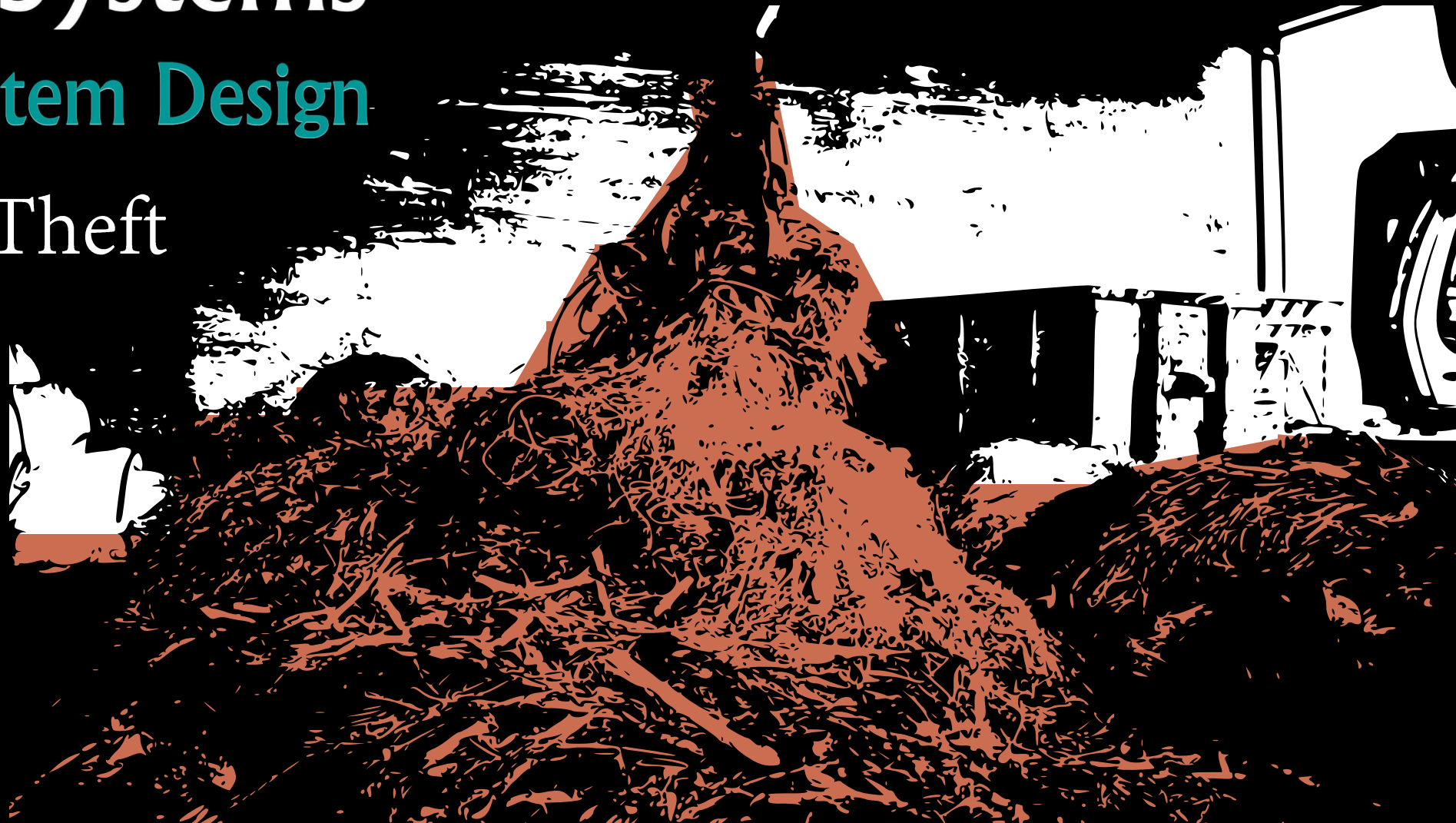


RAMACTM
Remote Access Management and Control Systems

G-Matrix Systems

Integrated System Design

Copper Cable Theft



Problem Statement



Cable theft is a long-standing problem in South Africa and globally.

It was reported that Eskom alone, spends approximately **R2 Billion rand** a year in order to replace stolen copper cables (Fin24, 2018) (Eskom website-Friday, 13 July 2018).

Copper cables are extensively used in power and telecommunications infrastructure. Recyclers are not heavily regulated, and this creates the opportunity for illegal copper to re-enter the commercial cycle, an easy source of income for illegitimate copper thieves.

Large numbers of the population experience outages and are often affected for periods of 2 to 3 days before cables are either repaired or replaced.

The estimated financial loss due to copper theft is approximately
between **R5 billion and R7 billion per year.**

What is **Effected**?

