Application Review Criteria

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| **Requirement:** | **Good** | **Fair** | **Poor** | **Absent** |
| ***A.*** | ***Equitable Use*** |
| *a.* | *Utility:* |  |  |  |  |
| i. | Useful for all travelers, rather than specified for certain age groups or differing abilities. |  |  |  |  |
| *b.* | *Usability:* |
| i. | Includes basic usability options (i.e. text to speech as default) to avoid stigmatizing users. |  |  |  |  |
| ii. | Provides alternative means of inputting and outputting information (e.g., non-verbal) to ensure privacy. |  |  |  |  |
| iii. | Appeals to the widest possible audience by providing preference options based on a wide range within each specific ability. |  |  |  |  |
| iv. | Allows users to “hyper-personalize” the application via a user profile that accounts not just for their specific abilities but also preferences (e.g., family restrooms vs. wheelchair stall). This also requires that the level of facility detail built into the application data includes specifics such as family restroom vs. restroom. |  |  |  |  |
| v. | The ability to plan in advance is very important to both persons with disabilities and older travelers. Wayfinding applications should allow users to map their routes before arriving at the airport and know both distances and approximate times needed to/from the gate. This both reduces anxiety and allows users to make an informed decision on whether, for example, wheelchair assistance is necessary. |  |  |  |  |
| ***B.*** | ***Flexibility in Use*** |
| *a.* | *Utility:* |
| i. | Provide a choice in the way directions are given by using the device’s accelerometer/magnetometer/gyroscope to deliver instructions using compass heading (e.g., “walk north 100 feet”) or orientation (“walk straight 100 feet”). |  |  |  |  |
| ii. | For those who prefer cardinal directions, an easily accessed compass button is quite valuable. |  |  |  |  |
| iii. | Provide alternative information systems (e.g., text, vibration, flashing light) for receiving airport announcements, particularly for travelers who cannot hear the public address system. |  |  |  |  |
| iv. | Having a Bluetooth-controllable audio menu allowing for little hand use is helpful for travelers who are blind and those with limited manual dexterity. |  |  |  |  |
| v. | Convey wayfinding information using as many multisensory cues as possible including tactile (floor or wall) information, colors, sounds, temperature, volume, and smell. |  |  |  |  |
| vi. | Provide accessibility both with features provided by the operating system as well as interfaces with other wayfinding applications and other physical technologies such as Braille displays. |  |  |  |  |
| vii. | Allow users to move seamlessly from outdoor GPS navigation to the indoor navigation system provided by the airport application. |  |  |  |  |
| *b.* | *Usability:* |
| i. | Provide multimodal input methods such as touch screen (tap, lifting finger off screen), speech recognition, and gestures, including 3D touch gestures with use of fingers such as pinching and scrolling for magnification and navigation or hard-pressing to reveal more information about an item and 3D air gestures such as swipe, circle, or zoom that involve free movement in space. |  |  |  |  |
| ii. | Provide choice in moving forward and back between screens including scrolling as well as touch buttons such as “forward/next” or arrows. Minimize required user interaction accuracy and precision by using buttons that are as large as possible. |  |  |  |  |
| iii. | The application should be adaptable to a user’s pace, such as letting the user control progress within the application so that they have adequate time to read the text for popups that appear. In other words, popups should not automatically disappear based on a timer or user physical progress—the dismissal of the popup should be controlled by the user. |  |  |  |  |
| ***C.*** | ***Simple and Intuitive Use*** |
| *a.* | *Utility:* |
| i. | Terminology should be clear to users who are unfamiliar with map and navigation applications and should be consistent with standards of practice for similar applications. |  |  |  |  |
| ii. | Naming conventions for airport destinations and terminology should be consistent with the context (e.g., should replicate, to the extent possible, terminology used in a specific airport). However, where an airport uses unfamiliar terms, in the case of ABIA “hydration station” instead of “water fountain,” it may be necessary to also provide a more familiar term or description. Those who travel infrequently may also not be familiar with terms in common use in airports such as “concourse,” “hammerhead,” or “boarding area,” or they might be confused about the meaning of “departures” and “arrivals”; so, simple explanations or pictograms may be needed. |  |  |  |  |
| iii. | Applications should display information about alternative destinations (e.g., what’s nearby) on a map and/or list, with descriptions of points of interest. |  |  |  |  |
| iv. | Limit the information provided going through security as users typically put the mobile device away. |  |  |  |  |
| v. | Allow for random access to destination directions to enable users to locate destinations in any order (e.g., restroom) rather than assuming that the departure gate is always the primary destination. |  |  |  |  |
