not been selected.

<table>
<tr><th colspan="2">Flow of events</th></tr>
<tr><td>1)</td><td>This use case begins when the driver selects the navigation application.</td></tr>
<tr><td>2)</td><td>The driver selects from a list of options from a menu and enters a destination, as needed.</td></tr>
<tr><td>3)</td><td>The navigation system determines current vehicle location from the available information. (Usually, the navigation system uses GPS data, gyro, and speed sensor signal to decide the location precisely.)</td></tr>
<tr><td>4)</td><td>The navigation system processes the request and data then calculates the desired map position and / or route.</td></tr>
<tr><td>5)</td><td>A response is indicated on the graphic display unit(s). The map is always displayed with the vehicle location icon, unless the customer selects other functions that use the graphic display</td></tr>
<tr><td>6)</td><td>Turn information will be displayed (possibly including the distance to turn, as needed) and this use case ends.</td></tr>
</table>

Optional devices:	Conversational voice input support.					
Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		Navigation system
	X	X	X		

Support information	

NOTE 1   Possible display type: Map display on graphical display or turn-by-turn display on simple indicators (possibly including the distance).

NOTE 2   Turn guidance, via display, might occur on the map display or exclusive display.

2.7.1.2   GUID 1.2: Audible navigation via on-board system

Feature:	Display navigation system, based on on-board map data.					
Category:	Guidance					
Description:	System offers navigation guidance service, based on on-board map data through voice interface. Service may include vehicle location information and / or route to destination, all route explanation, distance to next turn, road name, and intersection name, in addition to turn-by-turn route guidance.					
Required devices:	• On-board navigation system. • User input devices, such as keyboard / mouse / joy stick /pointing device. • Vehicle positioning system (dead reckoning). • Synthesized voice (TTS) output or PCM audio, via vehicle audio server. • GPS / gyro / vehicle speed sensor.					
Required services:						
Prior conditions:	• The vehicle is equipped with an AMI-C navigation system • A navigation service has not been selected					
Flow of events						
1) This use case begins when the driver selects the navigation application.						
2) The driver selects an option from a menu and enters a destination, as needed.						
3) The navigation system determines current vehicle location from the available GPS / DGPS information or customer input.						
4) The navigation system processes user selection for the destination and calculates the route to the destination.						
5) The navigation system responds, as needed, prior to the turn (this might interrupt other audio functions such as the CD playing or a broadcast audio source).						
6) If the system doesn't have the location finding function, the customer will input when the vehicle passed the indicated turn to get the next direction and this use case ends.						
Optional devices:	Conversational voice input support.					
Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
	X	X	X		Navigation system

Support information	

NOTE 1   Audio interruption might affect the entire car audio system or just part of the system (e.g., only the front speakers will be occupied by navigation and the rear speakers will be used continuously for the other audio source).

NOTE 2   The customer may need to input the vehicle location into a simple type of navigation, which doesn't include the navigation application, to find out the vehicle location.

2.7.1.3 GUID 1.3: Copying navigation data to and from storage media

Category:	Guidance
Description:	The vehicle navigation system offers navigation guidance service, based on on-board map data through display and/or voice. Services might include vehicle location information and / or route to destination. In order to save the destination data or driving plan, a memory device is used for saving and loading. This enables the navigation service to be used on a non-personal car.
Required devices:	• On-board navigation system. • User input devices, such as keyboard / mouse / joy stick / pointing device. • A multi-function graphical display unit or simple display for turn-by-turn display • Map database (CD-ROM / DVD-ROM / HD). • Vehicle positioning system (dead reckoning). • GPS / DGPS / gyro / vehicle speed sensor. • Data storage media and media drive
Required services:	
Prior conditions:	A navigation service has not been selected.

Flow of events	
1)	This use case begins when the driver selects the navigation application.
2)	The driver selects from a list of options on a menu and enters a destination, as needed.
3)	The navigation application determines current vehicle location from the available information. (Usually, the navigation system uses GPS data, gyro, and speed sensor signal to decide the location precisely.)
4)	The navigation system processes the request and data then calculates the desired map position and / or route.

Saving	
1)	The driver inserts data storage media to a suitable socket.
2)	The driver selects the function "Save data to memory" via an HMI.
3)	A sequence of commands and menu choices for setup are displayed in detail. The driver selects the functions, "Storage media" and " Saving data" from the menu.
4)	Driver selects the "Save" command from the menu.
5)	The saved data is transferred to the storage media.
6)	The confirmation display or message appears on a graphical display.
7)	Driver ejects the media from the storage media.

Loading	
1)	The driver enters a different family vehicle.
2)	The driver inserts data storage media to suitable socket.
3)	The driver selects the function "Load data from the memory."
4)	A sequence of commands and menu choices for setup is displayed in detail. The driver selects "Storage media" and then "Saving data."
5)	The driver selects the "Load" command from the menu.

Category:	Guidance					
6) Selected data is transferred from the storage media to the vehicle system.						
7) The confirmation display or message appears.						
8) The driver ejects the media and this use case ends.						
Availability:	**IGN OFF**	**IGN ACC**	**IGN ON**	**WAKE UP**	**MOVING**	**STATIONARY**
		X	X		X	X
Actors:	**Vehicle system**	**Occupant**		**Service Provider**	**Other (specify)**	
		Driver	**Passenger**			
	X	X	X			
Support information:						

NOTE   Data storage media: PC card, HD, PDA, laptop.

2.7.2 GUID 2: Off-board navigation system

Feature:	Navigation from remote provider
Category:	Guidance
Description:	Navigation guidance service derived from an off-board database. An AMI-C system receives route calculation results from an outside service. The service is received through (HMI) display and / or voice. The service might be a map display and / or route to destination.
Required devices:	• Receiver / transmitter / data communication (modem) • Audio output and / or display • Microphone (for voice recognition) and / or switches • General purpose processor) or special purpose processor • Location system
Required services:	Service provider
Prior conditions:	The vehicle is equipped with an AMI-C navigation system. A navigation service has not been selected.

Flow of events
1) This use case begins when the driver selects the navigation application.
2) The AMI-C vehicle system establishes a connection to the service provider.
3) The driver selects the menu in detail (sub menu) and) enters a destination.
4) The vehicle AMI-C vehicle system passes a sequence of commands to the service provider.
5) The service provider processes commands and calculates desired information, then sends them to the AMI-C vehicle system.
6) The response is indicated on a display or, optionally, as a voice response and this use case ends.

Optional devices:		• Gyro / vehicle speed sensor • GPS /position sensor • Sound processor; text-to-speech / PCM sound		
Actors:	**Vehicle system**	**Occupant**		**Service Provider**	**Other (specify)**
		Driver	**Passenger**		
	X	X	X	X	
Support information:					

NOTE 1   A positioning system is not mandatory for the navigation system, if the customer manually requests the next direction after passing each turn.

NOTE 2   New information might occur as each waypoint is achieved.

NOTE 3   A missed turn might causes recalculation of route and a display update.

NOTE 4   Does the system need a Gyro / vehicle speed sensor

NOTE 5   There is a use case that only considers web browser type capability, similar to the route planning done on some current Internet sites. The user enters starting and ending addresses and gets a turn-by-turn list from the service. The vehicle could present the next expected turn and allow the user to indicate when they have completed that turn and are ready for the next one.

2.7.2.1 GUID 2.1: Navigation from remote provider

Feature:	Navigation from remote provider
Category:	Guidance
Description:	Navigation guidance service derived from off-board database. AMI-C system receives route calculation result from outside service. The service is derived through display and / or voice. The service might be a map display and / or route to destination.
Required/ Optional devices:	• Receiver / transmitter / data communication (modem) • Audio output and / or display • Microphone (for voice recognition) and / or switches • General purpose processor or special purpose processor • Gyro / vehicle speed sensor • GPS / DGPS position sensor • Sound processor; text-to-speech / PCM sound
Prior conditions:	• The vehicle is equipped with an AMI-C navigation system. • A navigation service has not been selected.

Flow of events
This use case begins when the driver selects the navigation application via the HMI.
The driver selects options from a menu of choices to setup and enter destination, as needed.
The navigation application determines current vehicle location from the available GPS / information.
The vehicle AMI-C system establishes the connection to the service provider.
The vehicle AMI-C system sends the destination information to service provider.
The service provider processes commands and calculates desired information, then sends the results to the vehicle AMI-C system.
A response is indicated on the graphical display units.
The graphical display shows the turn, possibly including the distance to turn, and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	

Support information:	

2.7.3 GUID 3: Navigation with communication system

Category:	Guidance
Description:	The vehicle's AMI-C system offers navigation service, based on on-board data with real time information (i.e. traffic accident, newly opened road, traffic jam, parking, and so on) provided by an outside service provider. The service provider may offer these services: • Assistance in deciding the destination (i.e. restaurant list including location data). • Download service (i.e. owner selected the destination at home using PC and sends data to vehicle through wireless communication). • Service may be derived through display and / or voice and might be a map display and / or route to destination.
Required devices:	• Receiver / transmitter / data communication (modem) • Audio output and / or display • Microphone (for voice recognition) and / or switches • General purpose processor or special purpose processor
Required services:	Service provider
Prior conditions:	• The vehicle is equipped with an AMI-C navigation system. • A navigation service has not been selected.

Flow of events
1) This use case begins when the driver selects the navigation application via the HMI.
2) The vehicle AMI-C system establishes the connection to the service provider.
3) The driver selects the menu in detail (sub menu), and the vehicle system passes a sequence of commands to the service provider.
4) The service provider processes the commands and sends the required data to the vehicle AMI-C system.
5) The vehicle AMI-C system creates an updated map and / or calculates the road route, incorporating downloaded information.
6) The updated results are indicated on displays or optionally as a voice response and this use case ends

Optional devices:	• Gyro / vehicle speed sensor • GPS /position sensor • Sound processor; text-to-speech / PCM sound

Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	
Support information:					

NOTE 1 The positioning system is not mandatory for the navigation system if the customer requests the next direction after passing each turn.

NOTE 2 New information might occur as each waypoint is achieved.

NOTE 3 A missed turn might causes recalculation / update of the route and display.

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2.7.3.1   GUID 3.1: Navigation with destination and traffic information

Category:	Guidance
Description:	The vehicle's AMI-C system offers navigation service, based on on-board data with real time information (i.e. traffic accident, newly opened road, traffic jam, parking, and so on) provided by an outside service provider. The service provider may offer these services: • Assistance in deciding the destination (i.e. restaurant list including location data) • Download service (i.e. owner selected the destination at home using PC and sent data to vehicle through wireless communication. Service may be derived through display and / or voice and might be a map display and / or route to destination.
Required devices:	• Receiver / transmitter / data communication (modem) • Audio output and / or display • Microphone (for voice recognition) and / or switches • General purpose processor or special purpose processor • Gyro / vehicle speed sensor • GPS / DGPS position sensor • Sound processor; text-to-speech / PCM sound
Required services:	Service provider
Prior conditions:	• The vehicle is equipped with an AMI-C navigation system • A navigation service has not been selected

Flow of events
This use case begins when the driver selects the navigation application.
1)   The vehicle system establishes a connection to the service provider.
2)   Because there is an accident, the driver requests a new route from the service provider. A sequence of commands and menu choices is displayed for setup and to decide on the data being requested from the service provider.
3)   The service provider sends alternate routes to the driver.
4)   The driver selects the newly opened road for route guidance via an HMI.
5)   The vehicle's AMI-C system sends related data, current position, destination, and database version to the service provider.
6)   The service provider calculates the route for the newly opened road and sends the data to vehicle AMI-C system.
7)   The vehicle AMI-C system receives the data from the service provider and it is displayed on a graphical display.
8)   The graphical display shows the response. The response is indicated on the display units.
9)   The vehicle AMI-C system combines the owned data and the received data, calculates the route to the destination and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	

Support information:	

2.7.4 GUID 4: Traffic information using multiplex broadcasting

Category:	Guidance
Description:	Radio broadcast tuner provides information through audio system, using Multiplex Broadcasting channel to get traffic information.
Required devices:	- Audio output - Radio tuner with RDS circuit (FM Multiplex Broadcasting) - Microphone (for voice recognition) and / or switches - Radio indicator (to show status of tuner) - General Purpose Processor (GPP)
Required services:	
Prior conditions:	- The vehicle is equipped with an AMI-C navigation system. - A navigation service has not been selected.

Flow of events	
1)	This use case begins when the driver selects a radio station.
2)	The tuner module receives the FM multiplex broadcasting and finds the traffic information signal.
3)	The tuned channel changes to the traffic information channel and receives the traffic information.
4)	Through audio output, the traffic service is offered and its status is shown via the indicator and this use case ends.

Optional devices:	Separate tuner for RDS, independent of radio station.			
Actors:	**Vehicle system**	**Occupant**		**Service Provider**	**Other (specify)**
		Driver	**Passenger**		
		X		X	
Support information:					

Process:

1) Select radio station by pressing switches or voice command on control head.

2) Tuner module (or GPP) receives switch / voice commands and sets tuner frequency.

3) RDS data is received and sent to GPP.

4) GPP processes data and changes the tuned station from audio program to traffic information.

5) Traffic information goes through audio output to driver.

6) After the information is relayed, the program changes back to the previous station.

7) The system waits for the next traffic information update.

NOTE   See GUID 3: Navigation with communication system for coverage of RDS_TMC.

2.7.4.1 GUID 4.1: Traffic information using multiplex broadcasting

Feature:	Traffic information using multiplex broadcasting
Category:	Guidance
Description:	Radio broadcast tuner provides information through audio system, using multiplex broadcasting channel to get traffic information.
Required devices:	• Audio output • Radio tuner with RDS circuit (FM multiplex broadcasting). • Microphone (for voice recognition) and / or switches • Radio indicator (to show status of tuner) • General purpose processor (GPP)
Required services:	
Prior conditions:	• The vehicle is equipped with an AMI-C navigation system • A navigation service has not been selected

Flow of events
1) This use case begins when the driver selects the radio station by pressing switches on the control head or giving a voice command.
2) The RDS data is received and sent to the general-purpose processor (GPP).
3) The GPP processes the data and changes the tuned station from the audio program to traffic information.
4) The traffic information is available via the audio output.
5) After the information is relayed, the (program) changes back to the previous station.
6) The system waits for the next traffic information update and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
		X	X	X	

Support information:	

2.7.5 GUID 5: Requesting an image from a remote traffic camera

Feature:	Visual displays of traffic conditions at various distances ahead of the vehicle.
Category:	Guidance
Description:	Vehicle obtains a digitized image of the road at a fixed location ahead of its current position from a traffic information service that maintains roadside cameras at various locations and displays it on the vehicle display.
Required devices:	• (High resolution) display • Microphone (for voice recognition) and / or switches • Receiver / transmitter / data communication (modem)
Required services:	Traffic information service
Prior conditions:	The vehicle is connected to the traffic information service.

Flow of events
1) This use case begins with the driver selecting the "Road Images" category from the traffic information service menu displayed on the graphical display.
2) NOTE   The images are to be selected, based on the vehicle position from the GPS receiver or driver specifications of the required image position.
3) The driver requests the image from the road images menu via the traffic information service.
4) The current image from the selected camera is downloaded and displayed.
5) If desired, the user can select other images, as needed.
6) This use case ends when the user selects another service or turns off the traffic information service.

Optional Devices:	GPS receiver				
Actors:	**Vehicle system**	**Occupant**		**Service Provider**	**Other (specify)**
		Driver	**Passenger**		
		X		X	
Support information:					

NOTE 1   This function involves the navigation system to obtain precise location and driving directions.

NOTE 2   Usually, the driver is interested in the approaching road condition, not passed road.

NOTE 3   The positioning system is not mandatory if the customer selects the data manually.

NOTE 4   New information might occur automatically.