- Residential and Commercial electricity,
- public transport,
- Telephone,
- Internet services.

Who is **Effected**?

- Mines,
- Transnet, Metrorail, PRASA
- Residents,
- Economy through Businesses,
- Telkom,
- Eskom and
- municipalities.

Theft on the Rail system causes trains to be delayed and cancelled for weeks/ months



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Common Solutions



Solutions to the scourge of cable theft have long been offered from various sources, but they have not proven highly effective.

The installation of concrete slabs or laying of concrete is common practice from municipalities. However, when there is a theft or maintenance needs to be done, a heavy-duty digger, capable of breaking concrete, needs to be hired and time to repair increases from a 2-day job to a 10-day job.

This places more strain on an already delicate network where there are constant emergency repairs with limited resources.

Maintenance and refurbishment efforts are hampered, negatively impacting revenue and service delivery.



Labour Intensive



Difficult to carry out maintenance



Extremely time-consuming



Exorbitantly high costs



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Investigated **Solutions**

Wired solutions:

- Designed for detecting seismic activity, however, these are very labour intensive. Soil must be compacted in a certain way.
- Costly to deploy due to the intricate circuits of multiple sensors.
- Portions of these circuits are also exposed, therefore the potential for vandalism and sabotage is ever-present.
- If the link to one sensor is broken the whole system is left inoperable.

Systems operating on the GSM network:

- These are susceptible to jamming- which presented a risk to the data flow reliability and ability to react in time to prevent theft.

Maintenance and refurbishment efforts are hampered negatively impacting revenue and service delivery.



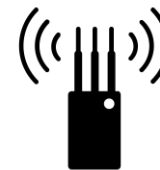
Labour Intensive



High-cost sensors, High-cost to deploy and maintain



Vandalism and sabotage is ever-present



Susceptible to Jamming



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G-Matrix Systems addresses the modern need for monitoring through a range of bespoke IOT communications solutions, from cold chain monitoring, to security and entry control, tracking, fluid measurement and more.

G-Matrix Systems is a **Full IoT Turn-key** solution provider and is completely network Agnostic

CONTACT US

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Our Core Business

RESEARCH & DEVELOPMENT

Internal R&D for product enhancement ensuring G-Matrix is always ahead of the curve with future Technologies.



RAPID PROTOTYPING

The G-Matrix Systems “Heart” is an all-encompassing device which allows for multiple sensors to be connected allowing rapid prototyping. This, together with our in-house 3D printers ensures prototypes are aligned with Customer expectations



PRODUCTION

40 000+ GPS units pass through our Test jigs every month supported by the G-Matrix test data base and monthly SLA



"A Good company delivers excellent products and services.
Great companies does all that and strives to make the world
a better place"

Bill Ford - Executive Chairman of *Ford* Motor Company

Our Services

- Electronic Firmware Development in right down to microprocessors
- Low Power Products – Sigfox, LORA, GSM, Low Power Radio, BLE, Solar powered, NB-IoT, RPMA, M-CAT1, MQTT Products.
- Labview Software Development
- Electronic and Mechanical Interfacing.
- Development on "Internet of Things" networks
- Integration on 3rd party Platforms
- Deployment of LPWAN networks
- Intensive research and development in Sigfox, Lora, BLE, Wi-Fi & GSM communication
- Management Systems for remote communication
- Development of smartphone application.

Current Products

RAMAC™

Remote Access Management and Control Systems

- Cold Storage Monitoring
 - Smart Location Button
 - Range Detector
 - Remote Lock Monitor and driver
 - Cable Theft Solution
 - Asset Tracker
 - Temperature Sensor
 - Power State Monitor
 - Tamper Proof Container Locks
 - Intrusion protection Sensors
 - Vibration Sensor
 - Magnetic Sensor
 - Power consumption and Battery monitor
 - Camera Pole Maintenance Monitoring
- RAMAC™ Portal is a ready to use online web-based portal, available to any customer
 - RAMAC™ App allows local device configuration, OTA Firmware updates, diagnostics and real time information of the device
 - RAMAC™ Cerebro is a consumer facing App which can be white labelled for our channel partners
 - RAMAC™ API allows for easy integration



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Integrated System Design

Our IoT Footprint



Remote Access Management and Control Systems

September 01, 2021 10:54:59 WED



Account:

All Accounts

Device Types:

