KOPANENG SECURITY

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CIPS – Critical Infrastructure Protection System

Current Threats & Security Risks

- **Current Security Threats:**
  - **Substation theft and vandalization**
    - Fences, gates and perimeters damage
    - Substation equipment (minisub, transformers, switchgear, cables, earth mats etc.)
  - **Cable theft (under & above ground)**
    - Signal cables &
    - Electrical distribution cables
  - **Electrical infrastructure**
    - Pylon theft and vandalism
    - Illegal connections
    - Overhead conductors, insulators and equipment
    - Overhead transformers, sectionalizer, reclosers and distribution equipment
    - Substations including fences and high value switching equipment
    - Distribution kiosks
    - Metering kiosks
  - Signaling Equipment (traffic lights)
    - Cables and equipment
    - UPS batteries and equipment cabinets
  - **Water infrastructure**
    - Manholes and valve boxes
    - Pipelines
    - Water meters (upgrade to IoT water meters)
  - Open land (land invasion)

CIPS - Technology Selection

Technology and Systems

- Technologies Selection
  - Kinetic Sensor
  - Potenza Sensor
  - Super Sensor System
  - Magnetic Detection (UGS) System
  - Transformer (asset) Protection
  - Streetlight Monitoring and Protection
- Command and Control Platform

CIPS – CRITICAL INFRASTRUCTURE PROTECTION SYSTEM

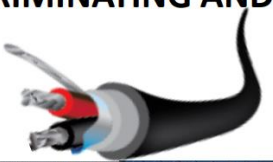
KINETIC SENSOR

Benefits of system:

- Communicates on LoRa or SigFox platforms
- Low-cost sensors
- Quick and easy to install, less than 30min to protect a large substation
- Multiple sensors per base station for optimized use and coverage
- Covert sensors
- Low capital (CAPEX) as well as operational (OPEX) cost
- Long lifespan of system and batteries
- Locally produced and manufactured system
- All assets can be protected (cables, equipment, fences, gates, doors)
- Ideal for remote locations
- Moveable detection system, move with the threat
- Multiple reporting platforms

SOIL MOUNTED SUPER SENSOR

INTELLIGENT, DISCRIMINATING AND LOW FALSE ALARM



SOIL MOUNTED SUPER SENSOR

INTELLIGENT, DISCRIMINATING AND LOW FALSE ALARM

- **Cost effective cable protection system**
- **May be used above ground on fences or below ground to protect cables, pipelines, valves etc.**
- **Can be used with new or existing installations**
- **Easy to use and fix in the operate for more than 20 years without any deterioration of its sensitivity, even after cuts and reconnections - which are typical to Fiber Optic cables and other special cables.**
- **Cheap to install, maintain and operate**
- **No mechanical parts to the detection system meaning a much higher MTBF and system durability**
- **Cost effective technology solution for large areas**
- **Integrated into TOAC Command and Control Platform**

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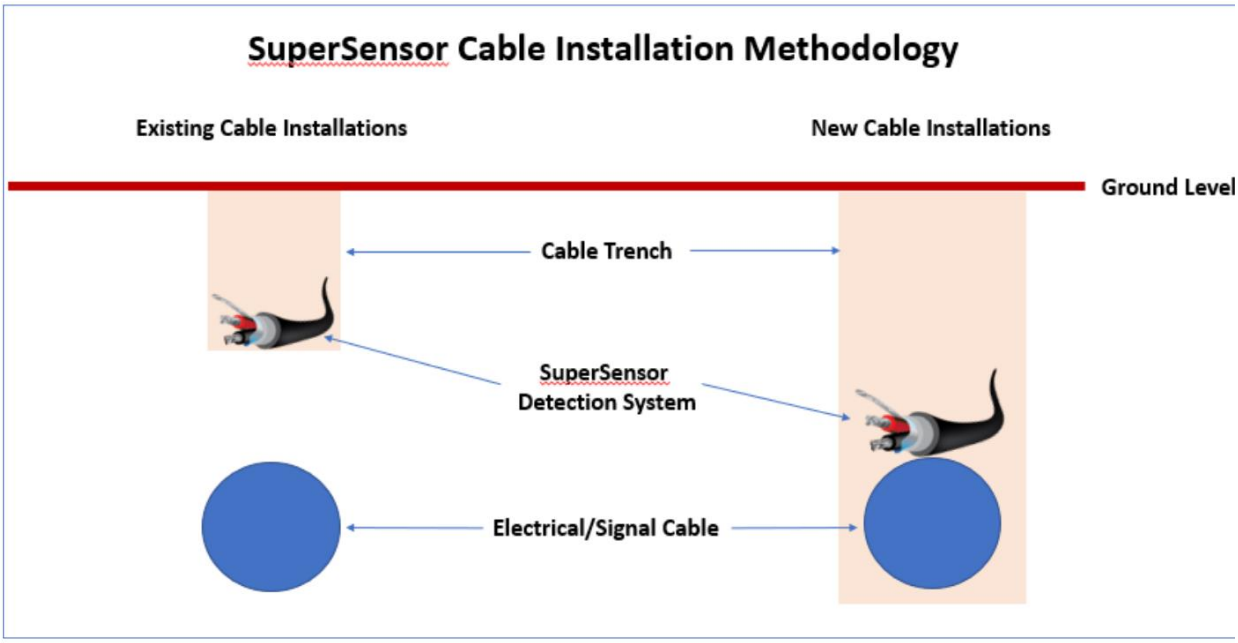

