TST TRAFFIC
SMARTCITY TECHNOLOGY

i-Impact

Designed to track & monitor your assets

i-Impact

Managing your critcal assets

TST i-Impact is a rugged, standalone tracking device that integrates automatically with the TST Platform.

i-Impact provides an easy solution for areas of operations, including; councils, infrastructure service providers and road networks.

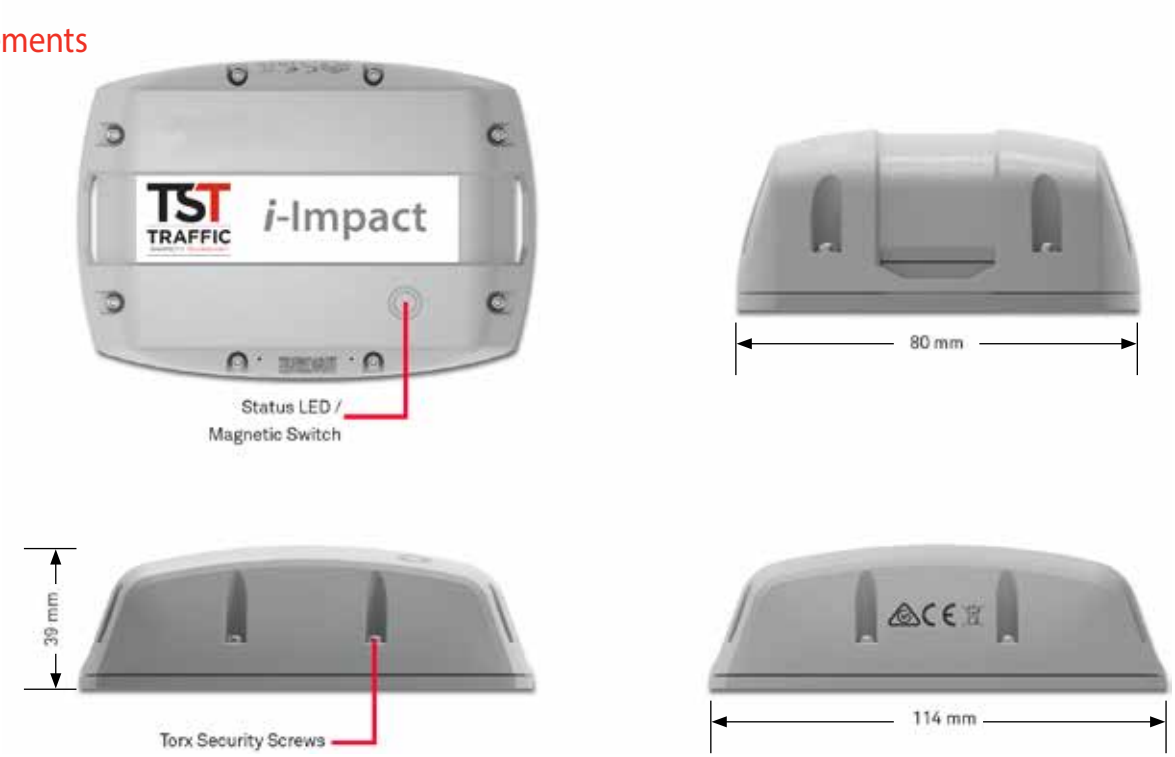
i-Impact provides an instant geolocation of assets such as concentrate poles, park benches, traffic signals, road signs, control boxes and road barriers. The device is designed to locate each asset within a network and if an impact is detected the exact location point is notified within TST. Giving instant reporting of posssible damage, where asset inspection and/or repair can be actioned.

Use cases include:

- Barrier Strike – alert and notification
- Pole Strike – alert and notification
- Road Signage – alert and notification
- Traffic Signals – alert and notification
- Traffic Signals Control Box– alert and notification

The i-Impact device is battery operated and has a life span of up to five years and utilises direct connection to the server meaning no other gateway or remote connections are required.