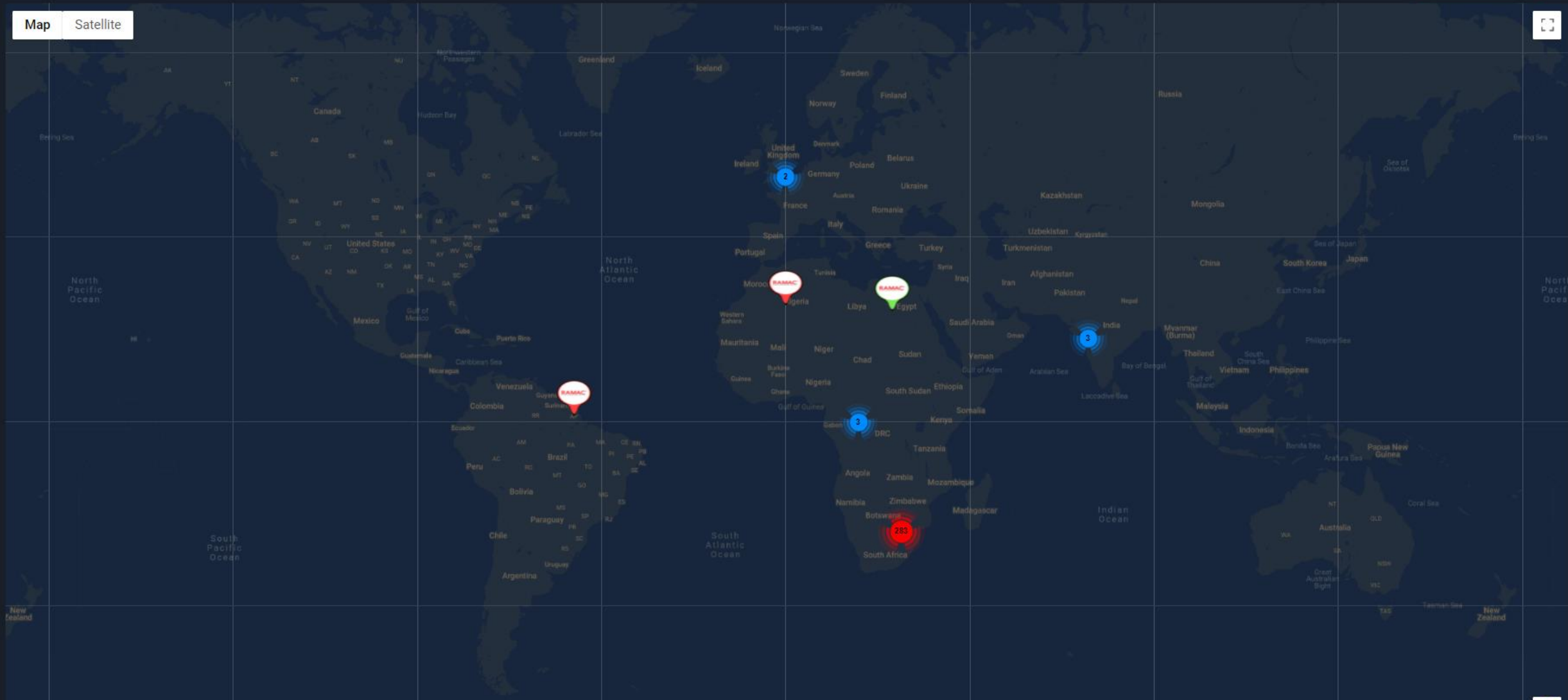
All Device Types

Devices:

All Devices

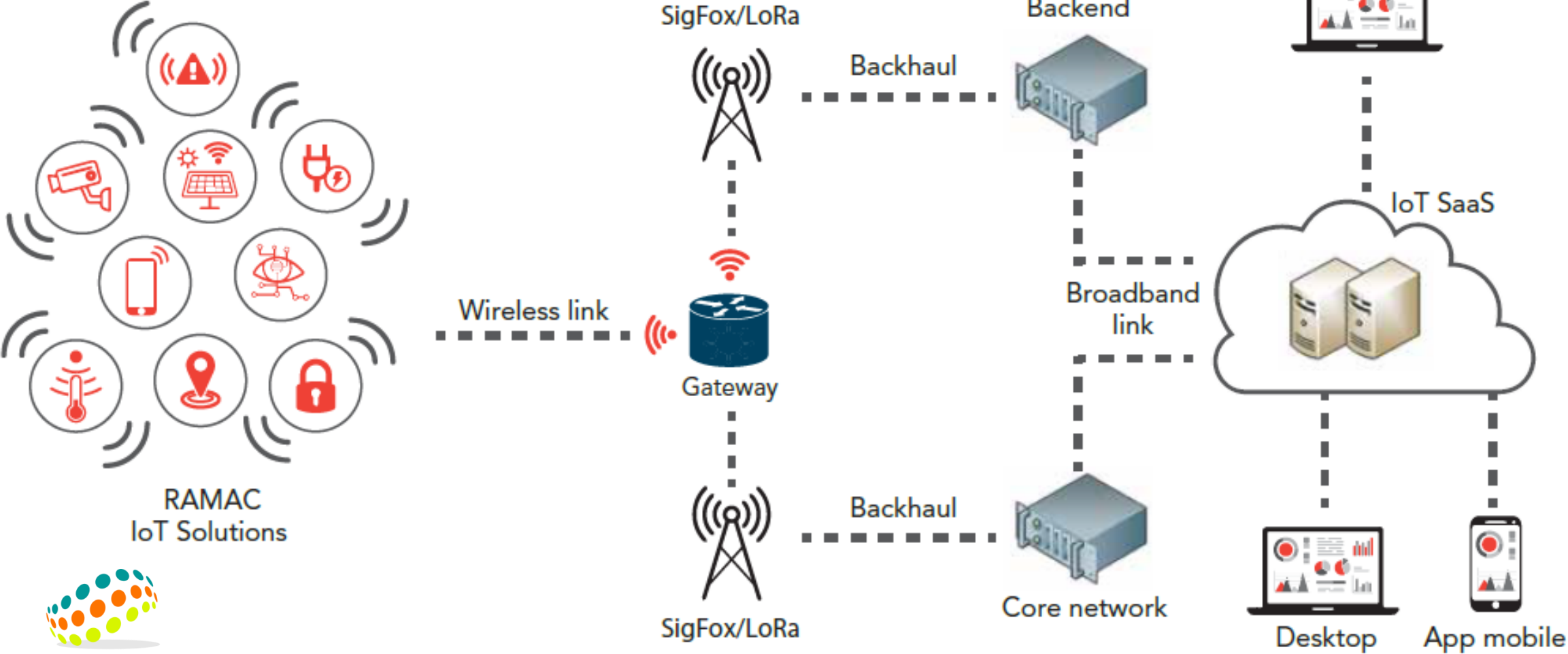
Total Devices : 433

Map Satellite



Your full **IoT Turn-Key** solution partner

Network Overview

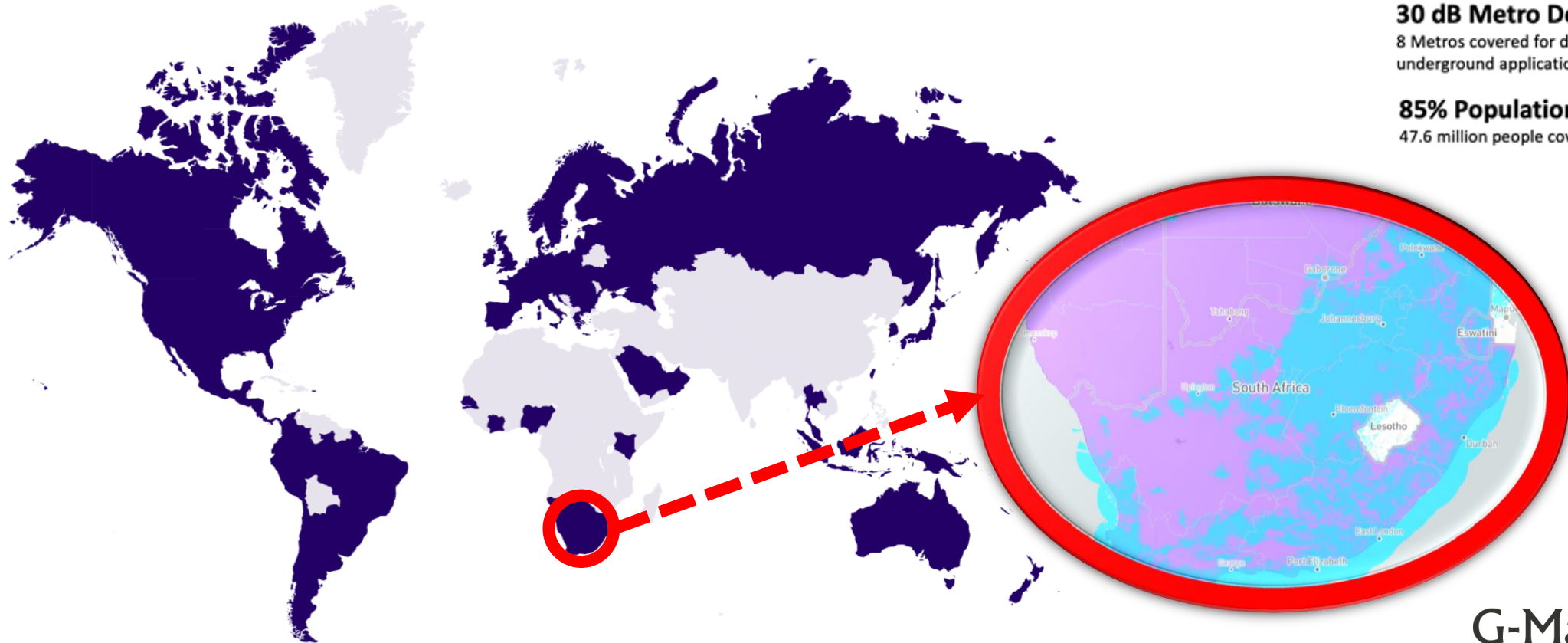


The Global Network



A worldwide footprint

Sigfox 0G network is already available in 72 countries and regions



SqwidNET
A DFA COMPANY

93% Population Covered
52 million people covered

90% Coverage on Highways
143 952 km of paved roads covered
538 829 km of gravel road covered

