



SENSUS

A technology factsheet for user interaction
for 90 Series and 60 Series cars





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Introducing Sensus

"The nature of the in-car experience is changing. I am confident that Volvo's approach to connectivity, services, entertainment and information will help to define a future where technology is used to simplify and enhance the car experience as we move towards new forms of mobility and car ownership."

- Henrik Green, Senior Vice President Research & Development



Sensus – our entertainment and driver support solutions – gives the driver full control and makes it an enjoyable driving experience. Interaction is intuitive and it's easy to use.

Connected, enjoyable experience

Sensus is based on the concept of a fully connected and enjoyable experience in the car.

Our approach is straightforward: using the latest and most relevant technology to deliver a superior user interface and an enjoyable user experience. It's based on what people want and what makes their lives easier.

Instinctive by nature

We understand that people want seamless connectivity and an easy-to-use interface that enables access to the kinds of services and applications they use everyday.

What do you want to do?

Sensus is designed around five basic elements:

- Entertainment
- Connectivity
- Navigation
- Services
- Control

By delivering a suite of applications and interfaces that support these elements, we have created an award-winning approach to in-car technology.

Now and whenever... Volvo Cars' approach to driver control

At Volvo Cars, we focus a lot of time on researching the main causes of car accidents. We've been doing this since the company started in 1927.

Distraction is a major cause of accidents on today's busy roads. We have performed a lot of user interface research in recent years aimed at developing the least-distracting driver control interface available.

As everyone knows, it is important to keep your eyes on the road. We make this easier with all critical information presented via the Head-Up display or in the Driver display. Non-critical information is delivered via the centre display.

We call this the 'now and whenever' approach, reflecting the importance of the information that is displayed by where it is visible.

We support this with one of the best voice control and steering wheel control systems in the industry.



Volvo On Call

Volvo On Call was one of the first automotive telematics services available when launched in 2001.

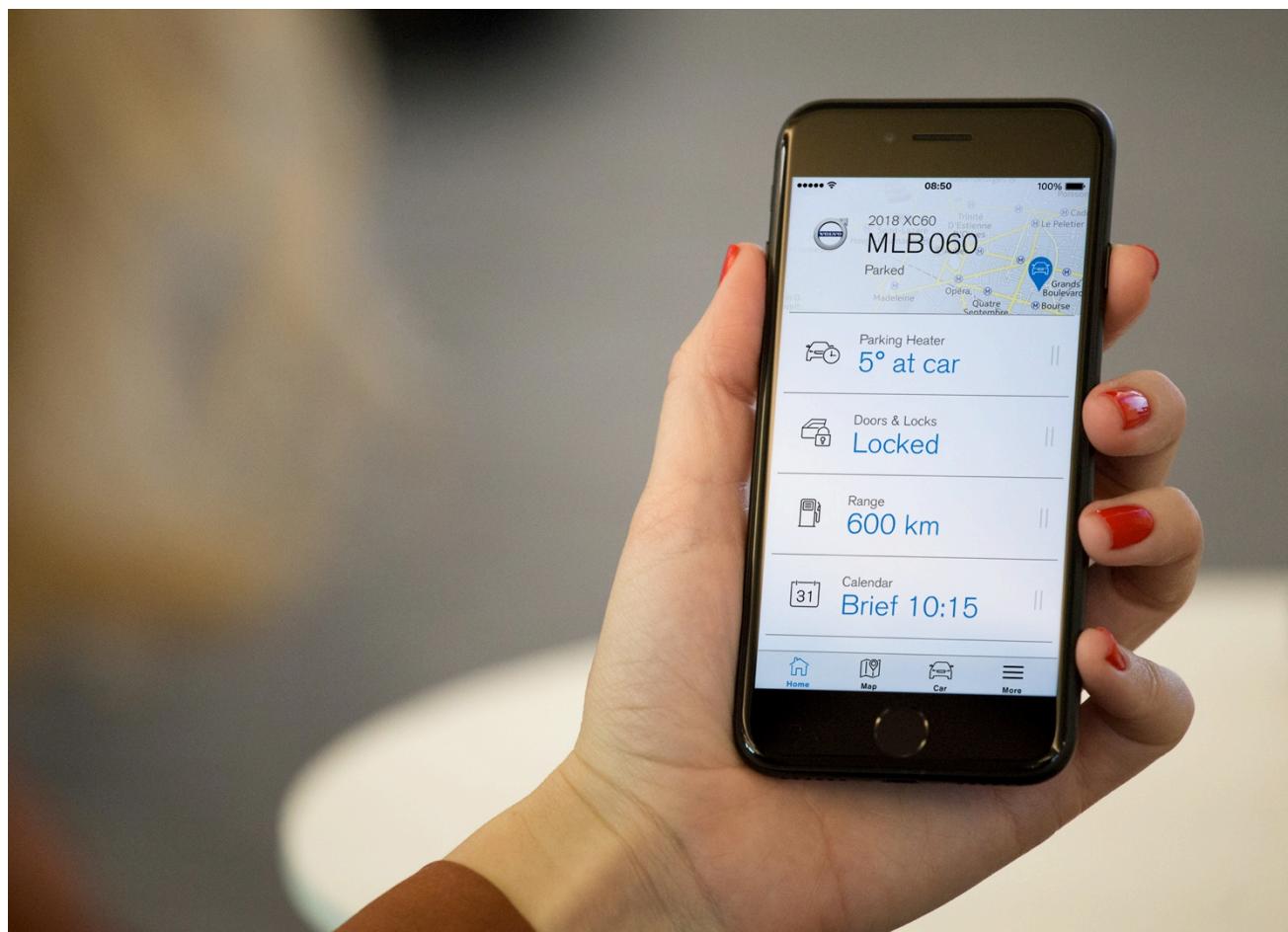
Volvo On Call was initially developed as a telematics safety system that alerts the emergency services if you are involved in an accident, or if you require roadside assistance due to a flat tyre. Volvo On Call also acts as a security system that allows stolen vehicles to be tracked.