2.7.5.1 GUID 5.1: Displaying an image from a roadside camera

Feature:	Visual displays of traffic conditions at various distances ahead of the vehicle.
Category:	Guidance
Description:	Vehicle obtains a digitized image of the road at a fixed location ahead of its current position from a traffic information service that maintains roadside cameras at various locations and displays it on the vehicle display.
Required devices:	• (High resolution) display • Microphone (for voice recognition) and / or switches • Receiver / transmitter / data communication (modem)
Required services:	Service provider
Prior conditions:	• The vehicle is equipped with an AMI-C navigation system • A navigation service has not been selected

Flow of events

1) This use case begins when the occupant selects the traffic information service provider by switch or voice command.
2) The occupant selects road images from the service provider menu.
3) The vehicle system requests vehicle position from the GPS receiver.
4) The vehicle system transmits vehicle position to service provider.
5) The service provider responds with a list of camera locations in the vehicle's vicinity.
6) The occupant selects desired camera through an HMI.
7) Current images from the selected camera are downloaded and shown on high-resolution graphical display.
8) If desired, the occupant selects another camera to view, possibly for an alternate route.
9) The image from the new selection is downloaded and displayed.
10) The occupant disconnects from traffic information service when satisfied and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	Traffic Information Service

Support information:	

2.7.6 GUID 6: Obtaining roadside information

Category:	Guidance
Description:	The user of the vehicle obtains general information while traveling on the highway (or any properly equipped roadway). This information could be travel-related information (i.e. traffic jams, weather conditions, construction) that is broadcast / received in any number of ways (i.e. dedicated short-range communication, mobile phone, etc). The vehicle could also send back general information, such as ID for toll collection.
Required devices:	• OBE (On-Board Equipment) equipped in the vehicle or mobile phone • Graphical display • Switches • General purpose processor (GPP) • Special purpose processor (SPP)
Required services:	
Prior conditions:	• The function operates when the ignition key is "on" and the on-board unit in the vehicle is activated. • An infrastructure like the Roadside Network that has roadside units and a service center is required.
Flow of events	

1)	This use case starts when the driver drives into the communication zone. (This is the area where the broadcast can be received).
2)	The vehicle, via some wireless communication method receives the signal from a roadside unit (some type of broadcast facility or tower) and sends the vehicle ID and / or other information, as needed.
3)	Recognizing the response from the vehicle, the roadside unit sends additional information, as needed.
4)	The information is communicated to the driver via a vehicle manufacturer defined method (display, speech).
5)	This use case will finish when all required data transmission is relayed or communication is disconnected.

Optional devices:	• Audio output • Audio input • Voice recognition input and output • Customer port			
Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
	X	X			
Support information:					

NOTE   The following list shows various applications that use DSRC technology, and some of applications are described under other categories:

— Advanced navigation system – Acquisition of travel-related information and sending traffic information and / or the information related with destination. See use case GUID 3.1: Navigation with communication system as a reference.

— ETC (Electronic Toll Collection) – Automatic payment transaction without stopping. See use case COMM 2.1: Road toll payment while vehicle is moving as reference.

— In-vehicle signing to assist for safe driving (i.e. highway, rail intersection, road condition, work zone, emergency vehicle warnings). See use case GUID 6.1: Traffic Information Display Via Dedicated Short-Range Communication as a reference.

— Probe data collection – See use case FLEE 1.3: Probe data collection via dedicated short-range communication (DSRC) as a reference.

— Supporting public transport operation – In order to improve the convenience of the public transport system, gathering information on the operational status of buses and other vehicles and providing instructions to them. See use case FLEE 5.1: Public transport vehicle support via DSRC as a reference.

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— Supporting commercial vehicle operation – To increase the efficiency of commercial vehicle operation, the vehicles provide tracking logs to the service facility, and the service facility provides the delivery instructions to the vehicle. See use case FLEE1.1: Vehicle status scheduled event, mobile phone as a reference.

— Related diagnosis – See use case SERV 3.3: Diagnosis Via Dedicated Short-Range Communication as a reference.

— Vehicle control – The applications related with automated cruise and intersection collision avoidance are out of AMI-C's scope.

2.7.6.1   GUID 6.1: Receiving and displaying information over short range

Feature:	Display of traffic information via dedicated short-range communication (DSRC).					
Category:	Guidance					
Description:	The vehicle receives information related to traffic conditions. That information may include many warning messages (i.e. highway conditions, approaching railroad intersection, work zones, or an emergency vehicle passing by).					
Required devices:	• On-board equipment (OBE) • Audio output • Graphical display • Switches • General purpose processor (GPP) or • Special purpose processor (SPP)					
Required services:						
Prior conditions:	A roadside network infrastructure with roadside units is required.					
Flow of events						
1)	This use case starts when the driver enters a communication zone.					
2)	The On-Board Unit (OBU) receives the message signal from a roadside unit, and transmits the received message to General Purpose Processor (GPP).					
3)	The GPP processes the messages and sorts them into messages related to emergency conditions or general messages.					
4)	The messages related to emergency conditions will be displayed immediately to the driver.					
5)	The vehicle system uses the user profile to determine whether to display the general message. If the received message is in a preferred category, it will be displayed. If it is not, it will be discarded.					
6)	This use case will finish when all required data transition is finished or the communication is disconnected.					
Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
			X		X	X
Actors:	Vehicle system	Occupant		Service Provider	Other (specify)	
		Driver	Passenger			
	X	X				
Support information:						

NOTE 1   The communication between the vehicle and the roadside unit is established via DSRC.

NOTE 2   The roadside unit might be facilitated along the road with appropriate distances to each other.

NOTE 3   The communication between the roadside unit and service center, which is gathering needed information to be delivered, are established, possibly with any communication media (i.e. satellites, fiber optics or wired).

NOTE 4   On-Board Equipment (OBE) is equipped in the vehicle.

NOTE 5   Roadside units are equipped along the roadside.

2.8 HOME

2.8.1 HOME 1: Activating home devices from vehicle

Category:	Home automation			
Description:	The vehicle owner initiates a remote command to activate / deactivate a device in the home (i.e. lights, appliances, thermostat, security system, etc.).			
Required devices:	Mobile phone			
Required services:				
Prior conditions:	The driver/ vehicle owner is in the vehicle away from home.			
Flow of events				
1)	This use case begins when the vehicle owner initiates a remote command to the home automation system.			
2)	The vehicle confirms the driver's ID.			
3)	The vehicle initiates a connection to the driver's home automation system.			
4)	The home automation system authenticates the driver.			
5)	The vehicle transmits the command.			
6)	The home automation system responds to the command by activating / deactivating.			
7)	The home automation system sends confirmation of the activation/deactivation to the vehicle system.			
8)	The confirmation is displayed via an HMI in the vehicle and this use case ends.			
Optional devices:	2-way wireless pager			

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X (vehicle owner)	X	X	Home Automation system

Support information:	

2.8.1.1 HOME 1.1: Remote activation of devices via mobile phone

Feature:	Remote activation of devices in the home via a telephone call from the vehicle.
Category:	Home automation
Description:	Vehicle owner initiates a telephone call with voice commands to activate / deactivate a device in the home (i.e., lights, appliances, thermostat, security system, etc.). The user interacts with the home device controller through verbal menu selections and voice commands. A device in the home is connected to the phone and receives outside calls by sorting personal phone calls, phone messages, fax and modem from automated control type calls. Once connection is established to the automated control device, commands can be used to choose the device that is to be controlled (e.g., lights, locks, thermostat, security system, cameras, and entertainment devices).
Required devices:	• Mobile phone • Voice recognition • Audio input / output
Required services:	
Prior conditions:	Vehicle system is operational and powered ON.

Flow of events
1. This use case begins when a voice command activates a hands-free phone call to the home automation system.
2. The home automation system answers the phone and determines if the call is voice, fax or modem.
3. If activated by voice, the device listens for the first 15 seconds for key words that are used to activate the home automation system. After this time period has passed and no key words have been encountered, the home automation system goes into a sleep state.
4. If a correct key word to activate the system has been used, the home automation system requests a password identifier before activating control activity.
5. The driver gives a password and the home automation system confirms the correct password.
6. The home automation system is now active and awaiting voice commands from the user.
7. If requested, a menu of available voice key words may be sent to the vehicle.
8. The home automation system will send confirmation of any requested action from the user.
9. The home automation system stops listening or continues to listen to commands until either the call times out (automatically or by user action) or times out when no commands have been issued.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
		X	X	X	Home Automation system

Support information:					

NOTE   The same functionality can be achieved with Internet access using an alternative wireless transceiver and an ISP.

2.8.2   HOME 2: Interrogating home status from vehicle

Category:	Home automation
Description:	Vehicle occupant requests status information from home system (e.g., perimeter security, power status, sump pump status, etc.).
Required devices:	• Home and auto transceivers • Home sensors connected to security system and transceiver
Required services:	
Prior conditions:	Vehicle system is active and ready.
Flow of events	

1)	This use case begins when the driver connects to his / her home system and initiates a status request.
2)	Vehicle confirms driver's ID.
3)	The home automation system authenticates the vehicle.
4)	The vehicle transmits a request status information.
5)	Home automation system receiver responds to the command by transmitting status information.
6)	Vehicle receives status information and reports it to the driver and this use case ends.

Optional devices:	Mobile phone				
Actors:	**Vehicle system**	**Occupant**		**Service Provider**	**Other (specify)**
		Driver	**Passenger**		
	X	X	X	X	Home Automation system
Support information:					

NOTE   The system is most valuable when used over long distances, implying Internet activation.

2.8.2.1   HOME 2.1: Remote request for status of device via display

Feature:	Home status interrogation from vehicle using graphical display
Category:	Home
Description:	Vehicle occupant requests status information from home regarding home system status (e.g., perimeter security, power status, sump pump status, etc.). This information is requested from graphical interface, using switch input for menu selection. The response from the home system is displayed on a graphical display.
Required devices:	• Mobile phone • Voice recognition • Audio input / output • Graphical display • Keypad
Required services:	
Prior conditions:	Vehicle system is operational and powered ON.

Flow of events
1) This use case begins when the driver, using the display menu choices and control switches, activates a phone call to the home system.
2) The home automation system answers the phone and determines if the call is voice, fax, modem or a vehicle system control command.
3) If the vehicle system control mode has been identified by the home automation system, the vehicle system receives a request for an ID identifier
4) The driver punches in a pin number and it is sent to the home automation system.
5) The home automation system sends a confirmation message to the vehicle.
6) Home automation system is now active and awaiting input commands from the user.
7) The driver requests a menu of choices from the home automation system. The home automation system sends the available menu of options to the HMI/graphical display.
8) The home automation system will confirm any action requested and taken to the vehicle system.
9) Activity continues until the user terminates access and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
		X	X	X	Home automation system

Support information:	

NOTE   The same functionality can be achieved with Internet access using an alternative wireless transceiver and an ISP. Optionally, voice recognition can be used for control and operation with either a verbal report display report on status.

2.9 INFO

2.9.1 INFO 1: Getting personal information from a service provider

Category:	Information
Description:	Service provider sends the personal information to the vehicle.
Required devices:	• Communication device (mobile / FM radio / satellite) • Display and / or audio • Selection method (switch and / or voice command)
Required services:	Service provider
Prior conditions:	Vehicle can communicate with (Internet) service provider. Audio and / or display system is installed in the vehicle.
Flow of events	
1) This use case begins when the occupant selects "Personal Service" from a menu of options, via an HMI.	
2) The occupant selects an item from the personal service menu.	
3) Vehicle connects to the personal service provider, informing the user of progress.	
4) The vehicle receives the personal service information.	
5) Occupant can access personal information (display and / or audio).	
6) If occupant wants more information, he / she selects more items from menu.	
7) The personal service provider sends the additional information.	
8) The occupant requests disconnection from the service provider and this use case ends.	

Optional devices:					
Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	
Support information:					

NOTE 1   Steps 1-3 of the flow of events may be done before the occupant drives the vehicle. For example, the user can access the vehicle system from his or her home or office PC to establish the connection between vehicle and the personal service provider.

NOTE 2   Step 4 can be done intentionally or unintentionally. The occupant may need to select whether the personal information has come by order (request) or been sent automatically (advertisement).

2.9.1.1   INFO 1.1: Requesting personal information from a service provider

Category:	Information
Description:	At the request of the user, the service provider sends personalized information to the user's vehicle. The information is personalized via the Internet or a special line from the home or office. The information may include preferred news, traffic information of the commute road, e-mail, local weather, etc.
Required devices:	• Mobile phone • Voice output • Alphanumeric display • Audio output • Switches / buttons • Service provider • Internet • Mass storage
Required services:	Service provider
Prior conditions:	• Vehicle can communicate with (Internet) service provider. • Audio and / or display system is installed in the vehicle. • Driver presets the preferred information in his home or office PC via Internet. • The server gathers the information. If there is any new information in the area driver preset, it is saved on the personalized area of the server.

Flow of events

1) This use case begins when the driver selects the option to receive personalized information via an HMI.
2) Vehicle system calls the service provider by mobile connection.
3) The personal service provider receives the request and downloads the information saved in the personalized area of the server.
4) Vehicle system decodes the data and shows the information on the character display.
5) Vehicle system changes "text-to-voice" to "read the information.
6) Vehicle system saves the information in the system memory.
7) If driver wants to listen again, he / she pushes the switch and the information is replayed from the system memory and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service Provider	Other Specify:
		Driver	Passenger		
		X	X	X	

Support information:	

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2.9.1.2   INFO 1.1: Requesting personal information from a service provider

Category:	Information
Description:	At the request of the user, the service provider sends personalized information to the user's vehicle. The information is personalized via the Internet or a special line from the home or office. The information may include preferred news, traffic information of the commute road, e-mail, local weather, etc.
Required devices:	• Mobile phone • Voice output • Alphanumeric display • Audio output • Switches / buttons • Service provider • Internet • Mass storage
Required services:	Service provider
Prior conditions:	• Vehicle can communicate with (Internet) service provider. • Audio and / or display system is installed in the vehicle. • Driver presets the preferred information in his home or office PC via Internet. • The server gathers the information. If there is any new information in the area driver preset, it is saved on the personalized area of the server.

Flow of events
1) This use case begins when the driver selects the option to receive personalized information via an HMI.
2) Vehicle system calls the service provider by mobile connection.
3) The personal service provider receives the request and downloads the information saved in the personalized area of the server.
4) Vehicle system decodes the data and shows the information on the character display.
5) Vehicle system changes "text-to-voice" to "read the information.
6) Vehicle system saves the information in the system memory.
7) If driver wants to listen again, he / she pushes the switch and the information is replayed from the system memory and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service Provider	Other Specify:
		Driver	Passenger		
		X	X	X	

Support information:	

2.9.1.3 INFO 1.2: Automatic transmission of personal information from a service provider

Category:	Information		
Description:	Service provider sends personalized information to user's vehicle automatically. The Information is personalized via Internet or a special line from the home or office. Information may include preferred music, preferred picture and preferred traffic camera etc. That information is first sent to the home server via wide bandwidth and then to the vehicle via a wireless connection.		
Required devices:	• Mobile phone home RF • Graphical display • Voice recognition input • Voice output, audio input • Audio output	• Pointing device • Switches/ buttons • Steering wheel switches • Digital audio format and digital video format.	
Required services:	• Personal service provider • Internet		
Prior conditions:	• Vehicle can communicate with (Internet) service provider. • Audio and / or display system in the vehicle. • Driver presets the preferred information in his home or office PC via the Internet. • Driver presets the time the information should be automatically downloaded. • The server gathers the information. If there is any new information in the area driver preset, it is saved on the personalized area of the server.		

Flow of events
1) This use case begins when the service provider downloads music or video information to the home server.
2) Home server calls the vehicle at the time the user has prearranged and preset.
3) The vehicle system receives the call and wakes up the Home RF receiver in the vehicle.
4) Home server downloads the information to the vehicle via Home RF.
5) Vehicle system decodes the data and saves the information in the system memory.
6) Driver pushes the steering pad switch to get the personalized information.
7) Vehicle system shows the information on graphic display.
8) Driver selects the information by voice command (i.e., MPEG video news).
9) Vehicle system decodes the MPEG and displays the video and this use case ends.

Availability:	IGN OFF		IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X		X	X	X	X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)	
		Driver	Passenger			
	X	X	X	X	Home server	

Support information:	

2.9.2 INFO 2: Sending vehicle data to a service provider

Feature:	Vehicle information (i.e. drive log, location) is sent to the service provider.			
Category:	Information			
Description:	Individual vehicle information (i.e. location, speed, temperature, diagnostic signal, etc.) is sent to the service provider or network server for special application.			
Required devices:	Communication device (mobile/ FM radio / satellite)			
Required services:	Service provider			
Prior conditions:	• Vehicle can communicate with (Internet) service provider. • Vehicle can get vehicle information (vehicle status). • Audio and / or display system is installed in the vehicle.			
Flow of events				
1) This use case begins when the occupant selects "Send vehicle data" from a menu of options, via an HMI.				
2) The vehicles system connects to the service provider.				
3) The vehicle information is sent to the personal service provider and the occupant is informed of the transmittal status via an HMI.				
4) When the information has finished transmitting this use case ends.				
Optional Devices:	• Display and / or audio • Selection method (switch and / or voice command)			
Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	
Support information:				

NOTE 1   Step 1 may be done before the occupant drives the vehicle (home or office).

NOTE 2   Step 2 may be done automatically.

