

**TECH OFFER**

## High Accuracy NB-IoT-based Tracking Device



### KEY INFORMATION

TECHNOLOGY CATEGORY:

Infocomm - Wireless Technology  
Infocomm - Networks & Communications  
Infocomm - Internet of Things

TECHNOLOGY READINESS LEVEL (TRL): **TRL6**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO174680**

### OVERVIEW

Caregivers often need to monitor the whereabouts of People with Intellectual Disabilities (PwIDs), who tend to wander off their usual route because of distractions or stress. Current measures to locate them are manual and time-consuming. Caregivers have to retrace the daily journey taken by the PwIDs and rely on the public to assist them.

This technology offer is a low-cost, reliable tracking and monitoring device, developed to enable caregivers to easily track the current location of the PwIDs. The tracking device uses Global Positioning System (GPS) to obtain location data, whereas the corresponding timestamp (date, time) is obtained from the Narrow Band Internet of Things (NB-IoT) network. The resultant timestamped GPS data can be sent to any cloud servers or IoT dashboards via NB-IoT communication. An existing issue with some current NB-IoT tracking system is, the timestamp may not be accurately tagged to the corresponding GPS location data, due to mis-synchronisation. This system is able to overcome such a problem, hence ensuring accuracy of tracking. The tracking device is encased in an access card form factor that can be worn around the neck, making it suitable for PwIDs as it is a

familiar form factor to them.

The technology owner is able to customise the tracking device; data can be streamed to a 3rd party application server for post-processing and dashboarding. The technology owner is keen to do R&D collaboration with tracking device design companies, and/or end application users such as PwID institutions, including those with existing tracking platforms.

## TECHNOLOGY FEATURES & SPECIFICATIONS

Location tracking using GPS technology is common. However, the communication link between the hardware and the internet or cloud servers has been more reliant on WiFi or mobile networks (3G/4G). Usage of WiFi is not possible outdoors and subscription to mobile networks is not practical as it will cost more just to send a few bytes of data. Thus, leveraging NB-IoT network which is mainly utilised by IoT devices to send a small amount of data is a cheaper option compared to mobile networks such as 3G and 4G.

In some NB-IoT dashboards, the platform requires position data and timestamp to be sent as separate packets to servers, i.e., the position data and corresponding timestamp are sent sequentially rather than in a collective packet. This can result in pointing to an incorrect association of location with corresponding time, due to data loss or data corruption. In this technology offer, the tracking device is able to effectively synchronise time data to position data, thus ensuring the time data and corresponding position data is always reflected accurately.

The device developed is specially designed to be encased within an access card holder that can be worn around the neck, hence reducing the number of possessions that needed to be carried by the PwIDs. In certain PwIDs, such as those with autism spectrum disorder, having a familiar form factor also reduces the risk of it being rejected.

## POTENTIAL APPLICATIONS

- Logistics - Outdoor asset tracking (Mobile Assets)
- Healthcare - Tracking of patients with dementia, people with intellectual disabilities

The device also comes with an android mobile application to locate the current position of the tracking device. Caregivers can use this to check on the live location of the PwID, and view the historical route taken by the tracker within a specified interval. Alerts can be sent to caregivers when the tracker exits/enters a preset perimeter (factory warehouse, school, homes, etc.). With NB-IoT communication, there can be other features such as fall detection alert, vital signs alert, etc.

## UNIQUE VALUE PROPOSITION

In this technology offer, an effective method is used to synchronise time and location data for GPS/NB-IoT based tracking. This ensures the accuracy of the location tracking, which is critical in applications such as tracking PwIDs.

The technology owner is keen to do R&D collaboration with tracking device design companies, and/or end application users such as PwID institutions, including those with existing tracking platforms.