30 dB Metro Densification
8 Metros covered for deep inbuilding and underground applications

85% Population covered at 20dB
47.6 million people covered for indoor applications



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Underground Cable Theft Solution

The RAMAC™ - Cable Theft Sensor is a SigFox Ready device that was specifically designed for the monitoring of underground cables. The 3-Axis accelerometer allows the RAMAC™ - Cable Theft Sensor to enter an ultra-low power state yet still wakeup immediately on detection of movement. This allows customers to use the device for monitoring of movement or Tilt on any assets that should be stationary. The ruggedized sensor allows for real-time monitoring and incorporates **Bluetooth Low Energy (BLE)** Functionality which enables the device to distinguish between authorized and unauthorized access (Alarm Event).



SPECIFICATIONS

- SigFox Certified
- ICASA Approved
- IP67 Rugged Housing
- Dimensions (LxWxH): 120 x 20 x 110mm
- Operating Temperature: -10°C to +60°C



BATTERY

- Equipped with Li-SOCL2
- +5 Years Battery Life
- Online Battery Indicator
- Heartbeat Sent Once A Day



CONNECTIVITY

- Bluetooth Low Energy
- SigFox RCZ1 - Class 0



CLOUD COMPUTING SERVICES

- RAMAC™ platform is MS AZURE hosted
- 3rd Party API Integration available
- Project Progress Management
- User Management and Control
- Full Reporting
- Client Customisation



Benefits

- Improve Service Delivery
- Reduce the risk of theft
- Reduce downtime
- Reduce CAPEX and OPEX on maintaining infrastructure
- Improving repair times
- Drive revenue growth
- Enhance cost management
- Address risk management
- Drive continuous improvement in customer experience
- Build strong brand value
- Innovation
- Improve financial health of the company





RAMAC™ Vibration Sensor

Overhead cable Infrastructure Monitoring using the RAMAC™ Vibration Sensor

The Ramac™ Vibration Sensor is designed for intrusion detection on prefabricated walls (prefab) palisades, weld mesh and game fences. The sensor is typically installed on existing structure to provide high security detection against break through, climbing and wire cutting attempts

Key Benefits



Advance Vibration Filters

Detects Cutting & Drilling



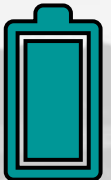
Mapped Vibration Signatures

Detects fence climbing, break through (prefab)



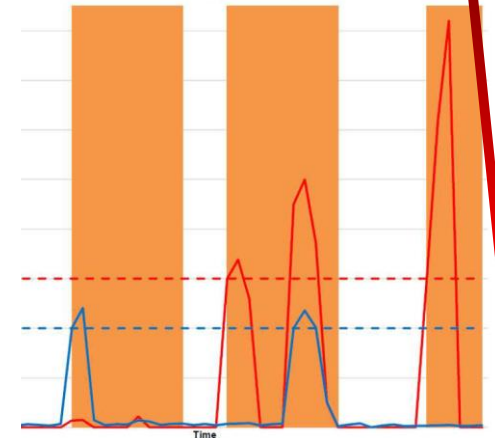
Long Range Communication

LPWAN technologies can communicate on average 43km away.



Low Power Consumption

IoT networks such as Sigfox and Lora allow the device to operate autonomously for up to 4 years.



Dimensions

- Size: 62x71x142mm
- Weight: 200g



G-Matrix Systems
Integrated System Design

Success story- Bidvest Protea Coin with City of Ekurhuleni



4000 early warning underground sensors deployed in City of Ekurhuleni
Between August 2020- April 2021 there were 356 incidents in total.
305 was early detected by the RAMAC solution.
That's 85% of all incidents

Cable Theft Incident Report since August 2020 to 13 May 2021

- 51 successful cable theft incidents took place during the above time period.
- Additional 305 incidents was detected early by the RAMAC devices and thereby **stopped before the theft took place.**
- RAMAC devices has been deployed throughout City of Ekurhuleni in the Benoni & Brakpan area, the replacement value of the copper cable alone suffered by the municipality from cable theft reached approximately R 6.4 million excl labour and machinery.
- Using the average cost per successful incident, It is presumed that the **RAMAC solution saved the municipality over R38 Million rand in copper replacement.**

Alerts are sent via Email, Telegram with a map card and shown in the NOC Dashboard View.