2.9.2.1   INFO 2.1: Sending a vehicle's data to a service provider

Category:	Information				
Description:	Vehicle information is sent to the service provider manually. The information is personalized via Internet or a special line from the home or office. The information includes vehicle location, speed etc.				
Required devices:	• Mobile phone • Vehicle data • Location data • Service provider				
Required services:					
Prior conditions:	• Vehicle can communicate with (Internet) service provider. • User sets the preferred information in his home or office PC via Internet.				
Flow of events					
1)	This use case begins when the driver calls the service provider to find the location of his / her vehicle that is being driven by a family member.				
2)	The service provider calls the vehicle system to send the location information via mobile communication.				
3)	The vehicle system receives the call and confirms authentication.				
4)	The vehicle system obtains the GPS data from the GPS device				
5)	The vehicle system sends the location data to the service provider and this use case ends.				

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X	X	X	X

Actors:	Vehicle system	Occupant		Service Provider	Other (specify)
		Driver	Passenger		
	X	X		X	

Support information:	

2.10 ITS

2.10.1 ITS 1: Obtaining traffic information from vehicle service provider

Feature:	Allows user requested update of traffic information
Category:	Intelligent transportation systems (ITS)
Description:	The vehicle occupant initiates a request to a vehicle service provider (VSP) for traffic information along the planned route or a specific traffic location. The VSP responds by sending a picture from a traffic camera and/or numeric information on traffic conditions.
Required devices:	• Navigation system • Interactive display
Required services:	Service provider
Prior conditions:	• Wireless connection service to vehicle service provider • Active access to traffic cameras/updated information

Flow of events
1) The driver requests updated traffic information from a vehicle services provider (VSP) while on an existing route or specific traffic location using the HMI interface
2) The VSP sends a traffic camera picture and/or numeric traffic information to the vehicle.
3) The vehicle's telematics system presents the traffic data to the occupant via the HMI.
4) The navigation system interprets the effected route information
5) The driver is prompted with possible changes to route
6) The driver selects a new route
7) The navigation system updates route information and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
			X	N	X	X
Actors:	Vehicle system	Owner / Operator	Occupant / Pass.	Service provider	Other (specify)	
	X	X		X		
Support information:						

2.10.2 ITS 2: Traffic update system – passive

Feature:	Allows auto-update of traffic information
Category:	Intelligent transportation system (ITS)
Description:	Occupant selects or enters route into navigation system. The occupant selects "Traffic Update," application for the planned route. Automatic traffic updates are received by the radio and the telematics system culls out the traffic information relevant to the planned route and presents it to the occupant.
Required devices:	• Traffic capable radio system • Navigation system
Required services:	
Prior conditions:	The local radio stations must transmit traffic information along the planned route.

Flow of events
1) The occupant selects or enters the desired route into the navigation system (either on-board or off-board) via the HMI.
2) The occupant selects the "Traffic Update" application via the HMI.
3) Standard traffic information is sent over the over the radio
4) The vehicle's telematics system selects traffic information that is relevant to the planned route and notifies the occupant.
5) Upon notification of a traffic problem, the occupant decides to take an alternate route. The occupant requests the navigation system provide an alternate route via the HMI.
6) Navigation system processes the traffic information and calculates a new route.
7) The new route is presented to the occupant via the HMI.
8) The occupant is rerouted based on updated traffic information.
9) Traffic updates continue to be processed along the new route.
10) The vehicle reaches the destination in the planned route, and the use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X				Navigation system

Support Information	

2.11 MESS

2.11.1 MESS 1: Making a call via videophone

Category:	Messaging
Description:	The user selects videophone from the displayed choices. The system responds with and / or displays a request for the name of the person to call. The user states or inputs name / number and a call is made over Internet or mobile. The display shows the initial image of the person called and updates it at a rate to be determined (non-real time video).
Required devices:	• Graphical display • Switches • General purpose processor (GPP) or special purpose processor (SPP) • Camera (integrated or hand-held) • Integrated telephone or modem • Audio output • Audio input
Required services:	
Prior conditions:	Mobile phone connection from car or Internet connection between car and ISP can be established.

Flow of events
1) This use case starts when the occupant selects the "Telephone" application on the HMI menu.
2) The vehicle queries the occupant on whether or not to save the current state of information, if required by the previously selected application.
3) The vehicle system presents the occupant with the telephone home screen.
4) The occupant enters a telephone number, using the vehicle manufacturer defined method.
5) The occupant hits the SEND key and the system dials the number.
6) If not cancelled by the occupant, the call is connected and this use case ends.

Optional devices:	• Voice recognition input and output • Customer port			
Actors:	Vehicle system	**Occupant**		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	
Support information:					

NOTE 1   Display and application startup preferences may be determined through a vehicle manufacturer-supplied user identification system.

NOTE 2   Availability and method of annunciation may be determined by the vehicle manufacturer and user preferences (accessibility).

2.11.1.1 MESS 1.1: Making a call via Internet videophone

Category:	Messaging
Description:	User selects Internet videophone from displayed choices; system responds with and / or displays the request of person's name to call. User states or enters name and number, and call is made. The display shows the initial image of the person called and updates at a rate to be determined (non-real time video).
Required devices:	• Graphical display • Switches • General purpose processor (GPP) or special purpose processor (SPP) • Camera (integrated or hand-held) • Modem • Audio output • Audio input
Required services:	Internet service provider (ISP)
Prior conditions:	Internet connection between the car and ISP can be established.

Flow of events
1) This use case starts when the occupant selects the "Internet Videophone" application on the HMI menu.
2) The vehicle queries the user on whether or not to save the current state of information, if required by the previously selected application.
3) The vehicle presents the occupant with the telephone home screen.
4) The occupant enters a telephone number, using the vehicle manufacturer defined method.
5) The occupant hits the SEND key and the system dials the number.
6) The vehicle warns the occupant that it is about to establish a connection to the ISP and may warn that standard telephone usage may not be available while connected.
7) The vehicle system connects the ISP.
8) Upon connection, the vehicle system sends the call request and phone number to the ISP.
9) The ISP connects the call over the Internet.
10) If not canceled by the occupant, the call is connected and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	

Support information:	

2.11.1.2   MESS 1.2: Making a call via videophone on a mobile network

Feature:	A video telephone call is placed over a mobile network.
Category:	Messaging
Description:	User selects mobile videophone from displayed choices; system responds with and / or displays a request for the name of the person to call. User states or enters name and number, and the call is made. The display shows the initial image of the person called and updates at a rate to be determined (non-real time video).
Required devices:	• Graphical display • Switches • General purpose processor (GPP) or special purpose processor • Camera (integrated or hand-held) • Integrated telephone • Audio output • Audio input
Required services:	
Prior conditions:	Mobile phone connection from the car can be established.

Flow of events
1) This use case starts when the occupant selects the "Mobile Videophone" application on the HMI menu.
2) The vehicle queries the occupant on whether or not to save the current state of information, if required by the previously selected application.
3) The vehicle presents the occupant with the telephone home screen.
4) The occupant enters a telephone number, using the vehicle manufacturer defined method.
5) The occupant hits the [SEND] key, the call is connected, and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKEUP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	

Support information:	

NOTE 1   Display and application startup preferences may be determined through a vehicle manufacturer-supplied user identification system.

NOTE 2   Availability and method of annunciation may be determined by the vehicle manufacturer and user preferences (accessibility).

2.11.2 MESS 2: Receiving a page

Feature:	Receive a page message.
Category:	Messaging
Description:	Vehicle receives a page / message and presents the information to the occupant.
Required devices:	• Alphanumeric display • Switches • General purpose processor (GPP) or special purpose processor (SPP) • One-way pager
Required services:	
Prior conditions:	The vehicle is subscribed to and equipped with a paging service.

Flow of events	
1)	This use case starts with the receipt of a page / message by the vehicle.
2)	The vehicle, in a matter to be determined by vehicle manufacturer-provided capabilities and user preferences, annunciates receipt of the message.
3)	The system queries the occupant asking whether or not to save the current state of information, if required by the previously selected application. (Existing e-mail, pages, SMS messages, fax or any other messages stored locally are displayed. New (unread) messages are highlighted.)
4)	Occupant selects the desired message, using any input method provided by the vehicle.
5)	The message item area of the screen representing the chosen date / time is highlighted and annunciated. If another message is desired, step 4 is repeated.
6)	When the occupant exits the application, this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKEUP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	
		Driver	Passenger		
		X	X	X	

Support information:	

NOTE 1   Display and application startup preferences may be determined through a vehicle manufacturer-supplied user identification system.

NOTE 2   Availability and method of annunciation may be determined by the vehicle manufacturer and user preferences (accessibility).

NOTE 3   Occupant may also choose other options for disposition of incoming messages, including reply, delete and forward.

NOTE 4   The message database may be remotely located, thus requiring the use of other system resources to access it.

2.11.3 MESS 3: Sending a page or message

Category:	Messaging
Description:	Operator / occupant sends a page message from the vehicle.
Required devices:	• Alphanumeric display • Switches • General purpose processor (GPP) or special purpose processor (SPP) • Two-way pager
Required services:	
Prior conditions:	The vehicle is subscribed to and equipped with a paging service.

Flow of events
1) This use case starts with the occupant selecting the "Messaging" application on the control screen.
2) The system queries the occupant asking whether or not to save the current state of information, if required by the previously selected application. If not, the vehicle presents the occupant with the Messaging home screen. (Existing e-mail, pages, SMS messages, fax or any other messages stored locally are displayed. New (unread) messages are highlighted.)
3) Occupant enters the page message, using the vehicle manufacturer defined method (i.e. voice, keypad).
4) Occupant hits the SEND key. If another page message is desired, step 3 is repeated.
5) If not canceled by occupant, the call is connected and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKEUP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	

Support information:	

2.11.4 MESS 4: Receiving and sending a fax

Category:	Messaging
Description:	Vehicle receives / sends a fax message using the vehicle's AMI-C system.
Required devices:	• Alphanumeric display • General purpose processor (GPP) or special purpose processor (SPP) • Switches • Integrated telephone or modem
Required services:	Internet service provider (ISP)
Prior conditions:	Mobile phone connection or Internet connection between the car and ISP can be established.

Flow of events
1) This use case starts with the receipt of a fax message by the vehicle or with the occupant accessing the Messaging Home screen.
2) Receive
3) The vehicle system presents the occupant with the "Messaging Home" screen and queries the occupant on whether or not to save the current state of information, if required by the previously selected application (An index of existing e-mail, pages, SMS messages, fax or any other messages stored locally are displayed. New (unread) messages are highlighted.)
4) Occupant selects the desired fax message using any input method provided by the vehicle. The size of the fax message (pages) should be indicated.
5) Occupant selects the desired output medium (i.e. display, print, voice) for the fax. If another fax is desired, step 3 is repeated.
6) Send
7) From the Messaging Home screen, occupant enters the fax message using any input method (i.e. voice, keypad).
8) Occupant hits the SEND key.
9) If not canceled by occupant, the call is connected over the Internet or via a mobile connection.
10) When the occupant exits the application, this use case ends.

Optional devices:	• Customer port • Printer • Voice recognition input and output • Graphical display

Actors:	**Vehicle system**	**Occupant**		**Service Provider**	**Other (specify)**
		Driver	**Passenger**		
		X	X	X	

Support information:	

2.11.4.1 MESS 4.1: Receiving a fax via an Internet connection

Feature:	Receive a fax message over the Internet.
Category:	Messaging
Description:	Vehicle receives a fax message and presents the information to the occupant.
Required devices:	• Alphanumeric display • General purpose processor (GPP) or special purpose processor (SPP) • Modem • Switches
Required services:	Internet service provider
Prior conditions:	Internet connection between the car and ISP can be established.

Flow of events
1) This use case starts with vehicle system receiving a fax message.
2) The vehicle, in a matter to be determined by vehicle manufacturer-provided capabilities and user preferences, annunciates receipt of the fax.
3) The vehicle system presents the occupant with the "Messaging Home" screen and queries the occupant on whether or not to save the current state of information, if required by the previously selected application (Existing e-mail, pages, SMS messages, fax or any other messages stored locally are displayed. New (unread) messages are highlighted.)
4) Occupant selects the desired fax message displayed on the screen by using an HMI input method.
5) The vehicle warns the occupant that receiving this fax will require maintaining a connection to the ISP and may warn that standard telephone usage may not be available while connected.
6) The occupant selects the desired output medium (i.e. display, print, voice) for the fax. If another fax is desired, repeat the previous step.
7) When the occupant exits the application, this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKEUP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle / system		Occupant		Service provider	Other (specify)
			Driver	Passenger		
			X	X	X	

Support information:	

2.11.4.2   MESS 4.2: Receiving a fax via mobile phone

Feature:	Receive a fax message over a mobile network.					
Category:	Messaging					
Description:	Vehicle receives a fax message and presents the information to the occupant.					
Required devices:	• Alphanumeric display • General purpose processor (GPP) or special purpose processor (SPP) • Integrated mobile phone					
Required services;						
Prior conditions:	Mobile phone connection can be established.					
Flow of events						
1)	This use case starts with the vehicle system receives a fax message.					
2)	The vehicle system, in a matter to be determined by vehicle manufacturer-provided capabilities and user preferences, annunciates receipt of the fax.					
3)	The vehicle system presents the occupant with the "Messaging Home" screen queries the occupant on whether or not to save the current state of information, if required by the previously selected application (Existing e-mail, pages, SMS messages, fax or any other messages stored locally are displayed. New (unread) messages are highlighted.)					
4)	Occupant selects the desired fax message using an HMI input method.					
5)	Occupant selects the desired output medium (i.e. display, print, voice) for the fax (or the output defaults to what is available). If another fax is desired, repeat the previous step.					
6)	When the occupant exits the application, this use case ends.					

Availability:	IGN OFF	IGN ACC	IGN ON	WAKEUP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	

Support information:	

2.11.4.3   MESS 4.3: Sending a fax via an Internet connection

Feature:	Send a fax message over the Internet.
Category:	Messaging
Description:	The owner / occupant sends a fax message from the vehicle.
Required devices:	• Alphanumeric display • General purpose processor (GPP) or special purpose processor (SPP) • Modem
Required services:	Internet service provider
Prior conditions:	Internet connection between the car and ISP can be established.

Flow of events
1) The vehicle system sends a request to the messaging home screen, asking if the occupant would like to save the current application. (If required by the previously selected application).
2) The occupant selects an option from the control screen that allows him/her to save the current application.
3) The vehicle presents the occupant with the "Messaging Home" screen.
4) Occupant enters the fax message, using the vehicle manufacturer defined method.
5) Occupant enters the telephone number that will receive the fax and hits the SEND key.
6) The vehicle notifies the occupant that it is about to establish a connection to the ISP and that standard telephone usage may not be available while connected.
7) If not canceled by occupant, the call is connected and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKEUP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system		Occupant		Service provider	Other (specify)
			Driver	Passenger		
			X	X	X	

Support information:	

2.11.4.4   MESS 4.4: Sending a fax via mobile phone

Feature:	Send a fax message over a mobile network.					
Category:	Messaging					
Description:	The owner / occupant sends a fax message from the vehicle.					
Required devices:	- Alphanumeric display - General purpose processor (GPP) or special purpose processor (SPP) - Integrated telephone					
Required services:						
Prior conditions:	Mobile phone connection can be established.					
Flow of events						
1)	This use case starts with the occupant selecting the messaging feature on the control screen.					
2)	The vehicle queries the occupant on whether or not to save the current state of information, if required by the previously selected application.					
3)	The vehicle presents the occupant with the "Messaging Home" screen.					
4)	Occupant composes the fax and enters a telephone number to send the fax using the vehicle manufacturer defined method.					
5)	Occupant hits the SEND key, the call is connected and this use case ends.					
Availability:	IGN OFF	IGN ACC	IGN ON	WAKEUP	MOVING	STATIONARY
		X	X		X	X
Actors:	Vehicle system	Occupant		Service provider	Other (specify)	
		Driver	Passenger			
		X	X	X		
Support information:						

2.11.5 MESS 5: Receiving and sending e-mail

Category:	Messaging
Description:	Occupant receives and sends E-Mail from the vehicle.
Required devices:	• Graphical display • Switches • General purpose processor (GPP) or special purpose processor (SPP) • Modem
Required services:	Internet service provider (ISP)
Prior conditions:	Internet connection between the car and the ISP can be established.

