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# Trekker Breeze 2.0: Trialled by Clients

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*The Trekker Breeze (TB) is a Global Positioning System (GPS) device developed by Humanware (Humanware, 2011; Riessen, Ryan, & Battista, 2009). The system uses GPS and digital maps to inform its user of particular locations via audible output. Specifically, the Trekker Breeze informs the user of a current location (street names, intersections, business names), provides points of interest, record travel routes, and can be operated using one hand. Trekker Breeze version 2.0 was released in October 2010 and included a number of enhancements and improvements from the 1.0 version.*

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In early 2011 Guide Dogs NSW/ACT Coffs Harbour office planned to trial the Trekker Breeze 2.0 (TB 2.0) inviting clients as participants. Of the nine clients that volunteered, five had previous experience using Trekker Breeze 1.0 (TB 1.0) and four clients had no experience using TB 1.0. Of these four clients, two had used other GPS wayfinding technology. Of the nine clients, five were female and four were male. Further, four clients were guide dog users and five clients used a long cane as a primary mobility aid. Six of the nine clients were over 50 years of age, two clients were aged between 40 and 50 years of age and one client was aged 16 years.

An initial two day workshop was conducted. Day 1 included three orientation and mobility (O&M) instructors and a product consultant from Humanware, Sydney, Australia. Time was spent discussing the new features and enhancements of the TB 2.0 with the goal of instructor's familiarising themselves with the new features. Day 2 of the workshop included an

additional two O&M instructors' and four clients. Three of the clients were familiar with TB 1.0 and one client had previous GPS experience. During the day, a revision of the TB1.0 features occurred, followed by an explanation of TB 2.0. Practical activities using the improved features followed. Tips were offered to assist with GPS connection and reduction of interference problems when connecting (Doyle, 2006; Turnage, 2010). Five clients were unable to attend the workshop. However, the instructors and one participant who attended the workshop provided these clients with the information and practical exercises during the following week.

## **Trialling Trekker Breeze 2.0: New features**

From February to April 2011, O&M instructors worked with the clients to explore the existing and new features of the TB 2.0. O&M instructors spent a total of 149 hours providing direct training and support to clients during the trial period.

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Instructors and clients explored such new features as (i) extending the available time for landmark titles (ii) exporting points of interest from the computer to the TB 2.0 (iii) creating a landmark for an address (iv) reverse a prerecorded route and backtracking the previous session (v) using the pedometer facility.

**(i) EXTENDING THE AVAILABLE TIME FOR LANDMARK TITLES**

When recording a landmark title, the default time available for users is four seconds. For most landmarks this amount of time is adequate, however, there may be occasions when there is a need to enter a longer title which requires more time to perform. The Humanware consultant suggested that the Windows Sound Recorder software on the TB 2.0 be used to extend the four second default time (Humanware, 2011a). To enable the software feature requires approximately 14 steps. These steps require the user to manipulate the SD card, preview .wav files, choose programs, browse files, choose files, manipulate second-length files, and record landmarks. Following workshop discussions seven participants believed that only technically inclined users would use this feature. No client attempted to use this feature when trialling the TB 2.0.

**(ii) EXPORTING POINTS OF INTEREST**

This feature allows the user to export the longitude and latitude points of a particular landmark or destination from the computer to the TB 2.0. This feature was demonstrated at the workshop. The feature was unable to be trialled with clients because of software restrictions on Guide Dogs NSW/ACT computers. However, once these restrictions

are removed, the feature will be trialled with clients.

**(iii) CREATE A LANDMARK FOR AN ADDRESS**

This feature is unique to TB 2.0. The feature permits the user to input an address of a specific location and the TB 2.0 will calculate the most direct route to the location. The TB 2.0 uses a modified keypad to achieve this. For example, letters and numbers are located on the TB 2.0 buttons similar to a mobile phone keypad. An address can be entered using the letters and numbers on the buttons, similar to a SMS text message on a mobile phone. As there is no screen to display the keys pressed, the TB 2.0 uses audio output to alert the user to each character in the cycle as it runs through the letter sequence and then repeats the process until the user takes the finger off the key. Once the most direct route is determined, the TB 2.0 will ask whether or not the user requires instructions for pedestrian or motorised travel, and also warns the user that the TB 2.0 instructions may take them to unfamiliar areas. The selected mode of travel has a bearing on the type and detail of the instruction provided. For example, when in pedestrian mode, the instructions are more detailed and include cross streets at intersections and distances to the next instruction. In the motorised mode, the instructions are less detailed and this reflects the anticipated time available to pass on information to the user as a vehicle passes through intersections and landmarks. A basic assumption is that the user would typically be a passenger in a vehicle and, therefore, require less detail when travelling in this way.