Measurements



Technical Specifications

General		
Device Interfaces	▪ Bluetooth Low Energy (Nordic Semiconductors nRF52840-QIAA-R) ▪ 802.11 b/g/n Wi-Fi (Espressif ESP8266EX)	▪ Cat-M1 / Cat-NB15 Cellular Module (uBlox SARA-R410M-02B) ▪ GPS Module (uBlox SAM-M8Q)
Standards	▪ Bluetooth v5.0[6] ▪ IEEE 802.11b/g/n/e/i ▪ IEEE 802.15.4-2006)	▪ 3GPP Cat-M1 / Cat-NB1 Release 13 ▪ MQTT v3.1 ▪ TLS v1.2
SIM Type	▪ Integrated MFF2	▪ -40 °C to 105 °C
Cellular Band Support	**Cat-M1 / Cat-NB1** Band 3 (1800), Band 5 (850), Band 8 (900), Band 12 (700), Band 13 (700), Band 28 (700 APT) MHz	
Global Positioning System (GPS)	▪ 3 Concurrent GNSS (GPS, GLONASS, Galileo) ▪ Precision TCXO oscillator ▪ AssistNow™ Online[2] ▪ AssistNow™ Offline[2] ▪ AssistNow™ Autonomous[2]	▪ 72 channel high sensitivity receiver -165dBm ▪ Satellite-Based Augmentation System (SBAS)[2] ▪ Quasi-Zenith Satellite System (QZSS)[2] ▪ Japanese Indoor MEssaging System (IMES)[2] ▪ Differential GPS (D-GPS)[2]
Antennas	▪ Cellular high Efficiency Multi-Band & Multi-Layer SMD dielectric antenna ▪ 2 x Precision tuned 2.4GHz trace antennas	▪ Embedded GNSS patch antenna filtered and amplified by internal SAW filter and internal Low Noise Amplifier (LNA)
Functionality		
Features	▪ Bluetooth advertising	▪ Bluetooth finding for enabled Bluetooth trackers[2]
Location Based Services (Order determined by Operating Profile)	▪ Bluetooth ▪ Global Positioning System (GPS)	▪ Wi-Fi Positioning System (WPS) ▪ Cell Tower Triangulation[2]

