

# **Advocates' Ask for Interfaces: Accessible Graphical User Interfaces (GUIs) in IFE systems or Other Small-Screen Devices**

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## **Background:**

When a graphical user interface (GUI) is "accessible," it means that the interface can be used by everyone regardless of ability or disability. For the purposes of this summary, an accessible IFE GUI is one which can be operated without sight or hearing, or by people with limited mobility. All of the basic principles of accessible design for electronic resources of all types, from stand-alone applications and apps, to Web pages and browser-based applications, can be found in the [Web Content Accessibility Guidelines 2.0 \(WCAG 2.0\)](#), hosted by the [Web Accessibility Initiative \(WAI\)](#) at the [World Wide Web Consortium \(W3C\)](#). Other useful guidelines and policies are listed in the [resources section](#) at the end of this document.

In IFE systems there are two categories of input mechanisms: touchscreen controls, and physical or tactile controls, such as buttons embedded in an armrest. Both types of controls can be made identifiable and accessible through the use of speech output, tactile indicators (such as a raised nib), braille labels or other methods. In all cases, users must be able to interact with all aspects of a GUI: for example, users must be able to read or hear on-screen text, identify controls (e.g., a checkbox, a slider or a button), determine what to do with a control, and know the state of the control itself (Is the checkbox checked or unchecked? Is the slider at 25% or 75%? Is the button in the on or off position?).

Assistive technology (AT) helps people with disabilities interact with applications, Web sites and other types of electronic resources. Screen readers, which are a form of text-to-speech (TTS) software, are among the most familiar types of AT. Screen readers, however, do not just read text that is visible on the screen. Instead, screen readers read from an application's code, which allows them to convey structure to users (such as identifying a button or other control) as well as content (such as reading the text that is visible on the screen). It is very important to note, however, that simply turning on a screen reader will not make an application or Web page accessible. Instead, electronic resources must be designed in an accessible manner in order to be usable with screen readers or other types of AT (such as screen magnifiers or braille-output devices).

Embedded or seat-back IFE systems operate for the most part in a manner similar to tablet or touch-screen computers, so it makes sense to approach the accessibility of these systems from the mobile perspective. In fact, some aircraft carry seat-back IFE systems that are, in fact, tablet devices running customized versions of the Android operating system. These and other types of seat-back IFE systems are controlled via touchscreen gestures or, in a dwindling number of cases, by physical buttons embedded in armrests. All can take advantage of existing solutions available on most modern tablet devices (or other mobile devices). For example, all iOS devices and modern Android and Windows Mobile devices come equipped with built-in

screen readers: VoiceOver, TalkBack and Narrator, respectively. These screen readers can be controlled using touchscreen gestures or keyboard commands, although in the latter case the "keyboard" effectively becomes armrest-control buttons. Any application designed to run on a device utilizing these operating systems can therefore take advantage of existing AT. In those cases, IFE engineers can theoretically concentrate on creating accessible applications without also having to be concerned with inventing AT to run on these systems. IFE systems that do not run on any of these three operating systems may need to have custom AT designed for those systems, but engineers can borrow methods and approaches from existing models from iOS, Android or Windows. Developer guidelines for designing accessible applications are listed in the [resources section](#) at the end of this document.

## **Our Ask - Basic Principles of Accessible GUIs**

WCAG 2.0 organizes accessible interfaces around [four principles](#): resources must be perceivable, operable, understandable and robust. The accessibility of electronic resources (including IFE systems) is determined using a number of factors, both visual and non-visual, all of which are related to these four principles. The non-exhaustive list below briefly summarizes the most basic criteria that would apply to IFE systems.

### **Visual:**

1. Sufficient foreground/background contrast
2. Visible on-screen focus indicator
3. Consistent and predictable layout
4. Clear and consistent labeling of controls
5. Absence of color alone to convey information
6. Textual alternatives for aural notifications or guidance
7. Captioning content clearly identified with logos
8. Ease of use for user controls (i.e. the ability to turn on/off captions with one button and the ability to adjust caption settings on the first level of the menu).
9. Interface accessibility features must also come with textual instructions on a seat-back card (as well with an aural component in the system).

### **Non-Visual:**

1. Operable with assistive technology, such as a screen reader or other speech-output device
2. Consistent and clear use of structural elements (headings, labels for controls, etc.)
3. Sufficient indication of the state and value of controls
4. Consistent and predictable layout
5. Tactilely discernible controls (where applicable; i.e., for armrest buttons)

## **List of GUI controls that must be accessible**

All users, including those with disabilities, must be able to read, identify and operate all GUI controls, either through touchscreen gestures or physical controls, including but not limited to the following items:

1. Call button
2. Food and beverage services, including the controls to select and purchase items
3. WiFi system, including the controls to select and purchase services
4. IFE systems, including the controls to browse channels, select and purchase IFE
5. IFE media players, including the ability to play, pause, stop, rewind and fast-forward through media
6. On-screen passenger-information systems, such as those conveying connecting-gate or baggage-claim information, destination information (such as the name of the destination or weather conditions)
7. Any static on-screen text (e.g., text describing a movie or a meal choice)

## Resources

Below is a list of resources for both iOS and Android developers who are interested in creating accessible mobile apps and Web sites, or who want to improve the accessibility of existing materials. Also listed are links to guidelines and best-practice documents for mobile accessibility. Note that developers using proprietary operating systems can also take advantage of the principles contained in these and other iOS-specific documents.

### Android resources

- [Android Accessibility](#)
- [Developing Accessible Android Applications](#)
- [Android Accessibility Tools and Guidelines](#)
- [Implementing Android Accessibility](#)
- [Developing an Accessibility Service](#)

### iOS resources

- [Accessibility in iOS](#)
- [Accessibility for Developers](#)
- [Accessibility Programming Guide for iOS: Introduction](#)
- [Accessibility Programming Guide for iOS: Making Your iOS App Accessible](#)

### Guidelines and Best Practices

- [BBC Mobile Accessibility Guidelines](#)
- [Mobile Accessibility at the Web Accessibility Initiative](#)
- [Mobile Accessibility Best Practices](#)
- [How WCAG 2.0 and Other W3C/WAI Guidelines Apply to Mobile](#)
- [Barriers Common to Mobile Device Users and People with Disabilities](#)
- [Current Section 508 Standards](#)
- [Revised Section 508 Standards](#) (to be released soon)

- [Web Content Accessibility Guidelines \(WCAG\) home](#)

### **Screen readers and other tools for testing accessibility**

Any accessibility-testing protocol must include the use of assistive technology. Below are links to screen readers, screen magnifiers and various tools for assessing the accessibility of Web sites and apps on mobile devices. Note that on all iOS devices, VoiceOver and Zoom are built into the operating system and so do not need to be downloaded and installed. On Android devices running 4.0 and higher, TalkBack and Magnification are pre-installed.

- [iOS Accessibility Home](#)
- [Configuring iOS Accessibility Features](#)
- [Quick Reference Guide for VoiceOver on iOS](#) (both gestures and keyboard shortcuts)
- [iPad Accessibility Features](#)
- [iPhone Accessibility Features](#)
- [TalkBack Home on Google Support](#)
- [TalkBack](#) (download from Google Play)
- [Explore by Touch](#), including gestures for controlling TalkBack
- [Accessibility Gestures for TalkBack 4.1 and later](#)