| vi. | To accommodate a wide range of wayfinding skills and information needs, routes and cues should be provided in a variety of ways, including turn-by-turn directions and overall route directions and alternative cues such as landmarks, points of interest, shorelines, and textures. |  |  |  |  |
| vii. | A “look around” feature allows the traveler who is blind to self-orient and to learn locations as they travel. Pointing the phone in a particular direction elicits a list of points of interest located there and the distance to each. This could also be generated via a “what’s around me” button, again providing specific directions to reach each nearby location. |  |  |  |  |
| viii. | Another preferred feature for users who are blind allows “bread crumb” recording of routes so that one can ask for assistance in walking a specific, often repeated, route and then have it recorded for step-by-step use in future. Most of these routes are also reversible. |  |  |  |  |
| ix. | Provide information that will accommodate a wide range of abilities, such as highly detailed descriptions for users who are blind, a visual/map-based system for people who have hearing loss, and information on where to locate a wheelchair for people with ambulatory limitations. |  |  |  |  |
| *b.* | *Usability:* |
| i. | To eliminate unnecessary complexity, instructions should be direct, such as: “turn left in 10 feet at the concourse walkway and walk for 100 feet.” |  |  |  |  |
| ii. | Provide a menu button on each screen to allow random access to previous screens and application features (e.g. changing preferences) to avoid going back screen-by-screen in a linear manner or starting the application over from the beginning. |  |  |  |  |
| iii. | The default for “usability” options such as text to speech should be basic preferences that are turned on, rather than hidden accessibility features that are turned off. |  |  |  |  |
| iv. | Each screen should clearly specify its purpose and indicate what is on the next screen and what was on the previous screen, providing full context of where the user is within the application. |  |  |  |  |
| v. | Icons should be familiar and consistent with user expectations and consistent with the design guidelines for the particular mobile phone platform. |  |  |  |  |
| vi. | The function of all buttons should be clear and consistent with user expectations. |  |  |  |  |
| vii. | To ensure that all users have access to all inputs and outputs, the default mode is to have all modalities turned on rather than forcing users to select those that they need and then limiting the types of modalities. |  |  |  |  |
| viii. | To accommodate a wide range of literacy and language skills, directions and destinations should avoid unfamiliar terminology (e.g., points of interest to identify restrooms) or define context-specific terms (e.g., hydration station to identify water fountains) that are not commonly used. |  |  |  |  |
| ix. | All features should be located in order of importance and consistent with the expectations, such as a menu at the top of the screen and “next” buttons at the bottom right of the screen. |  |  |  |  |
| x. | Provide multimodal prompts and outputs, including visual, speech, audio (e.g., non-speech cues sounds), and tactile cues to provide feedback that confirms user inputs (e.g., preference selection) and actions during and after task completion. These prompts and outputs should be consistent with the accessibility design guidelines and implementation for each mobile phone platform. |  |  |  |  |
| ***D.*** | ***Perceptible Information*** |
| *a.* | *Utility:* |
| i. | Provide multimodal prompts and feedback to provide orientation to the layout and one’s location in the airport (i.e., a route map that identifies where the traveler is in the wayfinding process). |  |  |  |  |
| ii. | Integrate an interactive map of the airport with spatial structure that is appropriate for conveying wayfinding-relevant information, including orientation, progress, and error correction in both visual and non-visual formats. |  |  |  |  |
| iii. | When possible, incorporate live picture tagging (identification of what the device is pointing at) to describe location and differentiate elements in the environment. |  |  |  |  |
| *b.* | *Usability:* |
| i. | Provide simultaneous visual (e.g., icons, text, and color), audio, and tactile outputs for redundant cueing. |  |  |  |  |
| ii. | Maximize contrast between foreground essential information (icons, text, etc.) and background (e.g., white or yellow on black, dark gray or blue). |  |  |  |  |
| iii. | Maximize legibility of essential information by making digital buttons and text as large as possible. |  |  |  |  |
| iv. | Information should be obvious; when possible, and taking the device’s zoom feature into consideration, all relevant information should fit on each screen to avoid scrolling down. When not possible it should be clear both visually and through text to speech that there is more information. |  |  |  |  |
| v. | Provide alternate text color and size options to meet individual preferences and abilities. |  |  |  |  |
| vi. | Use different vocal tones for different types of information, such as directions and landmarks. |  |  |  |  |