Flow of events
1) This use case starts with the occupant selecting the messaging application displayed on the graphical display.
2) If the system is in a state where no unsaved data is currently being displayed, the vehicle presents the occupant with the "Messaging Home" screen. (An index of existing e-mail, pages, SMS messages, fax or any other messages stored locally are displayed. New (unread) messages are highlighted.)
3) The occupant selects the desired e-mail message using an-HMI input method provided by the vehicle.
4) The message item area of the screen representing the chosen date / time is highlighted and annunciated. If another message is desired, repeat the previous step.
5) Occupant selects the desired output HMI medium (i.e. display, print, voice) for the e-mail (or the output defaults to what is available). If another e-mail is desired, repeat the previous step.
6) Occupant enters the e-mail message using the vehicle manufacturer defined HMI method (i.e. voice, keypad).
7) Occupant hits the [SEND] key or issues a voice command to send the e-mail.
8) If not canceled by the occupant, the system verifies the connection with the ISP and the e-mail is sent
9) When the user exits the application, this use case ends.

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	**Passenger**		
		X	X	X	
Support information:					

NOTE 1   Display and application startup preferences may be determined through a vehicle manufacturer-supplied user identification system.

NOTE 2   Availability and method of annunciation may be determined by the vehicle manufacturer and user preferences (accessibility).

NOTE 3   Occupant may also choose other destination applications for the message selected, as well as replay, delete, and transfer the entry.

NOTE 4   The message database may be remotely located, requiring the use of other system resources to access it.

2.11.6 MESS 6: Interactive audio chat

Category:	Messaging
Description:	The driver initiates an interactive audio chat session from the vehicle over the Internet.
Required devices:	• Graphical display • Switches • General purpose processor (GPP) or special purpose processor (SPP) • Modem • Audio input • Audio output
Required service:	Internet service provider (ISP)
Prior conditions:	Internet connection between the car and the ISP can be established.

Flow of events
1) This use case starts when the occupant selects the audio chat application on the graphical display.
2) If the system is in a state where no unsaved or volatile data is currently being displayed, the vehicle presents the occupant with audio chat home screen.
3) The occupant selects or enters the name of the desired chat site using the HMI (vehicle manufacturer defined method).
4) The occupant selects a key or issues the appropriate voice command.
5) The vehicle warns the occupant that it is about to establish a connection to the ISP and that standard telephone usage may not be available while connected.
6) If not canceled by occupant, the user is connected to the chat service provider.
7) The vehicle presents the occupant with an active chat screen, allowing control of input and output audio, connection options, etc. Chat operation continues until the occupant chooses to disconnect.
8) When the connection to the ISP is severed, this use case ends.

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	

Support information:	

NOTE 1   Display and application startup preferences may be determined through a vehicle manufacturer-supplied user identification system.

NOTE 2   Availability and method of annunciation may be determined by the vehicle manufacturer and user preferences (accessibility).

NOTE 3   A browser application-based chat function may be provided, given the browser application has been fully integrated into the audio system of the vehicle.

2.11.7 MESS 7: Accessing voice-mail

Category:	Messaging
Description:	The owner / occupant initiates a call to his / her voice mailbox from the vehicle.
Required devices:	• Alphanumeric display • Switches • General purpose processor (GPP) or special purpose processor (SPP) • Modem or integrated telephone
Required services:	• Internet service provider (ISP) • Voicemail service provider
Prior conditions:	Mobile phone connection OR Internet connection between the car and ISP can be established.

Flow of events
1) This use case starts with the occupant selecting the voice mail application on the messaging home control screen.
2) If the system is in a state where no unsaved or volatile data is currently being displayed, the vehicle presents the occupant with the voice mail home screen.
3) Occupant selects the option, "Access voice mail" using an HMI. (vehicle manufacturer defined method)
4) The connection is established to the occupant's voice mail system.
5) The occupant retrieves messages from the voice mail service provider system.
6) When the occupant has completed operations involving the voice mail service provider and the application has terminated, this use case ends.

Optional devices:	• Voice recognition input and output • Graphical display • Audio input • Audio output

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	

Support information:	

NOTE 1   All subsequent interactions between the voice mail service provider and the occupant are outside the purview of the AMI-C system, with the exception of the input and output methods being supported by the voice mail or browser application.

NOTE 2   Display and application startup preferences may be determined through a vehicle manufacturer-supplied user identification system.

NOTE 3   Availability and method of annunciation may be determined by the vehicle manufacturer and user preferences (accessibility).

NOTE 4   Voice mail application MMI will be determined by the vehicle manufacturer or voice mail service provider.

2.11.7.1   MESS 7.1: Accessing voice mail via the Internet

Category:	Messaging
Description:	The owner / occupant initiates a call to his / her voice mail from the vehicle over an Internet connection.
Required devices:	• Alphanumeric display • Switches • General purpose processor (GPP) or special purpose processor (SPP) • Modem
Required services:	• Internet service provider • Voice mail service provider
Prior conditions:	Internet connection between the car and ISP can be established.

Flow of events
1)   This use case starts when the occupant selects the voice mail application on the "Messaging home" screen via an HMI.
2)   If the system is in a state where no unsaved or volatile data is currently being displayed, the vehicle presents the occupant with the voice mail home screen.
3)   Occupant selects "Access Voice Mail" using an HMI. (vehicle manufacturer defined method)
4)   The vehicle warns the occupant that it is about to establish a connection to the ISP and may warn that standard telephone usage may not be available while connected
5)   The connection is established to the occupant's voice mail system.
6)   When the occupant finishes using the voice mail system and exits the application, this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKEUP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	

Support information:	

2.11.7.2 MESS 7.2: Accessing voice mail via mobile phone

Category:	Messaging
Description:	
Required devices:	• Alphanumeric display • Switches • General purpose processor (GPP) or special purpose processor (SPP) • Integrated Telephone
Required services:	
Prior conditions:	Mobile phone connection from the car can be established.

Flow of events
1) This use case starts with the occupant selecting the voice mail application on a messaging control screen.
2) If the system is in a state where no unsaved or volatile data is currently being displayed, the vehicle presents the occupant with the voice mail home screen.
3) Occupant selects "Access Voice Mail" using the vehicle manufacturer defined method.
4) The connection is established to the occupant's voice mail system.
5) The user interacts with the voice mail provider system to retrieve voice mail.
6) When the occupant has completed any operations involving the voice mail service provider and the exits the application, this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKEUP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	

Support information:					

2.12 MOBI

2.12.1 MOBI 1: SmartCard access

Feature:	Use of SmartCard to identify user and provide data to allow an action.			
Category:	Mobile Devices			
Description:	A SmartCard is used to operate a keyless vehicle system, and to provide identification data (i.e. voice print, retina scan, thumb print, etc.), password, and other personal and preference data to allow an action.			
Required devices:	• SmartCard • SmartCard reader in vehicle (either RF or contact) • Input to host computer			
Required services:				
Prior conditions:	User approaching a parked vehicle.			
Flow of Events				
1)	This use case begins when the driver approaches his / her vehicle and unlocks the door with his / her SmartCard.			
2)	The driver attempts to start the vehicle through an ignition switch. The vehicle prompts the owner for identification, via biometrics or a password stored on the SmartCard.			
3)	The driver identifies himself / herself and the vehicle starts.			
4)	The flow of events transfers to the "Load vehicle setup preferences" use case and this use case ends.			
Optional devices:	Biometric devices, such as thumbprint reader, retina scan, speaker recognition, etc.			
Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X			
Support information:				

2.12.1.1   MOBI 1.1: Unlocking door with SmartCard access

Feature:	.					
Category:	Mobile devices					
Description:	A vehicle identifies its owner by detecting the presence of the SmartCard the vehicle owner carries, and unlocks the driver side door is unlocked to allow access.					
Required devices:	A SmartCard detector embedded in the vehicle					
Required services:						
Prior conditions:	Vehicle has capability of detecting the presence of a SmartCard.					
Flow of events						
1)	This use case begins when the owner is within a certain proximity of his / her vehicle and the vehicle polls for the presence of a SmartCard.					
2)	The SmartCard responds to the vehicle with the owner identification information.					
3)	The vehicle authenticates the owner's identification.					
4)	The vehicle unlocks the driver side door, and this use case ends.					
Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X			X
Actors:	Vehicle system	Occupant		Service Provider	Other (specify)	
		Driver	Passenger			
	X	X				
Support information:						

NOTE   Another way of using the SmartCard is that the vehicle detects the presence of the SmartCard when the driver touches the door handle, authenticates the owner and then opens the door.

2.12.1.2   MOBI 1.2: SIM access profile

Feature:	Bluetooth Subscriber Identity Module (SIM) Access Profile functionality
Category:	Mobile
Description:	Use of SIM card. This can also be used for financial transaction
Required devices:	
Required services:	
Prior conditions:	

Flow of events	
1)	This use case starts when the driver selects the phone access menu.
2)	The system determines that the driver has selected the phone and shows a choice between internal and personal (inserted in the Bluetooth handset) SIM.
3)	The driver chooses the personal one.
4)	A phone call using the in car phone and personal SIM is placed.
5)	The user hangs up or the phone and/or the call ends and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X		X	X

Actors:		Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X		

Support information:	

2.12.2 MOBI 2: Mobile phone voice call

Category:	Mobile Devices
Description:	The user places a personal mobile phone into a docking cradle. The user interacts with the vehicle system to select a phone number to be dialed, which automatically dials the selected number on the docked phone.
Required devices:	• A pre-registered mobile phone for the vehicle • A microphone • Speakers • A human-machine interface device to accept user commands • A mobile phone docking cradle • An embedded mobile phone unit (Need an official name)
Required services:	
Prior conditions:	Pre-registration of the mobile phone in the vehicle

Flow of events
1) This use case starts when the mobile phone owner brings the mobile phone device into the vehicle and places it in a docking cradle.
2) The vehicle detects the mobile phone and the phone detects the vehicle.
3) The vehicle updates its user interface to include the new functions enabled by the phone.
4) The vehicle informs the occupant(s) of these new functions.
5) The mobile phone owner selects the new option, of "hands hands-free voice call."
6) The mobile phone owner enters the name or number to call.
7) The mobile phone owner engages in a normal hands-free voice call using a microphone and speakers in the vehicle.
8) The mobile phone owner finishes the call and this use case ends.

Optional devices:	Voice recognition device				
Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other (specify)**
		Driver	**Passenger**		
	X		X		
Support information:					

2.12.2.1 MOBI 2.1: Mobile phone voice call (docked)

Feature:	
Category:	Mobile devices
Description:	The user places a mobile phone into a docking cradle that provides a phone connection. The user interacts with the vehicle system through voice recognition to select a phone number to be dialed, which initiates a call on the docked phone.
Required devices:	• Mobile phone • Customer port • Docking cradle • Audio system • Microphone
Required services:	
Prior conditions:	There is a voice recognition and speech synthesis system

Flow of events
1) This use case begins when the driver enters the vehicle and places a mobile phone in the docking cradle.
2) The driver initiates the voice recognition system by pressing a button.
3) The radio, if on, is muted.
4) The driver voices a command to dial a number, followed by the phone number.
5) Mobile phone dials the number and makes connection.
6) The driver begins conversation by speaking into microphone and listening through speakers.
7) The driver activates (again) voice recognition system by pressing button.
8) The driver ends the call through a voice command.
9) Connection is terminated and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X		X		

Support information:	

NOTE   This use case stays the same regardless of how the phone connection is established. Bluetooth, IrDA and serial line are possible ways of phone connection.

2.12.2.2 MOBI 2.2 Mobile phone voice call using Bluetooth technology

Feature:	Bluetooth Hands free phone functionality
Category:	Mobile
Description:	Driver makes a hands-free phone call using a Bluetooth enabled phone in his pocket. This use case demonstrates the Hands free phone profile defined by BT Car Working Group.
Required devices:	Bluetooth mobile phone
Required services:	
Prior conditions:	• CD audio is playing over all vehicle speakers. • Navigation system has been set up to provide audio turn-by-turn directions.

Flow of events	
1)	This use case starts when the driver selects the hands-free phone function.
2)	The system determines that the driver has selected the hands-free phone function and mutes the audio volume to the front driver side speaker.
3)	The hands-free phone output is routed to the front driver side speaker, with the phone output volume adjusted appropriately.
4)	The driver proceeds to place a call using the Voice Response (VR).
5)	While the phone call is in progress, the navigation system determines that it must notify the driver that a turn is approaching. The CD audio output in the front passenger speaker is muted, and the navigation system uses the front passenger speaker to announce the turn. Once the turn announcement is made, the CD audio output volume on the passenger front speaker is restored to the original level.
6)	The driver finishes the hands-free call and de-selects the hands-free phone function.
7)	The CD audio output volume to the driver front speaker is restored to the appropriate volume and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:		Occupant		Service provider	Other (specify)
		Driver	Passenger		
	system				
	X	X			

Support information:	

2.12.2.3   MOBI 2.3: Phone access profile

Feature:	Bluetooth phone access functionality
Category:	Mobile
Description:	This use case is an extension of the Hands-Free Phone use case. In addition to using the Hands-Free phone, the user also needs to know and interact with phone parameters such as signal strength, battery level
Required Devices:	Graphic Display
Prior conditions:	

Flow of events	
1)	This use case starts when the driver selects the hands-free phone access menu.
2)	The vehicle system determines that the driver has selected the hands-free phone and shows a menu where to select the desired functionality.
3)	The driver chooses the desired function (access to phonebook, phone status, call forwarding, call barring, SMS support)
4)	The related information is displayed on the user interface.
5)	The user stops personal phone interaction and exits the phone access menu and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X			

Support information:	

2.12.3 MOBI 3: Mobile phone data call

Category:	Mobile Devices
Description:	A mobile phone is brought into the vehicle and used to provide a wireless data connection.
Required devices:	• A pre-registered mobile phone for the vehicle • A microphone • Speakers • A human-machine interface device • A mobile phone docking cradle • An embedded mobile phone unit
Required services:	
Prior conditions:	

Flow of events	
1)	This use case starts when the occupant brings a mobile phone into the vehicle.
2)	The vehicle detects the mobile phone and the phone detects the vehicle.
3)	The vehicle updates its user interface to include the new functions or applications enabled by the phone.
4)	The vehicle informs the occupants of these new functions.
5)	The mobile phone owner selects a new option and its application requires a data connection.
6)	The mobile phone establishes a data connection to the service provider and transfers information.
7)	The mobile phone owner interacts with the newly enabled application.
8)	The mobile phone owner terminates the application and this use case ends.

Optional devices:					
Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other (specify)**
		Driver	**Passenger**		
	X		X		
Support information:					

NOTE   Phone may connect without a cradle (Bluetooth or improved IrDA), or via a cradle connected to the user port, the AMI-C bus, or the vehicle manufactured bus.

2.12.3.1   MOBI 3.1: Mobile phone data call (docked)

Feature:	
Category:	Mobile Devices
Description:	A mobile phone is brought into the vehicle and used to provide a wireless data connection.
Required devices:	- Mobile phone - Customer port - Docking cradle - Protocol adapter - Graphic display
Required services:	Service provider
Prior conditions:	

Flow of events
1)   This use case starts when the user brings and docks a mobile phone device in the vehicle.
2)   The vehicle system discovers the phone's services.
3)   A graphic display shows a mobile phone icon indicating the additional phone services.
4)   The user selects the option, "dial-up networking application" that connects with the service provider.
5)   The dial-up networking application interacts with the mobile phone to make a wireless data connection.
6)   The user makes use of data connection to download e-mails.
h)   The user terminates application, the connection is dropped and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X		X		

Support information:	

NOTE   Several mobile phones may be brought into the vehicle and used to provide wireless data connections. These phones may be connected to different service providers and used by different occupants. There may be security reasons for preventing user A from accessing user B's data connection, etc.

2.12.4 MOBI 4: Mobile device messaging

Feature:	Send / receive asynchronous message via portable device.
Category:	Mobile Devices
Description:	A messaging device is brought into the vehicle. A message is received and read to the owner via text-to-speech. The owner dictates and sends a reply. The messaging device could be a pager or a mobile phone.
Required devices:	• A mobile messaging device • A docking cradle for the device, connected to an AMI-C network. • Speakers • A test-to-speech unit • A speech recognition unit • Speech recognition is available via a push-to-talk switch on or near the steering wheel (i.e. held down).
Required services:	
Prior conditions:	

Flow of events
1) This use case starts when the device owner places the device in its cradle and turns it on.
2) The vehicle detects the device and speaks, "<Make and model> device detected."
3) The phone device receives a message.
4) The device informs the vehicle of the incoming message.
5) The vehicle speaks, "New message has arrived from <Sender> subject <Subject>. Do you wish me to read the body of the message?"
6) The driver presses a manufacturer-defined HMI and says, "Yes."
7) The vehicle reads the message.
8) The vehicle asks the driver if they wish to reply to the message. The driver says, "Yes". The vehicle prompts the driver to dictate his / her reply.
9) The driver dictates his / her reply.
10) The vehicle converts the reply into text and sends it to the phone device.
11) The device replies with the converted message and this use case ends.