The platform keeps an audit log of every alert sent from the portal and where it was sent.

Should any user reset the alarm they will need to supply a reason.

Every action like muting a unit, resetting an alarm, suspending a device is time stamp recorded with the user details for accountability reasons.

DEVICEID	ALERT TYPE	DATE TIME	VIEW MAP
C7258F	AT1 Movement Alarm	2021-11-11 13:34:52	No Location
C51581	State: -Armed -Not Alarming -Temperature Normal -Door Closed -New Location -Moving	2021-11-08 15:30:31	
C51581	State: -Armed -Not Alarming -Temperature Normal -Door Closed -New Location -Moving	2021-11-08 15:24:40	
C51581	State: -Armed -Not Alarming -Temperature Normal -Door Closed -New Location -Moving	2021-11-08 15:18:50	

ADD MEMBERS

Movement alarm for AT1 device
Device:C6C3E5
Description: _Test 2
Date:2021-08-23 19:38:38
Account:V2 SALES DEMO
<https://portal.ramac.io/vd/C6C3E5/19>
19:38

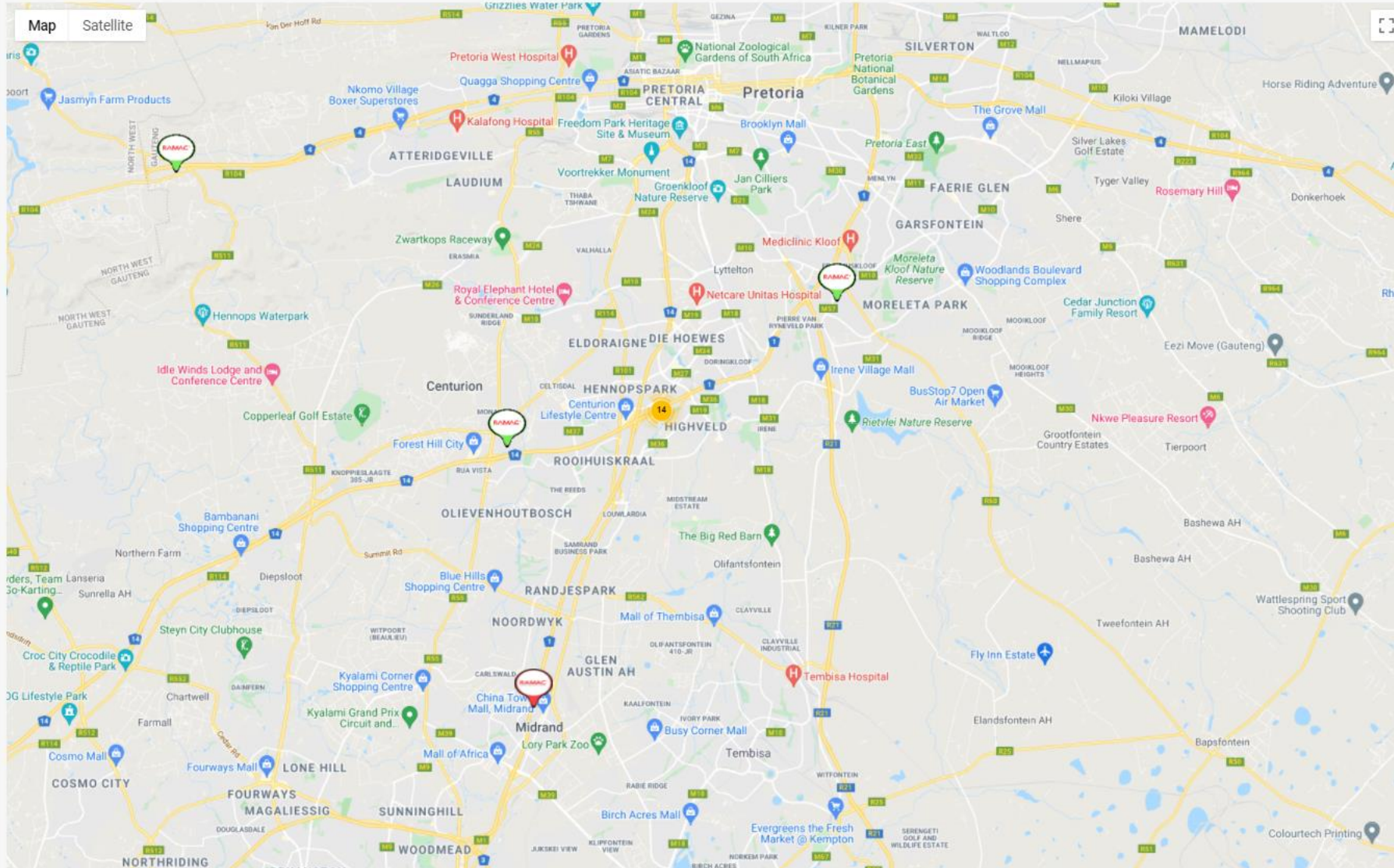
Movement alarm for AT1 device
Device:C71A07
Description: _Test
Date:2021-08-23 19:38:42
Account:V2 SALES DEMO
<https://portal.ramac.io/vd/C71A07/19>
19:38

