BRITISH STANDARD

BS ISO 22902-2:2006

Road vehicles — Automotive multimedia interface —

Part 2: Use cases

ICS 43.040.15

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National foreword

This British Standard was published by BSI. It is the UK implementation of ISO 22902-2:2006.

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Part 2: Use cases

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Contents

Page

Foreword iv

1 Scope 1

2 Use cases 2
2.1 COMB 2
2.2 COMM 9
2.3 CUST 18
2.4 EMER 28
2.5 ENTE 32
2.6 FLEE 51
2.7 GUID 60
2.8 HOME 75
2.9 INFO 79
2.10 ITS 85
2.11 MESS 87
2.12 MOBI 102
2.13 PREF 121
2.14 SAFE 131
2.15 SECU 134
2.16 SERV 137
2.17 USER 151
2.18 BLUE 158

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

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*

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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.

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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.

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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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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.

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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.

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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:	

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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.
Flow of events	
1)	This use case starts when the driver selects the navigation application and programs in the destination and display options.
2)	The graphical display shows the navigation map with an insert indicating turn-by-turn directions.
3)	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).
4)	The driver uses the touch screen to adjust the vehicle climate control.
5)	While driving, a weather alert is received. The vehicle system displays the alert in an insert window on top of the navigation display.
6)	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.
7)	The driver selects "more information" and the weather alert displays on the entire display.
8)	The driver dismisses the weather alert and the display returns to its default position. (HVAC display over navigation) 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 Weather alerts may be received in multiple ways: Internet connection, radio sub-carrier, pager, etc.

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EXAMPLE

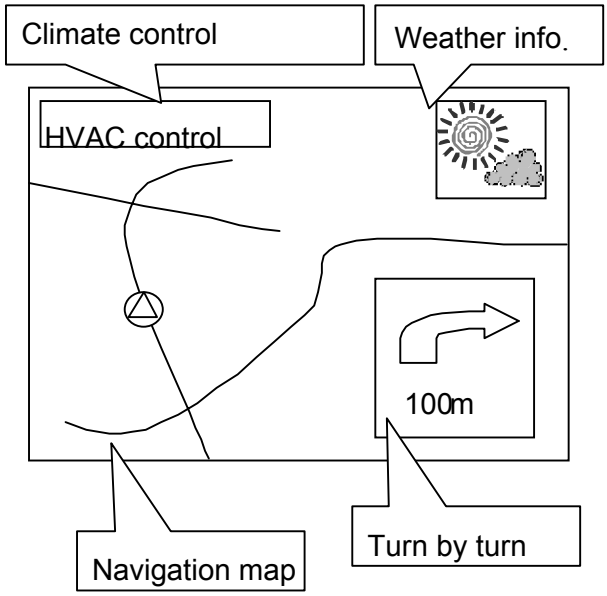

Figure 1 — Display screen

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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:	

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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.

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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.

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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:	

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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.

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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:					

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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:	

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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:	

AVA Documents
Document Sharing Hub

Full document details: BS ISO 22902-2:2006

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 (specify)**
		Driver	**Passenger**		
	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.

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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				

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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 (specify)**
		Driver	**Passenger**		
		X	**X**		

Support information:	Date / time

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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:	

AVA Documents
Document Sharing Hub

Full document details: BS ISO 22902-2:2006

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:	

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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 (specify)**
		Driver	**Passenger**		
	X	X	X	X	

Support information:	Date / time

Documents
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Full document details: BS ISO 22902-2:2006

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

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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:	

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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:	

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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.

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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.
Flow of events	
1)	This use case starts with the vehicle in operation.
2)	The driver encounters or witnesses an emergency situation.
3)	The driver activates the vehicle accident management system through an HMI, which establishes verbal link to service provider emergency center.
4)	The driver communicates the emergency to the center personnel, while the vehicle coordinates are relayed automatically to the emergency center.
5)	Emergency personnel take appropriate action (for example, call the police).
6)	The driver terminates the link and this use case ends.
Optional devices:	• Mobile phone • VIN data • Graphical display

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

Support Information:	

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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.

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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.

AVA Documents
Document Sharing Hub

Full document details: BS ISO 22902-2:2006

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.

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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 • Voice recognition input • Touch screen • Graphical display • Color video display • Audio system control • Audio mixer control • 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.

AVA Documents
Document Sharing Hub

Full document details: BS ISO 22902-2:2006

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.

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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:	

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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:	

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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.

Documents
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Full document details: BS ISO 22902-2:2006

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.

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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 output (speaker) • Switches / buttons • Radio tuner • Audio system control • Audio mixer control • Audio equalizer
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.

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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.

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006

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.

Documents
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Full document details: BS ISO 22902-2:2006

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.

Documents
Document Sharing Hub
Full document details: BS ISO 22902-2:2006