Optional devices:					
Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other (specify)**
		Driver	**Passenger**		
	X		X		
Support information:					

NOTE   The following user interface variations may be possible:

⎯ the message is spoken via text-to-speech;

⎯ the message is displayed as text;

⎯ messages are dictated and converted via speech recognition;

⎯ messages are typed into a (virtual) keyboard.

2.12.4.1 MOBI 4.1: Mobile device messaging, pager

Feature:	Receive and reply to an asynchronous message via pager.
Category:	Mobile Devices
Description:	A U.S. two-way pager device is brought into the vehicle. A message is received and read to or by the owner. The owner creates composes and sends a reply.
Required devices:	• Two-way pager • Docking cradle for the pager • Microphone
Required services:	
Prior conditions:	There is a voice recognition and synthesis system.

Flow of events	
1)	This use case starts as the driver brings a pager into the vehicle and docks it into a cradle.
2)	The driver starts the vehicle and turns on the radio.
3)	The pager receives a page.
4)	The vehicle system mutes the radio.
5)	The vehicle audio system informs the driver of the incoming page by voice synthesis through vehicle speakers.
6)	The driver activates voice recognition system by pressing a button.
7)	The driver sends a voices command to have pager read back the message (text or numeric).
8)	The vehicle audio system annunciates the message using voice synthesis through text-to-speech technology via vehicle speakers.
9)	The driver switches off the voice recognition system by pressing button.
10)	The radio volume is restored and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X		

Support information:	

2.12.4.2   MOBI 4.2: Receiving and replying to messages via SMS device

Feature:	Receive and reply to asynchronous message via SMS device.
Category:	Mobile devices
Description:	A SMS-capable device is brought into the vehicle. A message is received and read to or by the owner. The owner creates and sends a reply.
Required devices:	• SMS-capable mobile phone • Docking cradle • Microphone
Required services:	
Prior conditions:	There is a voice recognition and synthesis system.

Flow of events
1) This use case begins when the driver receives a message while operating the vehicle.
2) The vehicle system mutes the radio.
3) The vehicle system informs driver of incoming page by voice synthesis through vehicle speakers.
4) Driver activates voice recognition system by pressing a button.
5) Driver voices command to have pager read message.
6) The vehicle system reads out message by voice synthesis through vehicle speakers.
7) Driver speaks command to answer page.
8) System informs driver that it is ready to create message.
9) Driver dictates message by speaking into microphone.
10) Driver speaks command to send message to originator of received message.
11) Driver ends connection with voice recognition system by pressing button.
12) The radio volume is restored and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X		

Support information:	

2.12.5 MOBI 5: Sharing functions between the vehicle and a personal mobile device

Feature:	Portable device and vehicle share capabilities.				
Category:	Mobile Devices				
Description:	An occupant introduces portable device into vehicle, enhancing capabilities of one or both.				
Required devices:	Customer port or other device cradle.				
Required services:					
Prior conditions:	The vehicle can detect mobile devices brought into the vehicle, via a docking cradle, data port, wireless or similar technology.				
Flow of events					
1)	This use case starts when an occupant brings a mobile device into the vehicle.				
2)	The mobile device gains a new set of functions, or existing functions are enabled, that relate to the vehicle.				
3)	The vehicle system gains a new set of functions or capabilities that are hosted on the device.				
4)	The occupant interacts with the newly augmented combination of mobile device and vehicle system.				
5)	The mobile device is removed from the vehicle and this use case ends.				
Optional devices:	• Data communication (modem) • Voice communication (wireless phone) • Audio output • Audio input (microphone) • Voice recognition or switches • Graphical display • Sound processor • General purpose processor (GPP) or special purpose processor (SPP)				
Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X		X		
Support information:					

NOTE   Types of connectivity to consider across all types of mobile devices:

⎯ device interfaces via a cradle and RS232-like serial link;

⎯ device interfaces via USB;

⎯ device interfaces via Firewire;

⎯ device interfaces via IrDA;

⎯ device interfaces via Bluetooth;

⎯ device supports UPnP over lower-level connection;

⎯ device supports Salutation over lower-level connection;

⎯ device supports Jini over lower-level connection.

2.12.5.1 MOBI 5.1: Using a laptop's speech recognition capability with the vehicle's microphone and speakers

Category:	Mobile devices
Description:	The user brings a laptop into a host-less vehicle. The laptop connects the vehicle's microphone and speakers to its onboard speech recognition system.
Required devices:	• Microphone • Audio output • Docking cradle • Audio system control • Laptop
Required services:	Speech recognition and synthesis
Prior conditions:	

Flow of events
1) This use case begins when the occupant brings a laptop computer into the vehicle (and if not using Bluetooth or IR, physically connects it to a customer port).
2) Laptop device discovers the presence of available audio devices and offers option of using them to the occupant.
3) The occupant activates a laptop function that uses speech recognition and synthesis to provide hands-free, eyes-free access (e.g., to e-mail).
4) The vehicle system allocates resources to laptop, muting other output and enabling laptop to open audio streams to microphone and speakers.
5) The speech-driven laptop function begins using vehicle's audio channels.
6) The occupant uses the laptop function via voice recognition and synthesis.
7) The occupant terminates the speech recognition function via voice command.
8) The laptop function frees the vehicle audio devices; other audio sources are released from mute and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X		X		X

Support information:	

NOTE   This use case covers devices like MP3 player, etc.

- Device supports SLP over lower-level connection.

- Devices connect by establishing a PPP connection to an in-car server.

2.12.5.2   MOBI 5.2: Using a laptop as the user interface to on-board navigation

Feature:	A laptop (or PDA with JVM) user has vehicular applications displayed on his / her screen and accepts keyboard and mouse input.
Category:	Mobile Devices
Description:	A laptop is brought into the vehicle. The vehicle uses the laptop display, mouse and keyboard as an interface to an onboard navigation function.
Required devices:	• Customer port • Color video display • Audio output • Audio system • Laptop
Required services:	
Prior conditions:	• The vehicle can detect mobile devices brought into the vehicle. • The vehicle has at least one host (CPU with JVM). • The vehicle has a simple user interface, such as a small text-only screen, haptic control dial and basic text-to-speech. • The laptop has device drivers and client software installed sufficient to support the necessary connection, lookup and discovery mechanisms. In a primary scenario, Bluetooth is used to provide basic connectivity.

Flow of events
1)   This use case starts when the occupant brings his / her laptop into the vehicle.
2)   The laptop and onboard host are powered up, if they are not already in a powered state.
3)   The vehicle system reports that it has detected the laptop.
4)   The laptop reports that it has detected the vehicle system.
5)   The occupant instructs the vehicle to use the laptop, by twisting and clicking the haptic dial.
6)   The laptop owner grants permission for its interface to be used by the vehicle.
7)   A welcome screen, menu or similar message appears on the laptop screen.
8)   The driver selects navigation via the usual haptic dial / text screen route.
9)   The laptop displays the navigation function, accepting input via the mouse and keyboard.
10) The laptop owner interacts with the navigation function.
11) The laptop is removed from the vehicle.
12) The onboard navigation function returns to using the onboard user interface and this use case ends.

Secondary Scenarios	• The laptop is connected to the vehicle via a modem and PPP dial-up connection. • The laptop connects to the vehicle via IrDA. • The laptop connects to the vehicle via USB. • The laptop connects to the vehicle via a standard serial port. • The laptop connects to the vehicle via a parallel serial port. • In step 5, the laptop owner has the vehicle use the laptop without the driver's intervention. This removes the need for step 6. • In step 8, the laptop owner selects navigation via the laptop interface, rather than the driver using the onboard mechanism of haptic dial, etc.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X			X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X		X		X

NOTE   Further use cases:

— extend to include voice recognition software in the vehicle support applications on the laptop;

— extend to include voice recognition software on the laptop support applications in the vehicle.

2.12.5.3 MOBI 5.3: Establishing a dial-up data connection with a laptop

Category:	Mobile devices
Description:	A laptop connects to customer port, detects a docked or onboard mobile phone, and uses the phone to establish a dial-up data connection.
Required devices:	• Customer port • Laptop • Mobile phone
Required services:	
Prior conditions:	

Flow of events
1) This use case starts when the laptop owner brings it into the vehicle.
2) The laptop and onboard host are powered up, if they are not already in a powered state.
3) The vehicle reports that it has detected the laptop.
4) The laptop reports that it has detected the vehicle.
5) The driver tells the vehicle to use the laptop by twisting and clicking the haptic dial.
6) The laptop owner grants permission for its interface to be used by the vehicle.
7) A welcome screen, menu or similar message appears on the laptop screen.
8) The driver selects docked mobile phone.
9) The laptop opens a dial-up networking application to establish a data connection to a previously set-up service provider.
10) The laptop owner makes use of the data connection (i.e. web browser, ftp, etc.).
11) The laptop owner manually disconnects the dial-up networking application.
12) The mobile phone connection is released and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X		X		X

Support information:	

2.12.5.4   MOBI 5.4: Receiving audio output using wireless headset

Feature:	Wireless, Bluetooth-enabled headset used as audio output from any application.
Category:	Mobile Devices
Description:	A wireless, Bluetooth-enabled headset is used as audio output from any application.
Required devices:	- Bluetooth enabled headset - Audio system - Audio output - Customer port - Headphones - Graphical display
Required services:	
Prior conditions:	

Flow of events
1)   This use case begins when the user brings a Bluetooth-enabled headset into the vehicle.
2)   The system discovers services of the headset.
3)   An icon is shown on the graphical display to indicate the Bluetooth-enabled headset.
4)   The passenger plays a CD and listens to audio output through the headset.
5)   The passenger stops the CD player, the headset is freed and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X		X		X

Support information:	

2.12.6 MOBI 6: Synchronizing personal data between the vehicle and a personal mobile device

Feature:	Laptop and vehicle host exchange PIM data.			
Category:	Mobile devices			
Description:				
Required devices:	• The vehicle is equipped with a suitable user interface, such as voice, touch screen, keypad, haptic dial or similar device. • The vehicle can detect mobile devices brought into the vehicle, via a docking cradle, data port, wireless or similar technology.			
Required services:				
Prior conditions:				
Flow of events				
1) This use case starts when the mobile device owner brings the device into the vehicle.				
2) The vehicle informs the device owner that one or more valid data exchanges or synchronizations are possible between itself and the device.				
3) The device owner requests that PIM data be synchronized.				
4) The synchronization completes and this use case ends.				
Optional devices:				
Actors:	**Vehicle system**	**Occupant**	**Service provider**	**Other (specify)**
		Driver / **Passenger**		
	X	X		X
Support information:				

NOTE 1   A user may have preferences on the vehicle and in one or more devices that denote when and how synchronization should be performed. These will frequently conflict.

NOTE 2   Synchronization can be performed in an automatic, invisible fashion, or can be initiated from the portable device or from within the vehicle. Some technologies, such as Bluetooth, are intended to facilitate invisible synchronization. This may establish a common and popular paradigm.

NOTE 3   The Bluetooth paradigm will tackle issues arising from peer-to-peer synchronization, which may differ from PDA or phone to laptop sync, where the laptop is generally the "master" and the device is the "slave," regardless of which device initiated the synchronization. We should therefore watch what happens in Bluetooth and be prepared to learn from their experiences.

NOTE 4   Lower-Level use cases will cover a range of devices, including mobile phone, PDA, SmartCard, laptop, MP3 player and digital camera.

NOTE 5   Repeat these use cases for mobile Host, Controller and Device:

⎯ the device owner may choose to synchronize multiple data types or applications;

⎯ examples of specific data or applications: date / time, address book, calendar, to-do lists, e-mail, MP3 audio files, navigation or route planning data;

⎯ conflicts that arise between device and vehicle and are resolved;

⎯ synchronization may be performed invisibly to the user if there are no conflicts or resource shortages – perhaps the device owner has a profile somewhere that says, "do/do not prompt me before synchronizing," or, "only tell me about synchronizations if there are conflicts or resource shortages."

NOTE 6   Types of connectivity to consider across all types of mobile device:

• Device interfaces via a cradle and RS232-like serial link

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- Device interfaces via USB

- Device interfaces via Firewire

- Device interfaces via IrDA

- Device interfaces via Bluetooth

- Device supports UPnP over lower-level connection

- Device supports Salutation over lower-level connection

- Device supports Jini over lower-level connection

- Device supports SLP over lower-level connection

- Devices connect by establishing a PPP connection

2.12.6.1 MOBI 6.1: Data synchronization

Feature:	Bluetooth synchronization of mobile device data					
Category:	Mobile					
Description:	Synchronization of personal data with vehicle over Bluetooth link					
Required devices:						
Prior conditions:						
Flow of events						
1) This use case starts when the mobile device owner brings the device into the vehicle.						
2) The vehicle informs the device owner that one or more valid data exchanges or synchronizations are possible between itself and the device.						
3) The device owner requests that data be synchronized.						
4) The synchronization completes and this use case ends.						
Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X		X	X
Actors:	Vehicle system	Occupant		Service provider	Other (specify)	
		Driver	Passenger			
	X					
Support information:						

NOTE   Synchronization can be performed in an automatic, invisible fashion, or can be initiated from the portable device or from within the vehicle.

2.13 PREF

2.13.1 PREF 1: Configuring the vehicle's settings to an occupant's preferences

Category:	Preferences
Description:	Configure an AMI-C system according to an individual occupant's preferences.
Required devices:	
Required services:	
Prior conditions:	The vehicle supports hardware and software interfaces to the devices identifying users and possibly storing their preferences.

Flow of events
1) This use case starts when the occupant identifies himself / herself to the vehicle through an HMI.
2) The AMI-C vehicle system updates relevant screens and speech input/ output (I/O) systems to the occupant's pre-defined preferences such as; language settings, fonts, character sizes, color schemes, etc.
3) The AMI-C vehicle system adjusts the in-car systems to the user's preferred settings. (may include mirror and seat positions, climate control settings, steering wheel angle and position and so on.)
4) The vehicle system starts any required applications, based on vehicle location, time of day and any other relevant information.
5) Newly started applications may obtain information about the user's personal preferences and settings on a per-application basis.
6) This use case ends when the user is known to have left (e.g., removal of SmartCard, another user logs on, etc.) or the vehicle is turned off for more than some period of time (e.g., 30 minutes or according to user's preferences or factory settings).

Optional devices:					
Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X		
Support information:	Vehicle location Date/Time				

NOTE   Occupants may be identified via a combination of one or more technologies: User name / password, Smart Card and optional password, or biometrics, such as fingerprints or retina scans, speaker recognition, and so on.

2.13.1.1 PREF 1.1: Configuring a vehicle's settings via mobile phone

Feature:	Personal preferences – configure a vehicle for a user identified through mobile phone.
Category:	Preferences
Description:	A driver docks an active mobile phone. The driver is identified from the phone's SIM chip and his / her preferences are retrieved from local storage. The vehicle is configured to the driver's preferences (i.e., set application look-and-feel, mirror and seat positions, and climate control settings). Based on vehicle location and time of day, the load default routes into the navigation system.
Required devices:	- Mobile phone - Customer port - Voice recognition - Voice output - Audio output - Haptic dial - Docking cradle - Graphic Display
Required services:	
Prior conditions:	

Flow of events	
1)	This use case starts when the occupant docks the phone into its cradle.
2)	The occupant is identified from the Subscriber Identity Module (SIM) in the occupant's phone.
3)	The vehicle loads the occupant's preferences from onboard storage.
4)	The vehicle system greets the occupant by name.
5)	The vehicle annunciates, "I will now use your phone to download news articles."
6)	The vehicle establishes a Point-to-Point Protocol (PPP) dial-up connection to the occupant's ISP (details are stored in onboard storage) and connects to the news service via Hyper Text Transfer Protocol (HTTP) over Transmission Control Protocol/ Internet Protocol (TCP / IP).
7)	The occupant's preferences are stored in the vehicle for example to, "Download news in the morning from <CNN>." The vehicle downloads news articles from the news service, according to these online preferences.
8)	The vehicle stores the news articles in the onboard storage and terminates the data connection.
9)	The vehicle informs the occupant of the number of articles downloaded and the approximate cost associated with the download. The vehicle asks the occupant if they wish to hear the first article.
10)	The occupant turns the haptic dial until "YES" appears on the graphic display and clicks to select "YES".
11)	The vehicle system conveys news articles to the occupant and this use case ends.