The Volvo On Call app continues to expand its functionality with a wide range of connected services from Volvo Cars and our partners, aiming to make car ownership – and life – simpler.

"Our connected service offering is expanding to satisfy our customers' needs. Volvo On Call is changing from a remote car access app to a broad selection of enjoyable and functional connected services."

– Björn Annwall

Senior Vice President Global Consumer Experience





Volvo On Call

Delivering remote functionality to support everyday life.

At Volvo Cars, our pioneering approach to intuitive convenience and telematics services delivers a host of clever solutions that allows drivers to control their car remotely using a smartphone or a Windows 10 desktop-based Volvo On Call app.

Lost and found

Anyone who has lost their car in a parking garage will appreciate the Car Locator function, which flashes the lights and sounds the horn to help locate it. Similarly, the car can be locked and unlocked from a distance – or checked for locked status any time.

Notifications

Volvo On Call can send notifications to users. For example, the driver is notified if the alarm of the car is triggered. If the driver forgets to lock the car, Volvo On Call will send a reminder and enable it to be locked directly from the app.

Send destination

Volvo On Call can be used for destination searches – even from the comfort of a sofa – and the details can be sent to the car's navigation system.

When Volvo On Call sees that refueling is needed it can help find a fuel station and send the destination to the car, so it's ready to go.

Calendar integration

By giving Volvo On Call access to a calendar and contact data, the driver will be offered the option of sending meeting or contact addresses to the Sensus Navigation system, so the car is ready to guide them to the next meeting.

Preconditioning

One of the most widely used Volvo On Call features is the remote setting, starting or stopping the parking heater. Our new 90 Series and 60 Series cars can both heat and cool the car with remote engine start. So the car is always ready and comfortable.



Twin Engine support

Our growing range of Twin Engine plug-in hybrid cars is supported by a charging function in Volvo On Call that allows status monitoring of the high-voltage battery. It even enables pre-programming of charge times. It also sends reminders to use a charging station.

Driving journal

Trip history can be tagged as business, private, or marked with custom tags. It's a convenient and easy way for the driver to keep track of their travel. The driving journal is easy to export as an Excel file.

Wearables

Volvo On Call now comes with wearable support that works with iOS and Android operating system-based smartwatches, as well as Microsoft Band 2, for utilising the convenience of the Cortana digital assistant for remote voice control of the car.

Volvo On Call also supports Widget and 3D touch.



Volvo In-car Delivery

Technology should set you free – not enslave you.

With this in mind, we worked on devising a way to use existing connectivity platforms to make life easier.

In-car Delivery is a new service from Volvo Cars that allows online orders to be delivered directly to the boot of a Volvo car.

In-car Delivery utilises Volvo On Call functionality to allow single-time access – for partners the driver selects – to deliver goods or services to the car when it is parked. Service providers that offer this feature can simply book a time to deliver directly to the car, and the driver will be notified.

Delivered straight to your boot

The thinking is that packages, groceries, dry-cleaning, etc., can be delivered directly to the car while the owner is at work or play – essentially turning a car into a preferred delivery address.

In-car Delivery is currently available in Sweden, Norway, the United States and Switzerland, and will be extended to additional markets and partners/retailers over time.



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Services



Connected Service Booking



Connected Service Booking is a new service that supports the driver with car maintenance scheduling.