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All clients were able to access and use the SMS landmark creation feature as it enabled them to enter an address to which they had not previously travelled. Those clients who had experience with Wayfinder (another GPS device) or writing text messages using mobile phones were able to quickly transfer those skills to the TB 2.0. Six clients who had not previously used SMS took longer to understand the procedures, however were able to successfully enter an address after instruction.

#### **(IV) REVERSE A PRERECORDED ROUTE AND BACKTRACK THE PREVIOUS SESSION OR ROUTE**

The 'reverse a prerecorded route' feature enables a traveller to walk from point B back to point A. The backtrack feature is where the TB 2.0 recalls the route previously travelled assisting the user to return from point B to point A. The backtrack feature can be used even when the TB 2.0 is turned off, then on again.

Clients attempted to use both features in open areas and in built up areas in a city streetscape. Open areas include suburban parklands and any area approximately 20 metres or more away from the map used by the TB. Built up areas include the street and road network as used by the TB. Clients recorded routes from a single starting point and clients travelled to different locations recording routes and landmarks in a variety of directions. Clients found that neither feature functioned reliably in the open area. It appeared that the TB did not have maps to which it could refer. The Humanware consultant, concluded that these features required further refinement to assist their effectiveness in open areas. However, clients concluded that the reverse feature functioned the most reliably of the

two features when travelling in built up areas where street maps were available. In response to the overall inconsistency of the two features, clients preferred to record two separate routes for the same journey, one outward and one inward. Clients reported that recording two separate routes enabled them to subtly alter a journey as there were variations at road crossing points and other differences between each direction of travel.

#### **(IV) Pedometer**

The pedometer enables users to keep track of walking distance, average speed, and walking time. The tracking record can be reset at any time. All participants in the trial were independent travellers. When using the TB 2.0 travelling familiar routes, no client used the pedometer. Clients concluded that they were familiar with the routes and therefore the approximate distances they travelled, and believed they had no use for the pedometer. The pedometer timer stops recording when the traveller stops walking. The rest time is not included in the total time travelled. Clients believed that not recording rest time would be confusing and difficult when trying to evaluate the total time taken to travel a route.

### **Trialling Trekker Breeze 2.0: Enhanced features**

There are a number of features on the TB 2.0 that are improvements from the TB 1.0. Improved features include (i) landmarks, (ii) maps, (iii) use in vehicles, (iv) GPS coverage and connection.

#### **(i) LANDMARKS**

TB 2.0 sorts landmarks by creation date. All clients reported that this feature enables

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landmarks to be more easily located as the user searches landmarks in the chronological order of a route.

In recorded routes, the destination and the starting point can be included on the same street segment. Previously the destination and the starting point needed to be separated by a longer map segment. This enhancement removes some confusion that existed on shorter routes, as the TB 1.0 could not easily record routes on the same street block. Instead the TB 1.0 would pause for a lengthy period of time while it re-calculated the location.

Further, when entering a round-a-bout, the instruction provided by TB 2.0 was “drive onto the round-a-bout”. The left and right directions provided by TB 1.0 were not provided in TB 2.0. This enhancement simplifies the amount of information provided to the user when travelling in a vehicle.

One client who is a guide dog user made several trips to another city in another Australian state. She used the TB 2.0 to landmark several positions close to the front entrance of the hotel where she was residing. The landmarks included the front door, a rubbish bin, and a section of grass used to toilet her guide dog. With the landmarks in close proximity to each other, the TB 2.0 confused one landmark with the other. For example, the TB 2.0 would report the rubbish bin, when the landmark was the grass toileting area. Once the guide dog had become familiar with the landmarks, all but the ‘front door’ were deleted from the TB 2.0. The TB 2.0 could reliably locate the front door once the other landmarks had been deleted. From this experience the client concluded that the TB 2.0 could be used as

a back up or secondary mobility aid to a primary aid such as her guide dog.