Availability:	IGN OFF	IGN ACC		IGN ON	WAKEUP	MOVING	STATIONARY
Actors:	**Vehicle system**	**Occupant**				**Service provider**	**Other (specify)**
		Driver		**Passenger**			
	X			X			X
Support information:							

2.13.1.2   PREF 1.2: Vehicle personalization via Bluetooth technology

Feature:	Bluetooth synchronization of personalization data				
Category:	Preferences				
Description:	Personalization of vehicle settings using hand-held Bluetooth device				
Required devices:					
Required services:					
Prior conditions:					
Flow of events					
1)	This use case starts when the personal device is brought into range of the vehicle-embedded Bluetooth device. The personal device and the vehicle establish a Bluetooth connection and an authentication process is performed.				
2)	The user profile stored on the personal device is uploaded to the vehicle.				
3)	The vehicle greets the user by name.				
4)	The vehicle switches any relevant screens and speech I/O systems to the occupant's look and feel – language settings, fonts, character sizes, color schemes, etc.				
5)	The vehicle adjusts the in-car systems to the user's preferred settings. These systems might include mirror and seat positions, climate control settings, steering wheel angle and position, radio presets, service provider access information and so on.				
6)	The vehicle starts any required applications, based on vehicle location, time of day and any other relevant information.				
7)	Newly started applications may obtain information about the user's personal preferences and settings on a per-application basis.				
8)	When the user turns off the vehicle or wants to disconnect the Bluetooth link, he is asked if the user profile on the personal device shall be updated to the manually changed device settings in the vehicle.				
9)	This use case ends when the user is known to have left (e.g. disconnection of the Bluetooth link) or the vehicle is turned off for more than some period of time (e.g., 30 minutes or according to user's preferences or factory settings).				
Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X		X	X
Actors:	Vehicle system	Occupant		Service provider	Other (specify)	
		Driver	Passenger			
	X	X				
Support information:					

2.13.2 PREF 2: Managing access to privileged functions and applications

Feature:	Personal Privileges
Category:	Preferences
Description:	A user is granted certain non-standard access rights.
Required devices:	
Required services:	
Prior conditions:	The vehicle supports hardware and software interfaces to the devices identifying users and possibly storing their privileges
Flow of events	
1) This use case starts when the occupant identifies himself / herself to the vehicle.	
2) The vehicle authenticates the occupant and authorizes personal privileges.	
3) The occupant is informed of additional available functions based upon personal privileges.	
4) The occupant uses these functions.	
5) This use case ends when the user is known to have left (e.g., removal of SmartCard, another user logs on, etc.) or the vehicle is turned off for more than a set period of time (e.g., 30 minutes or according to factory settings).	
Optional devices:	• Voice recognition input and output • Authentication device • Customer port

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X		

Support information:	

NOTE 1   Occupants may be identified via a combination of one or more technologies: User name / password, SmartCard and optional password, or biometrics, such as fingerprints or retina scans, speech recognition, etc. Passwords may be required to authorize secure services.

NOTE 2   Privileges may apply to applications, as well as people. For example, a navigation application may mute the in-car speakers before communicating import route information to the driver (i.e. the need to turn off at the next exit due to severe congestion ahead).

NOTE 3   Privileged vehicle general reset and privileged device reset – Assume that the AMI-C system can be returned to default conditions.

2.13.2.1   PREF 2.1: Gaining access to online value-added service with a SmartCard

Feature:	A SmartCard owner is granted access to online value-added services.
Category:	Preferences
Description:	A SmartCard owner is granted access to online value-added services. In this case, the scenario calls for an advanced call center service with integrated data and voice over IP.
Required devices:	• Mobile phone or modem • Audio input • Audio output • SmartCard
Required services:	Real time assistance service provider
Prior conditions:	

Flow of events
1) This use case starts when the occupant inserts their SmartCard into an onboard reader.
2) The occupant requests Real Time Assistance, a value-added, advanced online help service.
3) The vehicle's Real Time Assistance client may authenticate the SmartCard owner.
4) The Real Time Assistance application establishes a secure data connection to the network-based service.
5) The Real Time Assistance service authenticates the occupant, using the details on their SmartCard.
6) Real Time Assistance commences, and a copy of the occupant's display appears on the Help desk operator's screen.
7) The occupant speaks to the operator via voice over Internet Protocol (IP).
8) The operator is connected to the onboard host and can guide the occupant through their problem.
9) The problem is resolved, the data connection is closed and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKEUP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	

Support information:	

2.13.3 PROD 1: Accessing productivity applications

Category:	Productivity
Description:	Occupant updates / accesses address (name, address, phone, e-mail, etc.) information, personal schedule information and / or personal to-do list information contained in the productivity applications feature of the vehicle's AMI-C system.

Required devices:	• Customer port • Speech recognition input and output • PDA • Laptop • Telephone • Modem	• Graphical display • Switches • General purpose processor (GPP) • Special purpose processor (SPP)

Required services:	
Prior conditions:	

Flow of events: Address Book

1) This use case starts when the occupant selects the "Productivity" function, on the graphical display menu.
2) The vehicle queries the occupant as to whether or not to save the current state information, if required by the previously selected application.
3) The vehicle presents the occupant with the "Productivity Applications" home screen.
4) The occupant selects the "Address Book" application from the menu on the "Productivity" home screen.
5) The occupant selects the first / next letter of the address to be found, using any input method provided by the vehicle.
6) The vehicle modifies the address entry list to reflect the occupant selection. The first address entry matching the input specification is highlighted.
7) If desired, the occupant may enter additional alphanumeric characters to further narrow the displayed address entry list. (Go to step 5.)
8) When the desired address entry is highlighted, the occupant selects the [Telephone] button / menu item if he / she wishes to call the person looked up.
9) The vehicle presents the occupant with Telephone application main screen. The destination phone name / number entry is already entered on the screen and this use case ends.

Flow of events: Personal Schedule

1) This use case begins when the occupant selects the "Personal Schedule" application from the productivity applications' menu.
2) The vehicle presents the occupant with the "Personal Schedule" home screen. The date / time displayed will be that shown when the schedule application was previously exited or, in the case of first use since car startup, the current date / time.
3) If the current date / time is visible on the screen, the entry area of the screen representing the current time will be highlighted. If there exists any entry / entries spanning the current time, these item(s) are also annunciated.
4) The occupant selects the desired date / time using any input method provided by the vehicle.
5) The entry area of the screen representing the chosen date / time will be highlighted. If there exists any entry / entries spanning the current time, these item(s) are also annunciated. If another date / time is desired, go to the previous step.
6) The occupant updates the information and saves the changes in a manner defined by the vehicle manufacturer. If another update is desired, go to the previous step.
7) When the user exits the application, this use case ends.

Flow of events: Personal To-Do List				
1)	This use case begins when the occupant selects the "Personal To-Do List" application from the productivity applications' menu.			
2)	The previously selected list or list of lists seen by this occupant, if known, is presented. If not known, the top "To-Do List" home screen is presented.			
3)	The occupant selects the desired command, list entry or list using any input method provided by the vehicle.			
4)	The message item area of the screen representing the chosen date / time will be highlighted and annunciated.			
5)	If a list is selected, it is expanded and the previous step is repeated.			
6)	The occupant chooses to terminate the application and this use case ends.			

Optional devices:					
Actors:	Vehicle system	**Occupant**		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	
Support information:					

NOTE 1   Address Book:

- Occupant may also choose other destination applications for the address book entry, as well as edit, delete and transfer the entry.

- Address book entries containing ambiguous data, such as multiple phone number in the case of transferring to the [Telephone] application, may require additional screens to determine appropriate data to be transferred.

- Address book database may be remotely located, requiring the use of other system resources to access it.

- Display and application startup preferences may be determined through a vehicle manufacturer-supplied user identification system.

- Availability and method of annunciation may be determined by the vehicle manufacturer and user preferences. [Accessibility]

NOTE 2   To-Do List:

- Occupant may also choose a variety of operations or destination applications for the list entry, as well as edit, delete and transfer the entry or create new entries.

- Transferring list entries containing ambiguous data, such as multiple phone number to other applications, may require additional screens to determine appropriate data to be transferred.

- The list database may be remotely located, requiring the use of other system resources to access it.

- Display and application startup preferences may be determined through a vehicle manufacturer-supplied user identification system.

- Availability and method of annunciation may be determined by vehicle manufacturer and user preferences. [Accessibility]

2.13.3.1   PROD 1.1: Accessing the address book

Category:	Productivity
Description:	The occupant updates address (name, address, phone, e-mail, etc) information contained in the Address Book feature of the vehicle's AMI-C system and calls the person looked up.
Required devices:	• Graphical display • Switches • General purpose processor or special purpose processor • Integrated telephone
Required services:	
Prior conditions:	

Flow of events
1) This use case starts when the occupant selects the "Address Book" feature on the control screen.
2) The vehicle queries the occupant on whether or not to save the current state of information, if required by the previously selected application.
3) The vehicle presents the occupant with the Address Book home screen, which includes a listing of address entries.
4) Occupant selects the first / next letter of the address to be found using any input method provided by the vehicle.
5) The vehicle modifies the address entry list to reflect the occupant's selection. The first address entry matching the input specification is highlighted.
6) If desired, the occupant may enter additional alphanumeric characters to further narrow the displayed address entry list. (Go back to step 4.)
7) When the desired address entry is highlighted, the occupant selects the [Telephone] button menu item.
8) The vehicle presents the occupant with the [Telephone] application main screen. The destination phone name / number entry is already entered on the screen and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKEUP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	

Support information:	

NOTE   The "Personal Schedule" and "To-Do List" low-level use cases would be very similar in flow, with the exception of placing the call.

2.13.4 PROD 2: Dictating e-mail message using speech-to-text technology

Category:	Productivity
Description:	The owner / occupant dictates a note or letter for transfer via e-mail, using the vehicle's AMI-C system.
Required devices:	- Graphical display - Switches - General Purpose Processor (GPP) or Special Purpose Processor (GPP) - Audio input - Audio output
Required services:	
Prior conditions:	The vehicle is equipped with an AMI-C system.

<table>
<tr><td colspan="2" align="center">Flow of events</td></tr>
<tr><td>1)</td><td>This use case starts when the occupant selects the "Dictation" application on the control screen menu.</td></tr>
<tr><td>2)</td><td>The vehicle system sends a message to the "Messaging Home Screen, asking the occupant if they would like to save the current application.</td></tr>
<tr><td>3)</td><td>The vehicle presents the occupant with the "Dictation" home screen."</td></tr>
<tr><td>4)</td><td>Using any method provided by the vehicle manufacturer, the occupant selects "Dictate New Note" option from the "Dictation" home screen".</td></tr>
<tr><td>5)</td><td>The vehicle presents the occupant with a "dictation status pop-up window" and begins recording ambient audio until commanded to pause or terminate recording.</td></tr>
<tr><td>6)</td><td>The occupant terminates the recording and selects "SAVE" from the "Dictation" home screen menu.</td></tr>
<tr><td>7)</td><td>The vehicle system prompts the occupant to label or name the recording before saving.</td></tr>
<tr><td>8)</td><td>The occupant selects the option "Send by e-mail" on the "Dictation" home screen.</td></tr>
<tr><td>9)</td><td>The recording is encapsulated, as required for inclusion into an e-mail message.</td></tr>
<tr><td>10)</td><td>The recording is transferred to the messaging application and this use case ends.</td></tr>
</table>

Optional devices:	- Voice recognition input and output - Customer port - PDA - Laptop - Telephone - Modem				
Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X	X	
Support information:					

NOTE 1   Occupant may also choose other destination applications for the record, as well as edit, delete and transfer it. Other possible destinations could be local storage or a voice mail system.

NOTE 2   A dictation / recording database may be remotely located, requiring the use of other system resources to access it.

NOTE 3   Voice recognition (VR) / automated transcription may be a preferred destination for dictation. Such an application may be remotely located, depending upon available processor / application capabilities.

NOTE 4   Display and application startup preferences may be determined through a vehicle manufacturer-supplied user identification system.

NOTE 5   Availability and method of annunciation may be determined by the vehicle manufacturer and user preferences. [Accessibility]

2.13.4.1 PROD 2.1: Dictation with e-mailing

Category:	Productivity				
Description:	The occupant dictates a note or letter for transfer via e-mail using the vehicle's AMI-C system.				
Required devices:	• Graphical display • Switches • General purpose processor or special purpose processor • Audio output • Audio input				
Require services:					
Prior conditions:					

Flow of events
1) This use case starts when the occupant selects the dictation function on the control screen menu.
2) The vehicle system sends a message to the "messaging home screen" that asks the occupant to save the current application.
3) The vehicle presents the occupant with the dictation home screen.
4) Using any method provided by the vehicle manufacturer, the occupant selects "Dictate New Note."
5) The vehicle presents the occupant with a dictation status screen and begins recording ambient audio until commanded to pause or terminate recording.
6) The vehicle prompts the occupant to label or name the recording.
7) Occupant selects "Send by e-mail…" on the dictation screen.
8) The recording is encapsulated, as required for inclusion into an e-mail message.
9) The recording is transferred to the messaging application and this use case ends

Availability:	IGN OFF	IGN ACC	IGN ON	WAKEUP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	**Passenger**		
		X	X	X	

Support information:	

2.14 SAFE

2.14.1 SAFE 1: Crash management system

Feature:	Occupant over rides 911 call due to severity of crash as determined by occupant.
Category:	Safety
Description:	A vehicle crash occurs and the airbag is deployed. The occupant decides an emergency call is not needed, and cancels the automated call.
Required devices:	• Crash management module • E-Call system • Mobile phone
Required services:	Vehicle service provider (VSP)
Prior conditions:	Need subscription to vehicle service provider emergency call.

Flow of events
1) A vehicle crash occurs.
2) An airbag(s) is deployed, which initiates an automated telematics call sequence for emergency support to the vehicle service provider.
3) Through the HMI, the occupant is given X amount of time to cancel the emergency call.
4) The occupant indicates to the telematics system via the HMI to cancel the emergency call
5) Emergency call is cancelled
6) The cancellation of the emergency call is logged in the telematics system (to support possible future litigation)
7) The occupant is notified the emergency call has been cancelled via the HMI.
8) The occupant manages situation of own accord and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X	X	X	X
Actors:	Vehicle system	Owner / Operator	Occupant / Pass.	Service provider	Other (specify)	
	x	x		x		
Support information:						

2.14.2 SAFE 2: Redundant driver assist system

Feature:	Allows AMI-C system to be default back up to automotive manufacturer driver assist network
Category:	Safety
Description:	The automotive manufacturer driver assist network (e.g. network to transfer blind spot camera output to driver display) fails. The AMI-C network is use as the redundant network to transfer date from the camera to the occupant graphical display.
Required devices:	Vehicle network interface switches between automotive manufacturer and AMI-C side networks
Required services:	
Prior conditions:	Need vehicle service provider subscription service.

Flow of events	
1)	An automotive Manufacturer driver assist network fails
2)	The driver is warned that failure in automotive manufacturers network has occurred.
3)	The AMI-C system is commanded by the automotive manufacturers network to change priority function to driver assist functions.
4)	The driver is notified by a vehicle service indicator of the vehicles that need for service.
5)	The AMI-C system is still active but has second priority to the automotive manufacturing required functions for driver assist

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X	X	X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	x	X		x	

Support information:	

2.14.3 SAFE 3: Driver assist arbitration

Feature:	Allows cooperation of driver assist and multimedia on same network				
Category:	Safety				
Description:	Driver assist system interrupts existing telematics applications over the AMI-C network and displays/announces the warning.				
Required devices:	Driver Assist safety system integrated with AMI-C network. Priority interrupt of telematics applications				
Required services:					
Prior conditions:					
Flow of events					
1)	The driver assist warning is tripped by rear monitor system.				
2)	The vehicle system mutes the audio stream.				
3)	The vehicle system switches the graphic display navigation screen to a warning camera pan view.				
4)	Warning is sounded over audio system speakers				
5)	The driver takes corrective action.				
6)	The vehicle system lifts the warning.				
7)	The audio stream is resumed and navigation screen returns to the graphic display.				

Availability:	IGN OFF		IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	x	X			

Support information:	

2.15 SECU

2.15.1 SECU 1: Disablement of stolen AMI-C components

Category:	Security			
Description:	A thief breaks in and removes AMI-C components for reuse / sale, but the components are disabled by an encryption and key scheme shared among the other system components, preventing them from being reused with other components			
Required devices:				
Required services:				
Prior conditions:				
Flow of events				
1)	This use case starts when the owner has a new AMI-C component installed in his / her vehicle.			
2)	As part of the installation process, a key is written into the component in a non-erasable manner.			
3)	Whenever the component is powered up, it executes a secure key exchange protocol across the AMI-C network; if the protocol is not completed correctly, the device does not operate.			
4)	A thief breaks into the car and removes the component.			
5)	The thief attempts to install the component in another vehicle with no security mechanism or with a different system key.			
6)	The component is powered up and the key exchange protocol fails, hence the device does not operate. And this use case ends.			
Optional devices:				
Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X				
Support information:				

2.15.2 SECU 2: Vehicle theft countermeasures

Category:	Security
Description:	The user detects a stolen vehicle and calls police, who sends a message to the vehicle. The vehicle responds with its current location. vehicle restart is also inhibited.
Required devices:	• Wireless transceiver • GPS
Required service:	
Prior conditions:	• Vehicle has automotive multimedia interface anti-theft system. • Vehicle has (non-defeatible) means of determining its location.