P1 Device Location Update
Device:C5005E
Description: Akheel_Goodwill
Date:2021-08-23 19:41:23
Account:V2 SALES DEMO
Map:[Click Here](#) to view latest location on map
RB



Account: All Accounts Device Types: RAMAC AT1 Devices: All Devices

Alerting Devices



Devices Having Alert

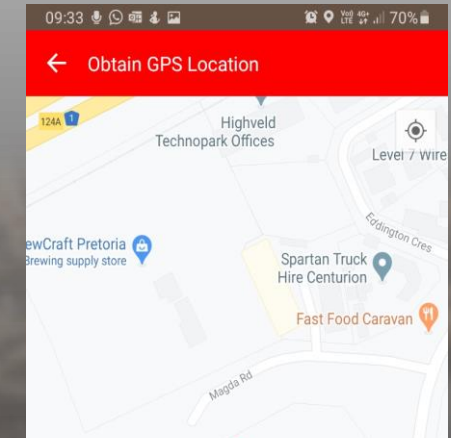
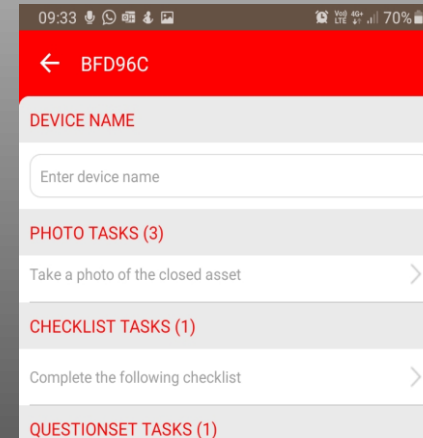
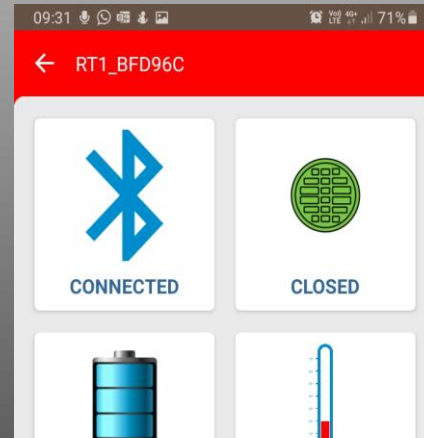
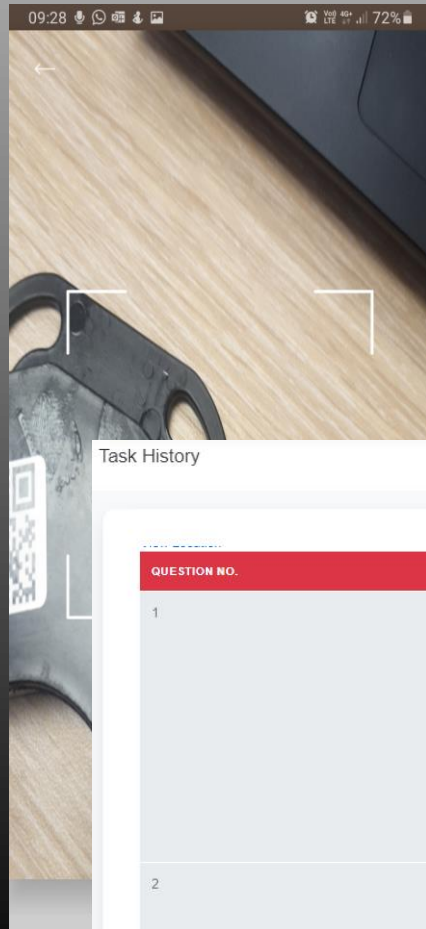
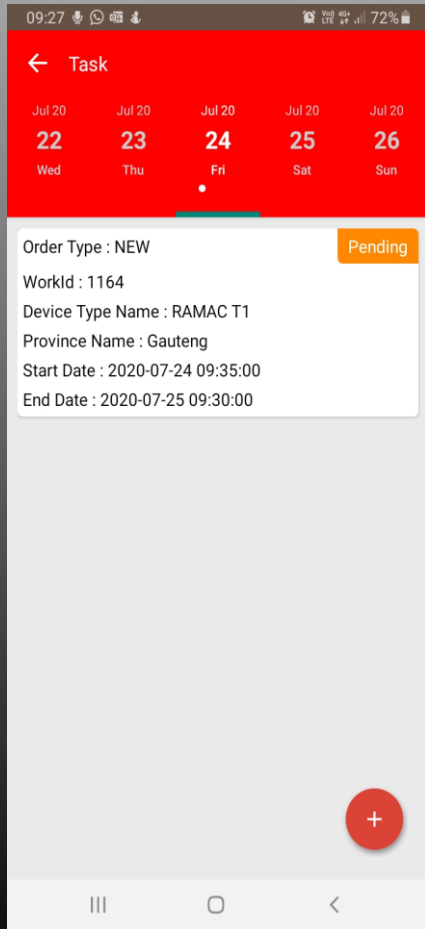
11 (Alert Devices) / 32 (Total Devices)