## **(ii) MAPS**

In the TB 1.0, inconsistencies were sometimes evident with map addresses. House numbers were sometimes nominated that did not exist or were actually several residences further along the street. In the TB 2.0 this same situation occasionally occurred. It was concluded that the maps, supplied by Navteq, needed updating. Clients were encouraged to note all anomalies encountered when travelling with the TB 2.0 and to submit these to Navteq via their Map Recording website (Navteq, 2011).

## **(iii) TB 2.0 USE IN VEHICLES**

One client on a single occasion compared the TB 2.0 with the Garmin vehicle GPS to determine a route to a relatively remote rural location on a minor country road 50 kilometres west of Coffs Harbour on the New South Wales Mid-North Coast. Both devices were given the address of the destination and compared for speed and accuracy of instructions provided during the journey. Although both devices provided timely turning instructions, the Garmin GPS placed the traveller at a destination several kilometres before the correct destination. However, the TB 2.0 continued to provide accurate directions to the front gate of the destination.

Six clients reported using the TB 2.0 in vehicles and found that accuracy and efficiency of routes nominated were high. In an inner city location the route to the destination sent the vehicle along several one-way streets. When the route travelled was reversed, the TB 2.0 nominated a different return route that safely led the

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driver and passenger to their original departure point.

The six clients reported that when travelling a route, if an alternative turn was taken then the TB 2.0 was usually able to re-calculate the route quickly to provide new instructions leading to the destination. This re-calculation facility was reported to be reassuring to all clients who used the TB 2.0 in vehicles.

#### **(IV) GPS COVERAGE AND CONNECTION**

Eight of the nine clients reported that they believed the GPS coverage of the TB 2.0 to be improved from the TB 1.0. One client reported maintaining GPS coverage while enclosed in an elevator. This was re-tested by the client 10 times with the same result. On one of the 10 trials the TB 2.0 also provided the correct approximate altitude while stationary on level two of the building in the escalator.

Another client used the TB 2.0 while bush walking away from mapped streets. The client was able to landmark many points on his regular walking track and most of these landmarks were under forest canopy. One landmark was under a dense forest canopy at the bottom of a gully at a creek crossing point. A member of the bush walking group attempted to use a handheld GPS device on the same training track and was only able to make contact with GPS satellites in open areas at the top of ridges. The TB 2.0 occasionally lost contact with GPS satellites on heavily overcast days.

#### **Conclusion**

All five clients who were familiar with using TB 1.0 agreed that TB 2.0 was an improvement on version 1.0 in many

respects. All clients agreed that the TB 2.0 was a useful orientation aid, however they still required and relied upon primary mobility aids such as the long cane or guide dog as well as their own sense of direction to accurately determine their location. Clients concluded that the TB 2.0 was used as a reinforcement and auxiliary support to assist their travel between destinations.

Following the trial, a competency-based TB 2.0 training module was devised to first, train O&M instructors to use the aid, and second, teach instructors the sequencing and techniques to teach clients (e.g., children and adults of various O&M skill levels and GPS experience). Clients who are interested in using the TB 2.0 are first assessed. Second, those clients who might benefit from the aid then commence TB 2.0 training. Once a client can use the aid competently and independently, then an TB 2.0 is issued to the client. As at 31 October 2011, 59 Guide Dogs NSW/ACT have been issued and trained with a TB 2.0.

From client reports it appears that the TB 2.0 provides them with greater independence and confidence when travelling and learning new routes. It is important to note however, that a prerequisite to using the TB 2.0 safely and accurately is existing competent O&M skills. Humanware does recognise that the TB is not a primary aid, but rather a secondary orientation aid and this cannot be overemphasised. Further, also highlighted by Humanware (2010), is that the aid should not be used with headphones when walking the streets as this interferes with the users ability to hear traffic and other potentially dangerous situations in the environment.

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