Flow of events	
1)	This use case starts when the driver detects that his / her vehicle has been stolen.
2)	The driver calls the security service and gives them the vehicle ID.
3)	The security service sends a message to the vehicle, requesting that it respond with its current location on a continuing basis and telling it to inhibit restart.
4)	The vehicle responds with its location and continues to respond until it the engine is turned off.
5)	The security service notifies the police of the vehicle's last reported location and this use case ends.

Secondary scenarios:	• Vehicle does not have capability to identify its location, but does have restart inhibit capability. • Also, vehicle may know approximate location (e.g. by mobile phone).
Optional devices:	

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X		X	

Support information:	

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2.15.3 SECU 3: Remote vehicle security function control

Feature:	Remote Door Status and Unlocking
Category:	Security
Description:	A remote vehicle security functions system allows vehicle owners to control certain functions of their automobiles by calling an automated service with a touch-tone phone. Functions can include: Opening or closing windows or sunroof, unlocking doors, disabling the engine (in case of vehicle theft), or other functions. The service also could be used to flash lights or sound the horn to find a parked vehicle, set the vehicle clock, or configure certain features.
Required devices:	
Required services:	
Prior conditions:	Driver has subscribed to the service that provides remote vehicle security functions.

Flow of events

1)	This use case starts when the driver calls a service provider from a touch-tone phone.
2)	The driver enters an ID number and a pin number.
3)	The driver selects the desired function from a menu read to him / her.
4)	The service provider sends a message to the vehicle indicating the function.
5)	The vehicle executes the requested function and sends a confirmation notice to the service.
6)	The driver hears a verbal confirmation and this use case ends.

Optional devices:					
Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X		X	
Support information:					

NOTE   The vehicle owner calls an automated voice response system with a touch-tone phone, enters a personal identification number (PIN) and selects the desired function from the menu. A pager signal is sent to a receiver in the vehicle, and the vehicle controller executes the requested function. Paging technology also allows text messages sent from a telephone or computer to be displayed in the vehicle.

2.16 SERV

2.16.1 SERV 1: Accessing online user guides and service manuals

Feature:	Provide on-line user manuals.
Category:	Service & Maintenance
Description:	The user accesses a service to obtain user guides and service manuals.
Required devices:	• Mobile phone • Graphical display • Keypad • Switches
Required services	• Vehicle data • ISP / Internet
Prior conditions:	Internet connection between the car and the Internet server (ISP) has been established.

Flow of events
1) This use case begins when the occupant requests access to a user guide or a service manual via the Internet.
2) The vehicle system transmits the requested Internet address to the domain host.
3) The documentation service (Internet site) responds with available options (for example, user guide or service manual).
4) The occupant selects the option desired.
5) The site requests vehicle information and configuration.
6) The vehicle supplies the requested information.
7) The site displays an index of the desired information.
8) The occupant selects the desired topic from the index.
9) The site displays the selected topic.
10) The occupant ends the Internet session and this use case ends.

Optional devices	• Two-way wireless • Pager • Pointing device					
Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X			X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	

Support Information	

2.16.2 SERV 3: Diagnose system fault

Category:	Service and Maintenance
Description:	Service technician uses one of two methods to perform diagnostics: Installs media that contains diagnostics software and service information, or Attaches a self-contained diagnostic tool to the customer port. Conventional diagnostic methods are used to work through a logical fault tree to isolate the fault condition.
Required devices:	• AMI-C system • Vehicle data • Graphical display • Customer port
Required services:	
Prior conditions:	• Service technician has documentation and diagnostic tools available. • Customer port connector is installed.

Flow of Events
1) This use case begins when the service technician installs diagnostic software or attaches a diagnostic tool.
2) Service technician runs diagnostics to isolate fault(s).
3) Service technician makes repairs.
4) Service technician confirms repairs by re-running diagnostics software.
5) Vehicle is returned to owner and this use case ends.

Optional devices:					
Actors:	Vehicle system	Occupant		Service provider	Other
		Driver	Occupant		
	X	X		X	X
Support information:					

NOTE 1   Diagnostics can be done continuously by the vehicle with integrated hardware and software, which may report a fault to the user and/or report the fault to a service activity through an external communication device.

NOTE 2   Diagnostics may be done by a remote service technician using wireless devices to initiate on-board diagnostic procedures. This could be activated by the owner, notifying the service center of a problem, or by regular interrogation by the service provider looking for "fault codes" from on-board diagnostic software.

2.16.2.1   SERV 3.1: Off-board diagnostics of an AMI-C system

Category:	Service and maintenance
Description:	An external diagnostic tester is used to diagnose an AMI-C system fault.
Required devices:	• External diagnostic tester (tool) • Customer port
Required services:	Vehicle data
Prior conditions:	Customer port connector access or direct connection to vehicle gateway if not equipped with a customer port.

Flow of events
1) This use case begins when the service technician attaches diagnostic service tool to the customer port.
2) The technician activates the diagnostic tool and the diagnostic procedure begins.
3) The diagnostic tool verifies that the AMI-C backbone signals and networks are functional; tests include diagnostic message exchange, signal levels, power levels and termination impedances.
4) The diagnostic tool does a system configuration test to determine what existing hardware and software services are available and what versions are being used.
5) The diagnostic tool's database is searched for relevant documentation, test scripts and user guides for services found, and compatibility information is generated.
6) The service technician performs test sequences, scripts and test scenarios as necessary.
7) The service technician makes the necessary repairs.
8) The service technician confirms correct operation.
9) The service technician returns the vehicle and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X	X	X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X				Service Technician

Support information:	

2.16.2.2 SERV 3.2: On-board diagnostics of an AMI-C system

Feature:	AMI-C system contains hardware and software components to continuously self-test.
Category:	Service and maintenance
Description:	System uses self-diagnostic software and hardware to continuously monitor system operation and report faults, and recommended repairs.
Required devices:	• Vehicle data (vehicle services) • Graphical display • Keypad • Switches • Indicator
Required services:	
Prior conditions:	

Flow of events	
1)	This use case begins when the AMI-C system detects a fault and responds by illuminating a small indicator light.
2)	The driver recognizes the notification light and requests additional information by selecting a fault report.
3)	The system displays the fault report on the graphical display.
4)	The driver may take corrective action or the driver may seek a service technician for help or the driver may request additional information.
5)	The driver closes the fault report display and the use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X			

Support information:	

NOTE   If the system is configured with a Java virtual machine to run external applications, many diagnostic services may be downloaded from on-line service providers.

2.16.2.3   SERV 3.3: Off-board diagnostics of an AMI-C system via dedicated short-range communication

Category:	Service and Maintenance
Description:	An external diagnostic tester is used to diagnose the vehicle through the DSRC communication.
Required devices:	• On-board unit for Dedicated Short-Range Communication (DSRC) • Diagnostic tool
Required services:	Vehicle data move to vehicle services
Prior conditions:	The vehicle is equipped with an on-board transceiver.

Flow of events
1) This use case begins when the service technician brings the tool in the communication zone. The diagnostic tool establishes a connection between the vehicle and the diagnostic tool.
2) The technician verifies the vehicle ID and begins diagnostic procedures.
3) The tool verifies that AMI-C backbone signals and networks are functional. (Tests include diagnostic message exchange, signal levels, power levels and termination impedances.)
4) The tool executes a system configuration test to determine what existing hardware and software services are available and what versions are being used.
5) The system searches its database for relevant documentation, test scripts and user guides for services and generates compatibility information.
6) The service technician conducts test sequences, scripts and test scenarios.
7) The service technician makes the necessary repairs.
8) The service technician confirms the correct operation and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X			

Support information:	

2.16.2.4 SERV 3.4: Off-board diagnostics of an AMI-C system via Bluetooth technology

Feature:	Bluetooth vehicle diagnostic profile implementation					
Category:	Service					
Description:	Checking or diagnosing vehicle status over the Bluetooth link					
Required devices:						
Prior conditions:						
Flow of events						
1)	This use case starts when the driver goes to an authorized gas station or garage and asks for a check-up of its car.					
2)	The service technician brings the tool in the communication zone and establishes a communication path between the vehicle and the Bluetooth diagnostic tool.					
3)	Technician verifies the vehicle ID and begins diagnostic procedures.					
4)	The tool first verifies that AMI-C backbone signals and networks are functional; tests include diagnostic message exchange, signal levels, power levels and termination impedances.					
5)	The tool does a system configuration test to determine what existing hardware and software services are available and what versions are being used.					
6)	A search of the database for relevant documentation, test scripts and user guides for services found is conducted and compatibility information is generated.					
7)	Test sequences, scripts and test scenarios are exercised, as necessary.					
8)	Necessary repairs are made.					
9)	Correct operation is confirmed.					
10)	The vehicle is returned and this use case ends.					
Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
	X	X	X			X
Actors:	Vehicle system	Occupant		Service provider	Other (specify)	
		Driver	Passenger			
	X	X				
Support information:						

2.16.3 SERV 4: Downloading a software application

Category:	Service and Maintenance
Description:	The occupant downloads new application software to the vehicle with Internet access through an on-line service provider.
Required devices:	• Mobile phone • Two-way, long-range transceiver • Graphical display • Keypad • Switches
Required services:	• ISP / Internet • Service provider
Prior conditions:	System must be powered and available.

Flow of events
1) This use case begins when the occupant activates the Internet through a service provider using control switches and a graphical display.
2) The occupant selects the Internet site.
3) The service provides the selected site.
4) The occupant uses switches to select the desired application.
5) The site downloads the requested application software.
6) The system prompts the occupant to select storage location from available options. [If mass storage is available, Save, Delete, Rename, Directory, Move, Copy, etc., are provided by the system.]
7) The site downloads the requested application software to the vehicle system.
8) The occupant receives a prompt asking if Auto Start should begin. If the occupant responds with yes, the application installs itself and runs.
9) The occupant confirms that the download (and, if applicable, the installation) was successful and the use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	

Support information:	

NOTE   If system allows installation of OS, runtime libraries, or any other software that requires the system to be re-booted, it is recommended that the vehicle be at a standstill.

2.16.3.1 SERV 4.1: Software download with vehicle in motion

Category:	Software Download
Description:	VSP offers list of available services to the driver while the vehicle is in motion
Required devices:	• Two-way, long-range transceiver • Display (e.g., graphical, variable text, text-to-speech, etc.) • Controls (e.g., button, switch, touch-screen, voice recognition, etc.) • Non-volatile memory • AMI-C host
Required services:	VSP / Internet
Prior conditions:	Contract for services between VSP and vehicle owner

Flow of events
1) Vehicle occupant makes a menu selection that contacts the vehicle service provider VSP.
2) The service provider connects with the vehicle; after validation takes place between the VSP and the vehicle the VSP requests configuration data.
3) Vehicle configuration data including installed software, software version, installed components, subscription level, etc. are transmitted to the VSP.
4) Based on the vehicle configuration data the VSP sends to the vehicle a list of services known to operate in that vehicle and their time to download.
5) The vehicle occupant makes a selection and that choice is immediately transmitted back to the VSP.
6) The VSP begins transmitting the requested service to the vehicle.
7) Estimated download completion time is indicated on the driver display
8) Upon completion of the download the requested service begins operation and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	

Actors:	Vehicle system	Occupant		Service provider	Other:
		Driver	Passenger		
	X	X	X	X	Navigation system

Support Information:	

NOTE   Items to check before download:

1) Devices – does vehicle have hardware to support service being downloaded. Similar to requirements description for off the shelf software.

2) Memory – to store application until no longer needed and memory to run the application.

3) Permissions – is this software allowed to access vehicle software it requires to run.

4) Other services (includes knowing version) – are services required for this software to run installed on the vehicle. Similar to needing Adobe Acrobat to read a PDF file.

5) Subscription type – e.g., basic, basic + emergency, basic + emergency + traveler information.

6) Restrictions to download – filters on content, trusted source.

2.16.3.2 SERV 4.2: Software upgrade to a parked vehicle

Category:	Software download
Description:	Contact vehicle service provider for software or service upgrade with the vehicle in park
Required devices:	• Two-way, long-range transceiver • Short range high bandwidth transceiver (i.e., 802.11) • Display (e.g., graphical, variable text, text-to-speech, etc.) • Controls (e.g., button, switch, touch-screen, voice recognition, etc.) • Non-volatile memory • AMI-C host
Required services:	Vehicle service provider
Prior conditions:	Contract for services between VSP and driver

<table>
<tr><th colspan="7">Flow of events</th></tr>
<tr><td colspan="7">1) The driver of a parked vehicle selects an option from the menu that contacts the vehicle service provider (VSP).</td></tr>
<tr><td colspan="7">2) The VSP receives the request and authenticates the vehicle for service. Upon successful authentication, the VSP contacts the vehicle and requests configuration data.</td></tr>
<tr><td colspan="7">3) The vehicle system transmits the configuration data such as; installed software, version, software license, installed components, subscription level, etc.</td></tr>
<tr><td colspan="7">4) Based on the configuration data the VSP notifies the vehicle system that a software upgrade is required. The VSP detects that the vehicle's transmission is in park and notifies the driver that a software upgrade is needed. The VSP also notifies the driver of any associated consequences such as costs or unavailable services if the download is accepted. The VSP asks the driver if they wish to receive the upgrade.</td></tr>
<tr><td colspan="7">5) The driver authorizes the software upgrade through HMI.</td></tr>
<tr><td colspan="7">6) The VSP recognizes that this vehicle is short-range high bandwidth (i.e., 802.11b) capable. Due to large size of the download file, the VSP suggests delaying the download until the vehicle is in contact with a transceiver.</td></tr>
<tr><td colspan="7">7) The driver chooses to ignore the recommendation and decides to request the upgrade anyway. The user enters authorization information and that information is immediately transmitted to the VSP.</td></tr>
<tr><td colspan="7">8) After receiving authorization, the VSP begins downloading the software upgrade to the vehicle using an alternative path.</td></tr>
<tr><td colspan="7">9) The HMI indicates the estimated download completion time.</td></tr>
<tr><td colspan="7">10) When the download is complete the software is installed and this use case ends.</td></tr>
<tr><td rowspan="2">Availability:</td><td>IGN OFF</td><td>IGN ACC</td><td>IGN ON</td><td>WAKE UP</td><td>MOVING</td><td>STATIONARY</td></tr>
<tr><td></td><td>X</td><td>X</td><td></td><td></td><td>X</td></tr>
<tr><td rowspan="2">Actors:</td><td rowspan="2">Vehicle system</td><td colspan="2" align="center">Occupant</td><td rowspan="2">Service provider</td><td rowspan="2" colspan="2">Other (specify)</td></tr>
<tr><td>Driver</td><td>Passenger</td></tr>
<tr><td></td><td>X</td><td>X</td><td>X</td><td>X</td><td colspan="2">Navigation system</td></tr>
<tr><td>Support Information:</td><td colspan="6"></td></tr>
</table>

NOTE   Items to check before download:

1) Devices – does vehicle have hardware to support service being downloaded. Similar to requirements description for off the shelf software.

2) Memory – to store application until no longer needed and memory to run the application.

3) Permissions – is this software allowed to access vehicle software it requires to run.

4) Other services (includes knowing version) – are services required for this software to run installed on the vehicle. Similar to needing Adobe Acrobat to read a PDF file.

5) Subscription type.

6) Restrictions to download – filters on content, trusted source.

2.16.3.3 SERV 4.3: Interrupting software download process

Category:	Software download
Description:	Contact VSP for fee-based software, the vehicle is in park and shut off before the download is complete.
Required devices:	• Two-way, long-range transceiver • Display (e.g., graphical, variable text, text-to-speech, etc.) • Controls (e.g., button, switch, touch-screen, voice recognition, etc.) • Memory • AMI-C host
Required services:	• VSP • Internet
Prior conditions:	Contract for services between VSP and vehicle owner

Flow of events
1) The driver of a parked vehicle selects an option from the menu that contacts the vehicle service provider (VSP).
2) The VSP receives the request and authenticates the vehicle for service. Upon successful authentication, the VSP contacts the vehicle and requests configuration data.
3) The VSP receives the vehicle's configuration data including, installed software, software license, software version, installed components subscription level, etc.
4) The VSP detects that the vehicle's transmission is in park and offers the driver a service upgrade and indicates the costs associated.
5) The driver accepts the software upgrade, which requires the driver to enter payment authorization information.
6) The driver turns the vehicle off before the download is complete.
7) The next time the vehicle is started, it automatically contacts the VSP and requests a continuation of the partial download.
8) The VSP validates this request and allows the download to resume.
9) The graphic display indicates that the unfinished download will resume and the estimated download completion time.
10) The download is completed, at this time the software fees are charged to the vehicle owner and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	Navigation system

Support Information:	

NOTE   Items to check before download (partial list):

1) Devices – does vehicle have hardware to support service being downloaded. Similar to requirements description for off the shelf software.

