

## **Smartphone Overview for the Blind and Visually Impaired**

The “smartphone” has become a primary technology for many people who are blind or have low vision. A smartphone provides a multi-purpose toolkit like a “Swiss army knife. In addition to communications functions of a regular cell phone, smartphones integrate Internet access, maps and location services (GPS), calendar and time functions, camera-based object identification, and support for running a variety of useful software applications.

Part of the success of smartphones is the simplicity and universal design of the user interface (UI). Sighted users appreciate and rely on a highly visual touch-sensitive display with many small icons and labels. But smartphone users can also use touch, motion, screen magnification and voice instead of or in addition to vision-based operations.

To effectively use a smartphones, blind and low vision users must know what the phone is capable to do, get the right “apps” installed and organized, and then personalize the phone’s environment to their individual needs and preferences. This process starts with picking the right device and an appropriate service provider for their needs.

### **Key Applications of Smartphones**

Communications:	phone, text, email, voicemail, social media, Skype
Internet information access:	news, weather, sports, general
Organizer:	calendar, reminders, medications, workouts, etc.
Navigation:	maps, location, directions
Object identification:	product, color, money value, bar codes, etc.
Text reader:	object labels, documents, books
Media player:	music, video, podcasts, audio books
Entertainment:	games, puzzles
Social networking:	special interest groups, friends, interaction

Future articles in this Tech Corner series will explore many of these apps in more depth. Most of these applications are also supported on tablets and PCs. Tablets often use the same or very similar apps and user interface as smartphones. Thus, these articles are also largely applicable to using a tablet by itself or in combination with a smartphone or more traditional mobile phone.

## **Accessibility Features for Smartphones**

Most smartphone models provide important accessibility features for users who are blind or vision impaired. Core accessibility features include:

### Device Navigation

Touch-sensitive icons or buttons on the user interface represent the various features and applications of smartphones. These navigation buttons can be grouped and placed in a specific spatial order on the phone and personalized for easy recollection for each specific user. A user can then navigate the device by touch and sound.

### Display customization

Users with low vision can customize the brightness, contrast, colorization and font sizes according to the user's specific preferences, making the device easier to read.

### Magnification

Various features can magnify items on a screen, including increasing text font sizes, zooming and panning on images, and zooming in on textual labels.

### Text-to-Speech

A smart phone "screen reader" mode provides spoken descriptions of items on the screen and can read text items. The screenreader feature is called VoiceOver on Apple devices and TalkBack on most others (i.e., Android

phones). The screen reader feature announces icons as the user touches or selects them on the screen. A user can also select a text-to-speech feature to read aloud long text items such as email or articles. .

### Speech-to-text (voice recognition)

Many applications including search functions and email entry support voice commands and dictation to simplify text input. Apple's Siri is a well-known example.

## **Considerations when Acquiring a Smartphone**

There are several key factors to consider in getting a smartphone, with some of greater or lesser importance when intended for user with impaired vision. Some include:

### Operating System and Brand:

The Operating System (OS) is the embedded vendor software that controls the smartphone and provides the basic software environment for running all other Apps. Details of the UI and support for specific Apps vary among different OSs.

OS selection is largely a question of Apple's iPhone vs. any other product. The OS for Apple phones and tablets is called iOS (proprietary to Apple products). For most other popular phones, the OS is, which is openly licensed and supported by Google. Historically, Apple iOS has provided stronger and earlier support than the Android OS for accessibility features and apps for users who are blind or vision impaired. But the Apple products were higher priced. More recently, Android products have more comparable accessibility features, and a wide range of premium vs. economy-focused devices. In the US, Samsung has emerged as a market leader among Android brands, with LG, Motorola and several other device manufacturers also providing Android options. Apple products retain

strong support among the blind and vision impaired community, with a large base of applications and user support networks. Users who will rely on support from the blind community should consider Apple products. Low vision users with a personal history with Android products and potential Android support from friends, family or their workplace can consider viable Android alternatives.

### Phone Size

Apple, Samsung and others offer a broad range of device sizes. The general trend is that phones are getting bigger over time. Basic smartphones have grown from about 4 inches to over 5 inches tall. Larger sized phones are over 6 inches (“Plus” models), with some devices at 8 inches. Large sized phones are sometimes referred to a “phablets” since for some users they represent a two-in-one hybrid of a phone and a tablet. Low vision users should consider the larger screen size as it supports much larger scaling of icons, text and images. Of course, smaller phones are typically easier to pocket and handle.

### Mobile Service Provider

There are over a dozen commercial providers of mobile service in NH, although some of these are basically reselling services of other networks. Purchasing a phone as part of signing up for a service package is often most economical. Major mobile service providers offer a range of device options, usually including both Apple and other major brands, but specific options vary. Smartphone users need to investigate service coverage maps with both data and voice services. Many advanced software applications require strong data networking, typically so called 3g and 4G mobile services.

### Phone age and tech specs

Most smartphones manufactured within 2-3 years will support most current blind and low vision applications. Some users who will extensively use text-to-speech options (e.g., Apple Voiceover) will benefit from getting

a more powerful phone (e.g., faster CPU speed and type). Camera resolution and screen picture resolution is generally sufficient on all models for low vision apps, although are typically higher with newer models. Users with very large media libraries, particularly if they include numerous audio books or movies may want to consider additional digital storage. Most newer devices have sufficient storage for most users who do not store movies. Users may save some money by purchasing older refurbished devices, but in general should not go back more than 2-3 years for model years. Users want devices to remain compatible with iOS and Android software releases. The software will continually evolve and eventually drop support for older devices.

## **Support and Assistance**

There are many available resources for users adopting smartphone technology. Service providers and phone vendors offer some support in person and online. Apple in particular offers a support line dedicated to blind and low vision accessibility users. A number of web sites provide useful tutorials on accessibility features and applications for the vision impaired, with somewhat stronger support for the iPhone than for other products. A few of the many web resources of interest include:

- Seminars@Hadley (podcasts on iTunes, especially the iFocus series)
- Video tutorials at Carrol Center for the Blind
- Voiceover tutorial app from LookTel
- Guide to Apps: [AppleVis.com](http://AppleVis.com)

The New Hampshire Association for the Blind provides some get started support as part of client services and also has peer groups for technology users to share experiences and tips. This NHAB Tech Corner will provide additional articles on applications and products of interest to users with vision loss.