



AAA CENTER FOR DRIVING SAFETY & TECHNOLOGY



2017 FORD MUSTANG GT PREMIUM CONVERTIBLE

INFOTAINMENT SYSTEM* DEMAND RATING

Very High Demand



The Ford Mustang GT Premium Convertible's SYNC® 3 (version 2.20) infotainment system received an overall very high demand rating largely due to task inefficiencies. Drivers experienced the highest levels of visual (eyes-off-road) demand when using the texting feature.

Optional and Standard Features in the 2017 Ford Mustang

○ Optional ● Standard	V6 Fastback	EcoBoost Fastback	EcoBoost Premium Fastback	GT Fastback	GT Premium Fastback	GT Premium Convertible
Android Auto			●		●	●
Apple Car Play			●		●	●
Mobile App Support			●		●	●
Text Messaging	●	●	●	●	●	●
Navigation			○		○	○
Touch Screen			●		●	●
Gesture Control						
Heads-Up Display						
Voice Commands	●	●	●	●	●	●
Console Control						

Additional trim levels available

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

- Placing a call using voice or the touch screen is quick and efficient. The voice system understands natural speech and provides on-screen voice command help.

WEAKNESSES

- Using voice commands for text messaging features requires very high levels of visual (eyes-off-road) demand on drivers. Tasks took drivers approximately 34 seconds♦ on average to complete.
- The dial pad and full phonebook are accessible via the touch screen while the vehicle is moving.
- Searching for points of interest in the navigation system took 55 seconds♦ on average.
- Navigating through the center stack menus requires high cognitive (mental) demand, making it difficult to use.

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

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

♦ Compared to a recommended maximum of 24 seconds

VEHICLE OVERVIEW: CONTROLS AND DISPLAYS



VOICE COMMANDS



STEERING WHEEL COMMANDS



INSTRUMENT CLUSTER



CENTER STACK

INFOTAINMENT SYSTEM

The SYNC® 3 infotainment system offers the following features:

CALLING AND DIALING



Drivers can pair a phone with the infotainment system to access phone calls, text messaging, Android Auto and Apple CarPlay. Pairing a phone is a simple and intuitive process. Once a phone is connected via Bluetooth, drivers can call from a contact list and dial phone numbers using voice commands or the center stack.

The Ford Mustang's calling and dialing system was easy to use and generated overall moderate demand among drivers in the study. The steering wheel buttons allow drivers to answer and end calls. Results from the on-road study showed that while use of the center stack generated very high visual (eyes-off-road) demand, interaction times were relatively brief. However, both the dial pad and full phonebook are accessible via the touch screen while the vehicle is moving, which researchers[^] noted may prolong the amount of time a driver's visual attention is away from the roadway.

Among the strengths of the calling and dialing functionality is the phone widget on the center stack display's home screen. The large phone widget presents an overview of data related to the paired phone, such as the number of unread messages. The widget also functions as a button, giving drivers quick access to the phone menu. The voice system is efficient at placing calls and allows drivers to keep their eyes on the road. Additionally, the voice system accepts and can swiftly process a wide range of intuitive calling-related voice commands.

TEXT MESSAGING



With a phone paired, drivers can receive messages and send replies using voice commands or the center stack. Access to text messaging functions varies depending on the type of phone connected. For instance, iPhone users can only access messages that are received while driving, whereas an Android allows drivers to access all text messages in their inbox. To reply to a message using either the Android or the iPhone, drivers can choose from 15 predefined responses using either voice commands or the center stack. While the vehicle is in motion, touch screen interactions are restricted to only listening to messages, and drivers must reply using voice commands.

The Ford Mustang's text messaging capabilities generated overall high demand on drivers. While driving, the system reads text messages aloud and does not display them on the touch screen. Selecting a message for reply is difficult and can be very time-consuming when using voice commands.

The system displays a list of potential replies on the touch screen from which drivers select a response through voice or touch. On-road study results showed that using the touch screen to complete texting tasks took approximately 11 seconds[♦] on average but required a high level of visual (eyes-off-road) demand. Researchers[^] did find voice commands for replying to a message to be intuitive, as the system reads only the body of a selected text message aloud without less important details, such as date and time of the received message. Of note is that the system does not decrease the volume of audio entertainment playing simultaneously, which is a design oversight.