When the car is due to be serviced, or in the case of an unexpected fault, the car will alert the driver and offer to book a time with the driver's preferred service technician and will provide several booking alternatives to suit a busy calendar.

Once a convenient time is chosen, the driver simply selects 'book now' and the appointment will be made, with details ensuring technician is aware of what needs to be done to the car.

Connected Service Booking aims to make car maintenance as easy as possible.



Bluetooth®

Hands-free and Wi-Fi hotspot

Research shows that driver distraction accounts for up to 90 per cent of traffic accidents.

At Volvo Cars, we believe that providing a built-in hands-free phone solution that also provides a Wi-Fi hotspot is one way of effectively reducing distraction connected to phone use in a car.

This is one reason why Volvo offers seamless connectivity and Wi-Fi sharing from your smartphone to the car. We also offer this to make life easier.

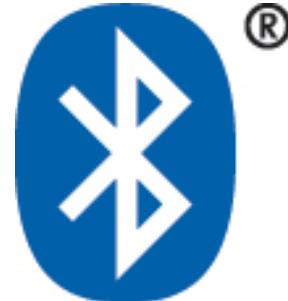
Volvo cars use Bluetooth® technology as standard.

Bluetooth® connectivity means that a phone can be connected to the car automatically when it enters, allowing a safe and easy hands-free experience. When the phone exits the car, the system disconnects, so any phone conversation can be continued as the driver leaves the car.

A smartphone can be operated via integrated controls on the steering wheel, with the driver's contact list accessible via the centre display for when a call needs to be made.

Voice Control of the phone is also available if the car has the optional Sensus Navigation system.

Thanks to Bluetooth® technology and the integrated steering wheel controls, it is easy to stream music services such as Spotify with a phone in the car, with full control to stop/play/skip tracks as desired. Track details are visible in the centre display.



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Level of functionality will vary depending upon the model and options chosen.

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90 Series



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60 Series

XC60



V60



S60



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Control



Touchscreen technology



Our new Volvo Cars portrait nine-inch tablet-like touchscreen has taken in-car entertainment, connected services and car feature interaction to a new level.

The award-winning solution is based on a clever infrared positioning system which uses the location of your touch to determine your desired input. As the screen is based on infrared technology it also delivers an almost reflection-free surface – perfect for use in moving objects such as cars.

Unlike traditional capacitive touchscreens, it can also be operated when wearing gloves or by people with long fingernails who might otherwise have difficulty placing fingertips on the screen. The screen size also allows for larger, easy-to-see and use virtual buttons.

Anyone familiar with smartphone or tablet computer interaction can easily operate the centre display with touch, swipe and pinch movements.



Touchscreen operation



Operation of the touchscreen is very straightforward with four 'tiles' delivering menu choices:

- Navigation
- Media
- Phone
- 3rd party apps and services

Our in-depth user research shows that these are the most commonly used features, along with climate settings, which always remain at the base of the screen.

The tiles expand when selected to reveal more functionality. The other three tiles remain visible and easy to select when these functions are required.

In addition to the main screen with four tiles, two further screens exist on each side of the main screen and can be accessed by swiping to the left or right.

These screens contain car settings and other entertainment applications, respectively.

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Control



Steering wheel controls

Quick and easy access to functions.



The left-hand spoke offers control of driving-function related systems such as Speed Limiter, Adaptive Cruise Control and Pilot Assist.

The right-hand spoke accesses infotainment features like audio, phone and navigation, plus Voice Control and a dedicated menu-scrolling button with four axis.



Driver display



The driver displays in Volvo cars use the latest high resolution screen technology to present a wealth of important information.

The display comes to life when you enter the car and presents speed, rpm, fuel/battery gear changes, navigation and incoming phone call information, plus other useful features.

We aimed to create a display that presents clearly visible information in an easy-to-understand design.

Built-in light sensors control the brightness of the display, that adjusts to exterior lighting conditions. The driver can choose between several different visual settings.

The driver display is available in both 8- and 12.3-inch formats.





Audio supremacy

Bowers & Wilkins

Audio excellence has always been an integral part of the Volvo Cars experience. Today is no exception. Volvo has teamed up with British audio legend Bowers & Wilkins to create one of the best in-car audio experience available.



Bowers & Wilkins uses bespoke acoustic technology developed over the British company's five decades of pioneering research into loudspeaker design.

The system is derived directly from acoustic technology developed for reference speakers used in some of the world's most demanding acoustic environments, including London's legendary Abbey Road Studios.

