



AAA CENTER FOR DRIVING SAFETY & TECHNOLOGY



2017 TOYOTA SIENNA XLE



Standard and Optional Features in the 2017 Toyota Sienna

○ Optional

● Standard

	L	LE	SE	XLE	Limited
Android Auto					
Apple CarPlay					
Mobile App Support			○	○	●
Text Messaging	●	●	●	●	●
Navigation			○	○	●
Touch Screen	●	●	●	●	●
Gesture Control					
Heads-Up Display					
Voice Commands	●	●	●	●	●
Console Control					

INFOTAINMENT SYSTEM* DEMAND RATING

Moderate Demand



The 2017 Toyota Sienna XLE Entune™ infotainment system generated an overall moderate demand level. The limited options presented in the center stack phone and audio menus resulted in quick interactions, although very high cognitive (mental) demand levels were observed. Text messaging proved to be a highly demanding interaction, due in part to the text-heavy design of the messaging menu.

ABOUT THE STUDY

Researchers evaluated 30 new 2017 vehicles' infotainment systems* to measure overall demand** placed on a driver when using voice command, touch screen and other interactive technologies to make a call, send a text message, tune the radio or program navigation, all while driving down the road.

STRENGTHS

- Drivers can quickly place calls and make audio selections using the center stack.
- On-screen voice prompts are easy to read and understand.

WEAKNESSES

- Sending text messages using voice commands requires high levels of cognitive (mental) demand for long stretches of time.

* Infotainment System: Vehicle system that combines entertainment and information content

**Overall demand measured: visual (eyes-off road), cognitive (mental) and time-on-task

VEHICLE OVERVIEW: CONTROLS AND DISPLAYS



VOICE COMMANDS



STEERING WHEEL COMMANDS



INSTRUMENT CLUSTER



CENTER STACK

INFOTAINMENT SYSTEM

The Toyota Entune™ In-Vehicle Infotainment System offers the following features:

CALLING AND DIALING



The Toyota Sienna's Entune™ system offers phone calling via the voice command system and center stack when connected to a phone paired via Bluetooth. Steering wheel buttons allow for quick call pickup and hang up. Users are prompted to pair a device from the home screen phone menu shortcut, as well as from any phone-related menu. All phone features are available via voice or touch screen when stopped, but the touch screen allows access to only a preset list of favorites once in motion.

Results from the on-road study suggest that placing calls to contacts and dialing phone numbers via voice commands or use of the center stack results in overall moderate demand. Researchers[^] noted the added safety measure of restricting access to the phonebook and dial pad on the touch screen. Despite phone features being limited to a list of favorite contacts, the layout of the menu required scrolling to place calls to contacts, likely contributing to the very high cognitive (mental) demand drivers experienced. However, reducing phone functionality to this list of favorite contacts and four favorites on the home screen led to shorter task interaction times.

Contrastingly, using voice commands to call contacts and dial numbers allowed drivers to keep their eyes on the road. Interaction times, however, averaged 28 seconds[♦], which may be due to slow processing time and the jarring synthetic speech of the system's voice.

However, the Sienna's voice system does effectively guide users through the calling and dialing process, offering command examples on the touch screen that can easily be repeated by the user. Should users prefer manual selections, some functions can be accessed using touch-screen buttons in addition to voice commands once a voice session has begun.

TEXT MESSAGING



With a paired phone, drivers can access text messaging functions via voice commands and the center stack with little restriction while driving. Drivers can send one of 15 predefined messages to stored contacts or new phone numbers using voice commands and reply to messages in their inbox using the center stack. Incoming messages can be accessed using the touch screen and read aloud as the body of the message cannot be viewed while the vehicle is in motion. While stopped, drivers have the option to customize the predefined messages.

When using either the voice command system or the center stack, sending messages generated overall high demand. While drivers were able to keep their eyes on the road when using voice commands, the task resulted in high levels of cognitive (mental) demand.

Sending messages using the voice command system incurs high levels of cognitive (mental) demand for 45 seconds[♦] on average. Slow system processing times likely contributed to such lengthy interaction. Drivers can use conversational commands to send messages and refer to the touch screen for additional instructions and examples.

Using the center stack to access messages took significantly less time than using the voice system (25 seconds[♦] on average). While the steps to reply to messages using the touch screen are intuitive, users may have difficulty accurately pressing the relatively small buttons within the text-heavy messaging menu. Researchers[^] noted that the wait time necessary to load inbox messages on the Sienna was longer than in other systems tested, an aspect that may have increased task times.

[^]Researchers with expertise about how humans interact with technology evaluated the usability of the infotainment system in stationary vehicles.

[♦] Compared to a recommended maximum of 24 seconds



The audio entertainment system includes: AM, XM, and FM radio; CD; USB; Bluetooth; and auxiliary audio via the voice command system and center stack. A few audio options are available via steering wheel buttons. The touch screen displays audio information on the home screen and, if a menu other than audio entertainment is currently loaded, any audio-related changes will appear in a temporary dropdown ribbon along the top of the screen.

Overall, the Sienna created moderate demand when using the audio entertainment system. Although the limited options presented in the center stack audio menu allowed for short interactions, drivers were subjected to very high levels of cognitive (mental) demand. However, the larger touch-screen size, in comparison to other Toyota models evaluated, better suits the layout of the Sienna's audio menu, as the rectangular buttons are of an adequate size to be easily selected. Moreover, the home page and the customizable list of favorites provide convenient, alternative methods for making audio changes.

When using the voice command system, drivers were subjected to high levels of mental demand for an average of 21 seconds[♦]. The system conveniently provides audio-related on-screen prompts, though commands were simple enough that drivers were able to keep their eyes on the road.

[♦] Compared to a recommended maximum of 24 seconds

VEHICLE CONTROLS AND DISPLAYS

VOICE COMMANDS



The Sienna's Entune™ infotainment system includes a voice command system, which allows drivers to access phone functions, text messaging and audio entertainment. Drivers can activate the voice command system by pressing the dedicated button on the steering wheel and interacting with the automated female voice. Available commands and examples are displayed on the touch screen and are sorted by function and relevance to the current menu.

INSTRUMENT CLUSTER



The Toyota Sienna's instrument cluster, located behind the steering wheel, features a central 4.2-inch digital display in its center, with familiar gauges detailing vehicle information on either side. The display offers access to vehicle status, warnings and settings, as well as current audio entertainment information. Drivers can navigate through the cluster display menus using steering wheel buttons.

STEERING WHEEL CONTROLS



The steering wheel contains 15 raised buttons organized in a logical manner. Eight buttons on the left give access to audio entertainment, the voice command system and a few phone controls. Seven buttons on the right side organized in a familiar directional pad can be used to access the instrument cluster display.

CENTER STACK



The center stack contains a 7-inch touch screen surrounded by eight touch-sensitive buttons and two physical dials. Phone functions, text messaging, audio entertainment and other system applications are available from the home screen. Below the touch screen, a small monochrome LCD display with 14 physical buttons and five dials give access to climate settings.

VEHICLE SALES SUMMARY

The 2017 Toyota Sienna is the 35th best-selling vehicle in the United States, with 127,791 vehicles sold during 2016¹.

¹Source: Automotive News at autonews.com; Wall Street Journal at wsj.com – data updated to 2/25/2017