| vii. | Provide compatibility with a variety of techniques or devices used by people with sensory limitations, such as ASL, voice recognition, or speech output. |  |  |  |  |
| viii. | Geofencing is a technique that can be used such that when a user enters a particular space or passes by a particular landmark, they can be given a notification to validate the wayfinding route as they navigate the airport. |  |  |  |  |
| ***E.*** | ***Tolerance for Error*** |
| *a.* | *Utility:* |
| i. | Provide visual, tactile, and/or audio warnings to identify errors during wayfinding. Also see note on geofencing above. |  |  |  |  |
| ii. | Provide sensing capability to identify a traveler’s current location and orientation on an interactive plan of the airport. |  |  |  |  |
| iii. | Incorporate user tips to facilitate different phases of getting around the airport, such as preparing to go through security (have your ID out, wheelchair may cause delay, etc.), parking, accessing assistance, etc. |  |  |  |  |
| iv. | Include map/interactive directional map to see progress and correct mistakes. |  |  |  |  |
| v. | Add an auto timer for the user’s flight departure to avoid missing one’s flight. |  |  |  |  |
| vi. | Alert travelers of arrival at their destination. |  |  |  |  |
| vii. | Identify each gate that is passed along the route to discourage unconscious actions. |  |  |  |  |
| viii. | Incorporate real-time data about closed facilities and services (like a security checkpoint) and include vertical transitions like escalators and elevators. The application should adjust wayfinding routes in real time to avoid routing a user to a closed facility. |  |  |  |  |
| *b.* | *Usability:* |
| i. | Provide fail-safe directions by ensuring that photographs and descriptions of destinations line up with the angle that the user will be facing. |  |  |  |  |
| ii. | Provide visual, tactile, and/or audio verification outputs to affirm or confirm a selection (e.g., “Are you sure you want to choose ‘find restroom?’”). |  |  |  |  |
| iii. | Provide sufficient and redundant detail in the directions such as number of feet and use of landmarks/signs/geofences to avoid errors. |  |  |  |  |
| iv. | Provide redundant route details, including the provision of landmarks (e.g., “walk past the drinking fountain”), distance (e.g., “walk 20 feet until you reach the drinking fountain”), and compass directions. |  |  |  |  |
| v. | Automatically select the units for distance based on the locale that the user has selected on the mobile device (e.g., use “imperial” for U.S. English locale), but also offer a manual option to choose metric or imperial. |  |  |  |  |
| vi. | Provide redundant multimodal feedback to alert the user of their arrival at a destination. |  |  |  |  |
| vii. | Understand and anticipate that the user may be interrupted during navigation and need to close and re-open the application (e.g., when going through security checkpoints or switching to another application to scan a ticket). |  |  |  |  |
| ***F.*** | ***Low Physical Effort*** |
| *a.* | *Utility:* |
| i. | Wayfinding information should be appropriate for a user’s abilities. |  |  |  |  |
| *b.* | *Usability:* |
| i. | The interface should be appropriate for a user’s abilities. |  |  |  |  |
| ii. | Locate buttons along the top, bottom, and sides of the interface where they can be easily found and operated. |  |  |  |  |
| iii. | Where possible, use one column of information to facilitate screen reading. |  |  |  |  |
| iv. | The order defined for screen reading elements should match the logical order in which the information should be presented to the user. |  |  |  |  |
| v. | When re-opening the application after an accidental shutdown, the start-up should bring the user back to where he/she left off. |  |  |  |  |
| vi. | Minimize scrolling and other repetitive actions such as double tap and hitting “next” after every direction. |  |  |  |  |
| vii. | Large touch-screen targets (e.g. buttons or check boxes) are easier to activate to turn features on/off than slide controls that require both accuracy and hand movement. |  |  |  |  |
| viii. | Having a Bluetooth-controllable audio menu allowing for little hand use is helpful for both travelers who are blind and those with limited manual dexterity. |  |  |  |  |
| ***G.*** | ***Size and Space for Approach and Use*** |
| *a.* | *Utility:* |
| i. | Photographs should provide a clear line of sight to important wayfinding elements. |  |  |  |  |
| *b.* | *Usability:* |
| i. | Applications should be compatible with all desktop and mobile devices to accommodate needs for screens and interfaces of different sizes. |  |  |  |  |
| ii. | All buttons should be large enough size for users with a range of dexterity ability and variations in hand sizes to target them. |  |  |  |  |
| iii. | Include as little information on a screen as possible to enable active areas of the screen to be as large as possible, enabling users to apply reasonable operating forces. |  |  |  |  |
| iv. | All the buttons should be placed in the corners or the edges of the screen, allowing easier navigation for users who have difficulty seeing the screen. |  |  |  |  |
| v. | Provide adequate sizes of objects and space on the screen for use of assistive technologies (e.g., mouthstick and pointer) as input device. |  |  |  |  |