[Show All](#)

DEVICE ID	DEVICE TYPE	ALARM STATUS	LAST SEEN
C74604	AT1		12 minutes ago
C5007B	AT1		1 hour ago
C4DD3B	AT1		1 hour ago
C4DD2C	AT1		1 hour ago
C12ED1	AT1		1 hour ago
C4D277	AT1		1 hour ago
C6A9C1	AT1		1 hour ago
C57B76	AT1		1 day ago
C75DF9	AT1		8 days ago
C7690A	AT1		8 days ago
BFA048	AT1		19 days ago

Work Order Overview

The work order process is a step-by-step guide to activating the device whereby the Communication will only be enabled on the installation.



QUESTION NO.	TASK	ANSWER
1	Take a photo of the height installed in the ground	
2	Take a photo of the installed Device	



Audit Log

All information captured by installer during the installation will immediately be available on the portal on completion of all tasks.

Search Device Id

Work Order History

Start Date: End Date: Order Type: Assigned User: Device:

Status:

[Clear Search](#)
 Show entries

WORK ORDER ID	WORK ORDER TEMPLATE	CLIENT	START DATE	END DATE	ORDER DATE	ORDER TYPE	DEVICE	STATUS	ASSIGNED TO	INSTALLATION DATE	ACTION
7697	Protea Coin	Protea Coin	2021-05-27 14:01:00	2021-05-27 15:16:00	2021-05-27 14:01:44	NEW	RAMAC MD1	COMPLETED	Kenneth Lindgren	27-05-2021	
7696	Protea Coin	Protea Coin	2021-05-27 13:57:00	2021-05-27 15:15:00	2021-05-27 13:58:53	NEW	RAMAC MD1	COMPLETED	Kenneth Lindgren	27-05-2021	
7695	Protea Coin	Protea Coin	2021-05-27 13:53:00	2021-05-27 15:16:00	2021-05-27 13:53:33	NEW	RAMAC MD1	COMPLETED	Kenneth Lindgren	27-05-2021	
7654	Protea Coin	Protea Coin	2021-05-27 12:03:00	2021-05-27 14:15:00	2021-05-27 12:04:29	MAINTENANCE	C6A397	NEW	Kenneth Lindgren	27-05-2021	
7653	Protea Coin	Protea Coin	2021-05-27 00:12:00	2021-05-27 13:10:00	2021-05-27 11:36:43	NEW	RAMAC MD1	COMPLETED	Kenneth Lindgren	27-05-2021	
7652	Protea Coin	Protea Coin	2021-05-26 14:38:00	2021-05-26 16:25:00	2021-05-26 14:38:45	NEW	RAMAC MD1	NEW	Kenneth Lindgren	-	
7590	Protea Coin	Protea Coin	2021-05-25 12:15:00	2021-05-25 13:45:00	2021-05-25 12:25:01	NEW	RAMAC MD1	COMPLETED	Kenneth Lindgren	25-05-2021	
7591	Protea Coin	Protea Coin	2021-05-25 12:15:00	2021-05-25 13:45:00	2021-05-25 12:25:01	NEW	RAMAC MD1	COMPLETED	Kenneth Lindgren	25-05-2021	
7592	Protea Coin	Protea Coin	2021-05-25 12:15:00	2021-05-25 13:45:00	2021-05-25 12:25:01	NEW	RAMAC MD1	COMPLETED	Kenneth Lindgren	25-05-2021	
7593	Protea Coin	Protea Coin	2021-05-25 12:15:00	2021-05-25 13:45:00	2021-05-25 12:25:01	NEW	RAMAC MD1	COMPLETED	Kenneth Lindgren	25-05-2021	

Pulse Sensor



Cable Theft Sensor



Temperature Sensor



RAMAC™ Portal
& Mobile App



Vibration Sensor



Remote Lock Unit



Smart Location
Button



RAMAC™
Remote Access Management and Control Systems

Power State Sensor



Asset Tracker



Magnet
Sensor



Intrusion Protection



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Contact Us

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