2) Memory – to store application until no longer needed and memory to run the application.

3) Permissions – is this software allowed to access vehicle software it requires to run.

4) Other services (includes knowing version) – are services required for this software to run installed on the vehicle. Similar to needing Adobe Acrobat to read a PDF file.

5) Subscription type – e.g., basic, basic + emergency, basic + emergency + traveler information.

6) Restrictions to download – filters on content, trusted source.

2.16.3.4 SERV 4.4: Software download not allowed

Category:	Software Download
Description:	Rear seat passenger contacts VSP or ISP for download which is not allowed due to virus being discovered.
Required devices:	• Two-way, long-range transceiver • Display (e.g., graphical, variable text, text-to-speech, etc.) • Controls (e.g., button, switch, touch-screen, voice recognition, etc.) • Memory • AMI-C host
Required services:	• Vehicle service provider • Internet
Prior conditions:	Contract for services between VSP and vehicle owner

Flow of events

1) The vehicle rear seat passenger makes a menu selection that contacts the vehicle service provider VSP.
2) Validation for service takes place between the VSP and the vehicle. When successful the VSP connects to the vehicle and requests configuration data.
3) Vehicle configuration data including installed software, software version, installed components, software license, and subscription level are transmitted to the VSP.
4) While browsing the Internet, the rear seat passenger discovers new software they wish to download and install in the vehicle. They initiate the download.
5) During the download the virus detection software discovers that this software is infected, ends the download, cleans any files that became infected by this virus and informs the user.
6) The user acknowledges the message and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X		X	X

Actors:	Vehicle system	Occupant		Service provider	Other:
		Driver	Passenger		
	X	X	X	X	Navigation system

Support Information:	

NOTE   Items to check before download (partial list):

1) Devices – does vehicle have hardware to support service being downloaded. Similar to requirements description for off the shelf software.
2) Memory – to store application until no longer needed and memory to run the application.
3) Permissions – is this software allowed to access vehicle software it requires to run.
4) Other services (includes knowing version) – are services required for this software to run installed on the vehicle. Similar to needing Adobe Acrobat to read a PDF file.
5) Subscription type – e.g., basic, basic + emergency, basic + emergency + traveler information.
6) Restrictions to download – filters on content, trusted source.

2.16.3.5   SERV 4.5: Downloaded software fails to function

Category:	Software Download
Description:	Contact the vehicle service provider for software or service upgrade, the vehicle is in park but the newly downloaded version fails to work.
Required devices:	• Two-way, long-range transceiver • Display (e.g., graphical, variable text, text-to-speech, etc.) • Controls (e.g., button, switch, touch-screen, voice recognition, etc.) • Non-volatile memory • AMI-C host
Required services:	• VSP • Internet
Prior conditions:	Authorization mechanism between VSP and vehicle owner Contract for services between VSP and vehicle owner

Flow of events
1) The driver of a parked vehicle selects an option from the menu that contacts the vehicle service provider (VSP).
2) The VSP receives the request and authenticates the vehicle for service. Upon successful authentication, the VSP contacts the vehicle and requests configuration data.
3) The VSP receives the vehicle's configuration data including, installed software, software license, software version, installed components subscription level, etc.
4) Based on the configuration data, the VSP notifies the vehicle that a software upgrade is required. The VSP detects that the vehicle's transmission is in park and notifies the driver that a software upgrade is needed. The VSP also notifies the driver of any associated consequences such as costs or unavailable services if the download is accepted. The VSP asks the driver if they wish to receive the upgrade.
5) The driver decides to upgrade and enters authorization information. The information is immediately transmitted to the VSP.
6) After receiving authorization, the VSP begins transmitting the software download to the vehicle.
7) When the download is complete the software is installed. The driver attempts to run the software but it fails.
8) The system detects the download failure and uninstalls the software upgrade then reverts to the previous version.
9) The driver is notified that the new software version is not compatible with the vehicle system. The user acknowledges this message and the use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X			X

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X	X	Navigation system

Support Information:	

NOTE   Items to check before download:

1) Devices – does vehicle have hardware to support service being downloaded. Similar to requirements description for off the shelf software.

2) Memory – to store application until no longer needed and memory to run the application.

3) Permissions – is this software allowed to access vehicle software it requires to run.

4) Other services (includes knowing version) – are services required for this software to run installed on the vehicle. Similar to needing Adobe Acrobat to read a PDF file.

5) Subscription type – e.g., basic, basic + emergency, basic + emergency + traveler information.

6) Restrictions to download – filters on content, trusted source.

2.16.3.6   SERV 4.6: Download triggers second download

Category:	Software download
Description:	Contact VSP for software or service upgrade, the vehicle is in park and the upgrade requires a second software download.
Required devices:	• Two-way, long-range transceiver • Display (e.g., graphical, variable text, text-to-speech, etc.) • Controls (e.g., button, switch, touch-screen, voice recognition, etc.) • Memory • AMI-C host
Required services:	VSP / Internet
Prior conditions:	Contract for services between VSP and vehicle owner

Flow of events
1) While parked in their driveway, the vehicle occupant makes a menu selection that contacts the vehicle service provider VSP.
2) Validation for service takes place between the VSP and the vehicle. When successful the VSP connects to the vehicle and requests configuration data.
3) Vehicle configuration data including installed software, software version, software license, installed components, subscription level, etc. are transmitted to the VSP.
4) The configuration data indicates that the vehicle requires a software upgrade. By virtue of the vehicle's transmission being in park, the VSP sends a request to the user indicating this need and any consequences such as costs or services that may not be available due to accepting the download. In this instance the upgrade requires additional software from a second vendor to be downloaded and asks if they wish to do the upgrade.
5) The vehicle occupant chooses to do the upgrade. The user enters authorization information and that information is immediately transmitted to the VSP.
6) After receiving authorization, the VSP begins transmitting the first piece of software to the vehicle.
7) Estimated download completion time is indicated on the driver display
8) When the first download is complete, the VSP automatically connects to and begins download from the second location
9) After both downloads are completed, they are installed and this use case ends.

Availability:	IGN OFF	IGN ACC	IGN ON	WAKE UP	MOVING	STATIONARY
		X	X			X

Actors:	Vehicle system	2.16.3.7 Occupant		Service provider	Other:
		Driver	Passenger		
	X	X	X	X	Navigation system

Support Information:	

NOTE   Items to check before download (partial list):

1) Devices – does vehicle have hardware to support service being downloaded. Similar to requirements description for off the shelf software.

2) Memory – to store application until no longer needed and memory to run the application.

3) Permissions – is this software allowed to access vehicle software it requires to run.

4) Other services (includes knowing version) – are services required for this software to run installed on the vehicle. Similar to needing Adobe Acrobat to read a PDF file.

5) Subscription type – e.g., basic, basic + emergency, basic + emergency + traveler information.

6) Restrictions to download – filters on content, trusted source.

2.16.4 SERV 5: Changing to a new service provider

Category:	Service and Maintenance
Description:	Customer changes providers. The customer cancels one service and subscribes to another.
Required devices:	• Wireless interface is installed • Mobile phone • Graphics display • Keypad • Switches
Required services:	Internet service provider
Prior conditions:	System must be powered and active.

Flow of events
1) This use case begins when the customer locates a new service provider on-line and downloads the subscriber package.
2) The occupant notifies new service provider and gives required registration information, activating new service.
3) The occupant downloads new application software (see SERV 4).
4) The occupant executes the application software to configure and set up per the service provider's instructions.
5) The occupant notifies the new service provider and gives required registration information.
6) The occupant activates the new service, confirms operation, and this use case ends.

Optional devices:	Mobile phone, graphical display, keypad, switches				
Availability:	**IGN OFF**	**IGN ACC**	**IGN ON**	**WAKE UP**	**Moving**	**Stationary**
		X	X			

Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other (specify)**
		Driver	**Passenger**		
	X	X		X	

Support information:	

NOTE 1   The new software may be provided on media, instead of downloaded.

NOTE 2   The new service may be activated on-line after software installation, instead of the owner notifying the service directly.

2.17 USER

2.17.1 USER 1: Shared multifunction display (with vehicle manufacturer functions)

Category:	User Interfaces
Description:	The multifunction display is being used when a request is made by the AMI-C system to display user requested information (e.g., navigation) on the multifunction display.
Required devices:	• Graphical display unit • General Purpose Processor (GPP)
Required services:	
Prior conditions:	

Flow of events
1) This use case begins when the occupant selects to see navigation (or other system) information on shared graphic display.
2) AMI-C navigation system requests permission via GPP from the system resource manager (SRM) for use of the graphical display.
3) The AMI-C system, via GPP, provides necessary data attributes (i.e. data type, volume, format, etc.) to the SRM.
4) SRM grants permission.
5) The vehicle system sends data, via GPP, to the shared display unit.
6) The occupant views information and this use case ends.

Optional devices:					
Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
	X	X	X		
Support information:					

NOTE   System contains AMI-C device / application software.

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2.17.2 USER 2: Sharing a display between AMI-C and an auto maker's functions

Category:	User Interfaces			
Description:	The character display unit is being used when a request is made by the AMI-C system to display user requested information (e.g. Internet Radio Station) on the character display.			
Required devices:	• Character display unit • AMI-C host platform (GPP)			
Required services:				
Prior conditions:				
Flow of events				
1)	This use case begins when the occupant selects to see Internet Radio Station (or other system) information on the shared character display.			
2)	The vehicle system requests permission, via GPP, from the system resource manager (SRM) for use of the character display.			
3)	The vehicle system, via GPP, provides necessary data attributes (data type, format, etc.) to the SRM.			
4)	SRM grants permission.			
5)	The vehicle system sends data via GPP to the display unit.			
6)	The occupant views information and this use case ends.			
Optional devices:				

Actors:	Vehicle system	Occupant		Service provider	Other (specify)
		Driver	Passenger		
		X	X		

Support information:	

2.17.3 USER 3: Sharing the audio system between AMI-C and an automaker's functions

Category:	User interfaces
Description:	The audio system is being used when a request is made by AMI-C system to provide user requested information (e.g. turn-by-turn navigation, e-mail access, etc.) through the vehicle audio system.
Required devices:	• AMI-C host platform (GPP) • Vehicle audio system • Navigation system
Required services:	
Prior conditions:	

Flow of events	
1)	This use case begins when the occupant selects a vehicle function that requires information through the vehicle audio system (e.g. turn-by-turn navigation system, or e-mail access, etc.).
2)	The vehicle system requests permission, via GPP, from the system resource manager (SRM) for the use of the vehicle audio system.
3)	The vehicle system provides necessary audio attributes (e.g., analog, stereo, mono, channel, etc.), via GPP, to the SRM.
4)	SRM grants permission and opens channel for audio input.
5)	The vehicle system sends audio signals / data via GPP to the audio system.
6)	The occupant listens to the information and this use case ends.

Optional devices:					
Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other (specify)**
		Driver	**Passenger**		
		X	X		
Support information:					

2.17.4 USER 5: Submitting input via voice recognition system

Category:	User interfaces
Description:	Vehicle is equipped with a voice recognition and synthesis (TTS) system with microphone for user's primary input.
Required devices:	• Voice recognition / synthesis system (text to speech) TTS with microphone • AMI-C host platform (GPP)
Required services:	
Prior conditions:	

Flow of events
1) This use case begins when the occupant activates or wakes up the speech recognition system for listening commands by pressing a button or by uttering command in the microphone.
2) The occupant speaks appropriate command to select / activate / control desired system (i.e. audio / DVD / VCR, Navigation, etc.).
3) The speech recognition (GPP) system recognizes the command and requests permission from the system resource manager (SRM) for use of the occupant requested resources.
4) SRM grants permission.
5) Speech recognition system sends data to the occupant-desired device.
6) The occupant listens / views information.
7) If further occupant input is required (e.g. menu selection), the TTS processor provides output to the user.
8) The occupant provides appropriate response by speaking proper command.
9) Steps 3 through 8 are repeated, as needed, and this use case ends.

Optional devices:					
Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other (specify)**
		Driver	**Passenger**		
		X	X		
Support information:					

2.17.5 USER 6: Sharing a multifunction heads-up display between AMI-C and an auto maker's functions

Category:	User Interfaces
Description:	The multifunction head-up-display is being used to display information (i.e. vehicle speed, audio system status, climate control etc.) when a request is made by the AMIC interface to access and display navigation information, such as left / right arrow, street name, etc.
Required devices:	• Head-Up-Display (HUD) • AMI-C host platform (GPP)
Required services:	
Prior conditions:	

Flow of events
1) This use case begins when the occupant selects to see navigation (or other AMI-C system) information on shared multifunction HUD.
2) AMI-C navigation (or other) system requests permission, via GPP, from the system Resource Manager (SRM)" for use of the portion of HUD area.
3) AMI-C system provides necessary data attributes (data type, display area needed, volume, format, etc.), via GPP, to the SRM.
4) SRM grants permission for display.
5) AMI-C system sends data to the shared HUD unit, via GPP.
6) The occupant views information and this use case ends.

Optional devices:				
Actors:	Vehicle system	Occupant	Service provider	Other (specify)
		Driver	Passenger		
		X			
Support information:				

2.17.6 USER 7: Using a universal remote control

Category:	User Interfaces			
Description:	An IR or Bluetooth wireless remote control is used to control vehicle audio system (i.e. CD / tuner / tape, DVD, TV, VCR, etc.). The remote control is also used to control multiple displays and input channels to the display.			
Required devices:	• IR or Bluetooth wireless remote control • AMI-C host platform (GPP)			
Required services:				
Prior conditions:				
Flow of events				
1) This use case begins when the occupant presses a button on the remote to activate the desired system (i.e. audio / DVD / VCR, etc.).				
2) AMI-C system requests permission, via GPP, from the system resource manager (SRM) for use of occupant requested resources.				
3) SRM grants permission.				
4) AMI-C system sends data, via GPP, to the occupant desired device.				
5) The occupant listens / views information and this use case ends.				
Optional devices:				
Actors:	Vehicle system	**Occupant**		Service provider	Other (specify)
		Driver	Passenger		
		X	X		
Support information:				

2.17.7 USER 8: Submitting input using buttons on the steering wheel

Feature:	Buttons on steering wheel for driver interface to vehicle manufacturer / AMI-C system.
Category:	User Interfaces
Description:	Steering wheel contains set of buttons for driver to control / select / access vehicle manufacturer / AMI-C system resources.
Required devices:	• Steering wheel buttons • AMI-C host platform (GPP)
Required services:	
Prior conditions:	

Flow of events
1) This use case begins when the driver presses a button on the steering wheel to select / activate / control a desired system (i.e. audio, DVD, VCR, HUD, Navigation, etc.).
2) AMI-C system requests permission, via GPP, from the system resource manager (SRM) for use of user requested resources.
3) SRM grants permission.
4) AMI-C system sends data, via GPP, to the user desired device.
5) The driver listens / views information and this use case ends.

Optional devices:					
Actors:	**Vehicle system**	**Occupant**		**Service provider**	**Other (specify)**
		Driver	**Passenger**		
		X			
Support information:					

2.18 BLUE

2.18.1 BLUE 1: Internet data access

Feature:	Bluetooth DUN Profile implementation					
Category:	Bluetooth use cases					
Description:	Accessing Internet data in car using Bluetooth enabled hand-set in					
Required devices:	• Mobile phone • Integrated phone					
Required services:	Internet service provider (ISP)					
Prior conditions:						
Flow of events						
1)	This use case starts when the driver selects a feature that requires an Internet connection.					
2)	The vehicle system determines that the driver needs an Internet connection and asks the driver to choose between using the integrated phone and the personal phone.					
3)	The driver chooses the personal phone and the system attempts to connect the vehicle to the Internet using the Bluetooth DUN profile.					
4)	The system notices that the Internet connection is not yet needed and releases the personal phone and the use case ends.					
Availability:	**IGN OFF**	**IGN ACC**	**IGN ON**	**WAKE UP**	**MOVING**	**STATIONARY**
	X	X	X		X	X
Actors:	**Vehicle system**	**Occupant**			**Service provider**	**Other (specify)**
	X	X				
Support information:						

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