The result of the collaboration uses a combination of high-performance, low-distortion speaker designs, including extended range aluminium tweeters and Kevlar® midrange units, reflecting components found in Bowers & Wilkins award-winning loudspeakers. It also features a centre speaker with Bowers & Wilkins tweeter-on-top technology for the first time in a car, providing a more open, spacious sound.



With 18 Bowers & Wilkins speakers, and an air-ventilated sub-woofer built into the chassis, Volvo's new 90 Series and 60 Series cars deliver a distinct sound system tuned to perfection by Volvo's own audio engineers and experts from Bowers & Wilkins.

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Entertainment



Audio supremacy

Harman Kardon

Volvo Cars' partnership with Harman Kardon delivers a detailed and powerful audio experience.



The Harman Kardon Premium Sound is a speaker system tailored to each car model to deliver detailed powerful sound. It includes one fresh-air subwoofer and one fresh-air woofer for outstanding bass performance in a compact format.

With crystal clear highs, powerful bass and low-distortion mid-ranges, the Harman Kardon sound provides an outstanding listening experience for all occupants. The system also delivers full surround sound thanks to details such as Quantum Logic surround and specific full-range speakers placement.

The driver simply connects a smartphone to Apple CarPlay or Android Auto to open up a whole world of music via their favourite music apps, such as Spotify. The apps and sound experience are then all controlled via the nine-inch centre touchscreen.



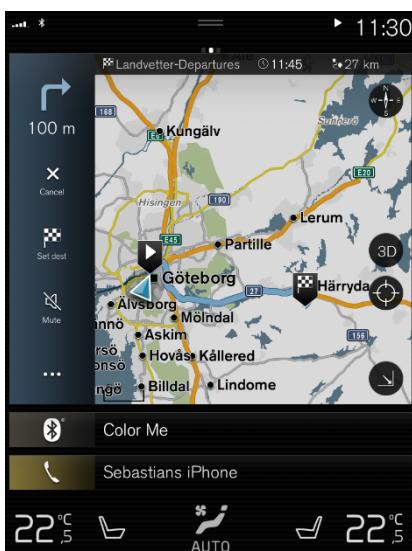
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Navigation



Sensus Navigation

Always there to guide you



Our Sensus Navigation system provides easy access to navigation functions for both front seat occupants. The maps are always current, with over-the-air updates.

Specific location/navigation-based apps are provided with Sensus Navigation, including:

- **Park&Pay** (find and pay for parking)
- **Yelp** (local business/restaurant/entertainment finder)
- **Glympse** (send a location to friends or family)
- **Local Search** (local business information)
- **Send to car** (send a destination to the car from a phone using Volvo On Call or via the Web with wego.here.com)
- **WikiLocations** (location-based information from Wikipedia)
- **Weather**

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Connect



Smartphone integration

Volvo Cars' Sensus user interface can now be equipped with smartphone integration, which enables access to specific phone features directly via the touchscreen.



Image shows Apple CarPlay in car screen



Image shows Android Auto in car screen

Sensus works seamlessly with both Apple CarPlay and Android Auto.

Unlike other automakers, Volvo Cars has a fully native integration that ensures a better overall experience and removes the need to switch from a phone's screen to the car screen.

As you can see from the images above, showing examples of CarPlay and Android Auto integration, the car's other 'tiles' are available at all times.

Smartphone applications will vary depending upon the type of smartphone being used.

Ultimately, Sensus is not about hardware or gigabytes of memory – it is about using the best available technology to deliver a distinct, easy-to-use and enjoyable user experience.



Native applications

Sensus comes with a range of native applications such as Spotify, Tuneln and Douban, to name but a few.

Applications included vary by region and by country to ensure that Volvo drivers have access to the services and entertainment they enjoy the most.

Below you can see a snapshot of the available applications.

App Name	US	EU	CN	JP	Require Sensus Navigation
Volvo ID	X	X	X	X	
Local Search	X	X	X	X	Navi
Weather	X	X	X	X	Navi
Tuneln	X	X		X	
Douban FM			X		
Pandora Internet Radio	X				
Find Parking			X	X	Navi
QingTing FM			X		
Yelp	X	X			Navi
Send-to-car	X	X	X		
Glympse	X	X		X	Navi
Pay for parking	X	X			Navi
Find Fuel, Hotel, Restaurant				X	Navi
Spotify	X	X		X	
Record and Send	X	X	X	X	
WikiLocations	X	X			Navi
Apple CarPlay	X	X	X	X	
Android Auto	X	X		X	

Relevant for the new 90 Series, 60 Series and XC40.

Relevant for the following models: XC90, S90, V90, V60, the new S60, XC60 and the new XC40. Some apps may not be available in all countries.

*Pandora is also available in Australia and New Zealand.

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Connected enjoyable experience



V O L V O

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