[^] 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 according to the federal government

INFOTAINMENT SYSTEM

AUDIO ENTERTAINMENT



The SYNC® 3 audio entertainment system includes: AM, FM and XM radio; CD player and USB port; Bluetooth audio; Apple CarPlay; and Android Auto. The system allows drivers to stream music from a variety of applications, if installed, on a connected phone. While the vehicle is in motion, drivers can access audio entertainment using voice commands, steering wheel buttons and the center stack.

Results of the on-road study showed that accessing common audio entertainment functions using the touch screen was difficult and distracting, and caused very high levels of cognitive (mental) and visual (eyes-off-road) demand. Conversely, voice commands generated mostly overall moderate demand as using voice required higher cognitive (mental) demand, but moderate visual (eyes-off-road) demand. Voice command interaction times were shorter when compared to touch screen interaction times.

The voice recognition system in this vehicle performed well when initiating entertainment tasks such as changing stations or choosing music selections. Notably, drivers were able to use conversational commands and did not have to memorize a set of system-specific phrases. While the system does provide on-screen prompts, drivers were still able to keep their eyes on the forward roadway. Unlike the texting functions, prompts on the touch screen that were related to entertainment tasks were easy to read and helpful for task completion.

Of note were the very high levels of visual (eyes-off-road) demand associated with completing entertainment tasks using the touch screen display. While the touch screen's audio menu has a simple and straightforward layout, buttons are sometimes difficult to accurately press due to their smaller size, and the menu structure is more complex than it needs to be.

TURN-BY-TURN NAVIGATION SYSTEM



The navigation system provides turn-by-turn directions to addresses and points of interest. Drivers can access turn-by-turn navigation using voice commands or the center stack. While the vehicle is in motion, the touch screen restricts drivers from accessing the system's full menu of categories. However, drivers found the menu made available to be complex and time-consuming.

The on-road testing of the navigation system found that destination entry was difficult and placed very high overall demand on a driver. Specifically, whether accessing via voice or touch screen, the system required high cognitive (mental) focus and required drivers to take their eyes off the road for a significant amount of time.

Accessing the navigation system using voice commands took 55 seconds♦ on average to search for points of interest. While the system recognizes natural speech with accuracy and guides the user effectively, the system can only process small bits of information at once, resulting in a multi-step process, which may lengthen the time required to complete a task. If the voice system is activated within the navigation menu, suggested navigation-related commands are displayed on the touch screen as a visual aid.

The dense button layout and muted color scheme have the potential to prolong the time required for drivers to search through the extensive number of categories on the touch screen. Lastly, the list of popular destinations in the shortcuts bar cannot be sorted, making it difficult to find the desired destination.

♦ Compared to a recommended maximum of 24 seconds according to the federal government

VEHICLE CONTROLS AND DISPLAYS

VOICE COMMANDS



The Mustang includes a voice system that allows drivers to access calling and dialing, text messaging, audio entertainment and turn-by-turn navigation via voice commands. The voice system is activated using the voice recognition button on the steering wheel. An automated female voice provides drivers with step-by-step guidance on how to use the voice system, such as offering suggested commands and indicating when to speak.

INSTRUMENT CLUSTER



The Mustang's instrument cluster behind the steering wheel features a 4.2-inch full-color LCD display, accessible via steering wheel buttons. The display is surrounded by familiar analog dials and gauges.

STEERING WHEEL CONTROLS



The steering wheel contains 20 buttons that give access to the cluster display, audio entertainment, cruise control, phone and the voice recognition system.

CENTER STACK



The center stack features an 8-inch full-color LCD touch screen, controlled by five buttons and two dials located below it. Further down the center stack, an additional cluster of buttons controls the vehicle's climate.

VEHICLE SALES SUMMARY

The 2017 Ford Mustang is the 51st best-selling vehicle in the United States, with 105,932 Mustangs sold during 2016¹.

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