<table>
<tr><td rowspan="4">Operating Profiles</td><td>Fixed Daily Check-In
Low battery impact
Bluetooth advertising every 2.5 seconds (30 seconds on and 30 seconds off)
Accelerometer is disabled
Perform location scan utilising WPS first then if results are poor switch to GPS
Send telemetry every 24 hours over Cat-M1</td><td>12 Hourly Check-In (coming soon)
Low to medium battery impact
Bluetooth advertising every 2.5 seconds (30 seconds on and 30 seconds off)
Accelerometer is disabled
Perform location scan utilising WPS first then if results are poor switch to GPS
Send telemetry every 12 hours over Cat-M1</td></tr>
<tr><td>6 Hourly Check-In (coming soon)
Low to medium battery impact
Bluetooth advertising every 2.5 seconds (30 seconds on and 30 seconds off)
Accelerometer is disabled
Perform location scan utilising WPS first then if results are poor switch to GPS
Send telemetry every 6 hours over Cat-M1</td><td>Movement Tracking (future support)
Medium to high battery impact
Bluetooth advertising every 2.5 seconds (30 seconds on and 30 seconds off)
Accelerometer is enabled
Perform location scan utilising WPS first then if results are poor switch to GPS
Send telemetry at the start and end of movement events over Cat-M1 based on G-Force threshold</td></tr>
<tr><td>Bluetooth Gateway (future support)
High battery impact
Bluetooth finding is randomised across 60 seconds to maximise observations
Accelerometer is disabled
Perform location scan utilising WPS first then if results are poor switch to GPS
Send telemetry over Cat-M1</td><td>Bluetooth Gateway & Tracker (future support)
Very high battery impact
Bluetooth advertising every 2.5 seconds (30 seconds on and 30 seconds off)
Bluetooth finding is randomised across 60 seconds to maximise observations
Accelerometer is enabled
Perform location scan utilising WPS first then if results are poor switch to GPS
Send telemetry at the start and end of movement events over Cat-M1 based on G-Force threshold</td></tr>
<tr><td colspan="2">User Customisable Profiles (future support)
Low to very high battery impact
Features customisable to suit your specific needs</td></tr>
<tr><td>Security</td><td colspan="2">ARM® TrustZone® Cryptocell 310 cryptographic accelerator
MQTTS v3.1
TLS v1.2
AES-128</td></tr>
<tr><td>On-board Storage</td><td colspan="2">Caches up to 50 telemetry records if the device is out of range to ensure no data is lost</td></tr>
<tr><td>Over the Air Firmware Support</td><td colspan="2">Support for remote firmware upgrades of all main subsystems to ensure latest features, performance enhancements and bug fixes are deployed with ease</td></tr>
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Sensors		
Onboard Sensors	▪ 3-axis Accelerometer (High G-Force, sustained movement, orientation, start and stop events)	▪ Temperature (Internal device components)
Electrical		
Battery[4]	▪ Lithium-thionyl chloride battery pack with super capacitor	▪ 3.6V / 12000 mAh
LED	▪ Multi-colour RGB LED	
Push Button	▪ Magnetic switch under LED	
Physical		
Dimensions	▪ 114 x 80 x 39 mm	
Weight	▪ 250 grams	
Housing	▪ IP67 water and dust resistant ▪ Pressure release vent ▪ Industrial grade PC thermoplastic	▪ IK10 impact resistance ▪ UV stabilised ▪ Impact modified
Temperature	▪ Operating: -20 °C to 60 °C4	▪ Storage: 5 °C to 25 °C4
Humidity	▪ 5 % to 95 % non-condensing	
Certifications	▪ CE ▪ Bluetooth SIG ▪ UN38.3 ▪ RoHS	▪ RCM ▪ EME
Mounting Options	▪ VHB (supplied and adhered to base of unit) ▪ Mounting Bracket (available separately)	▪ Cable tie slots to feed metal or plastic cable ties through (optional and not supplied)
Package Contents	▪ 1 x Cat-M1 Tracking Unit ▪ (VHB Tape applied to bottom of unit)	▪ 5 x IPA Wipes (In Accessory Pack) ▪ 1 x Scouring Pad (In Accessory Pack) ▪ 1 x Activation Magnet (In Accessory Pack)

THINGS YOU NEED TO KNOW:

[1] Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead, lower actual data throughput rate. Environmental factors will adversely affect signal range.

[2] Coming soon.

[3] Custom operating profiles are available on request for orders of >5K. These can be designed to achieve either longer battery life where less location reporting is required or shorter battery life with more frequent location reporting or transmissions.

[4] Extended exposure to temperatures outside of the recommended temperature range may shorten the life of the battery life. Ensure you use with the unit within the recommended operating temperature range.

[5] Cat-NB1 (NB-IoT) support coming soon.

[6] Currently being used with Bluetooth v4.2..

TST
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TST

320 Darebin Road
Fairfield VIC 3078

www.trafficltd.com.au

NSW
P: +61 2 9736 3677
F: +61 2 9736 3391
e: info@trafficltd.com.au

VIC
P: +61 3 9430 0222
F: +61 3 9430 0244
e: info@trafficltd.com.au

SA
P: +61 8 8362 2385
e: info@trafficltd.com.au

NT
P: +61 8 8947 0733
F: +61 8 8947 0713
e: info@trafficltd.com.au

ACT
P: +61 2 6299 7922
F: +61 2 6299 7977
e: info@trafficltd.com.au

WA
P: +61 8 9248 1002
F: +61 8 9209 2288
e: info@trafficltd.com.au

QLD
P: +61 7 3184 2000
F: +61 7 3266 2244
e: info@trafficltd.com.au

TAS
P: +61 3 6273 1177
F: +61 3 6273 1759
e: info@trafficltd.com.au

UNITED KINGDOM
P: +44 (0) 1159 223 797
F: +44 (0) 1159 223 836
e: info@aldridgetraffic.co.uk

ISO 9001 Quality
ISO 45001 OH&S
ISO 14001 Environmental

03/02/25 Ref: TST-I-IMPACT v.2.0