UNATTENDED GROUND SENSORS

COVERT INDEPENDENT MULTI-TECH DETECTION

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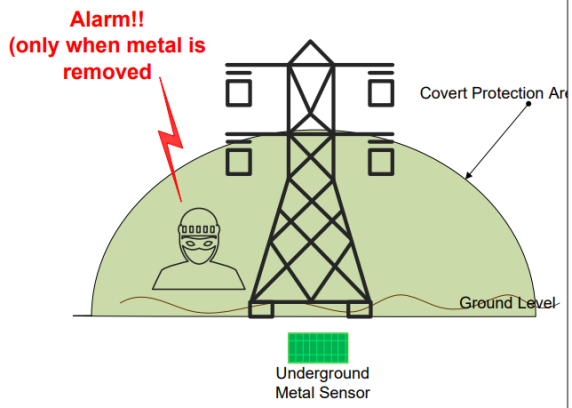
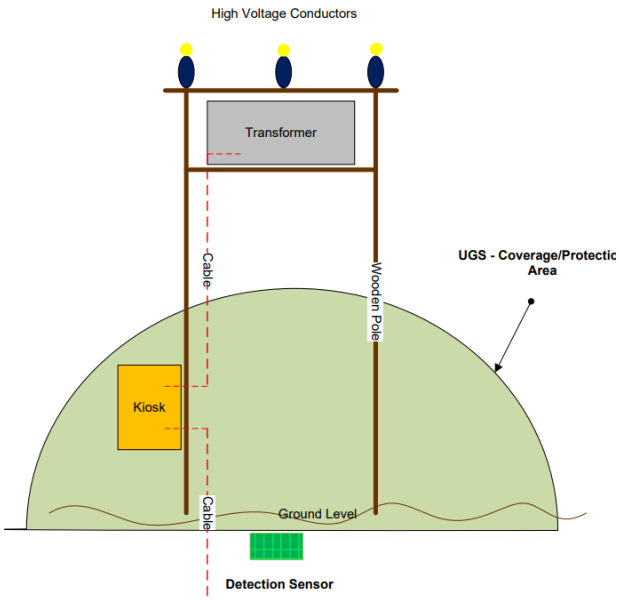
UNATTENDED GROUND SENSORS

COVERT INDEPENDENT MULTI-TECH DETECTION

- **Cost effective solution**. A complete and flexible re-deployable system with built-in sensors, data transmission, and integration into client's command and control Portal
- **Easy deployable**. A deployment will take less than 2 minutes to install and requires minimal technical knowledge. Ideal for redeployment and Wide Area use.
- **Standalone and mobility of sensors**. All sensors are standalone and not connected to an external power source of communication cable.
- **Effective detection and coverage**. All metal objects entering or exiting the protection zone will trigger an alarm.
- **Long battery life**. Typical sensor life of 3 years before battery replacement.
- **Land Invasion Detection System** for City of Cape Town
- **Reliability**. Demonstrations and references available.

SENSOR DEPLOYMENT CONFIGURATION EXAMPLES





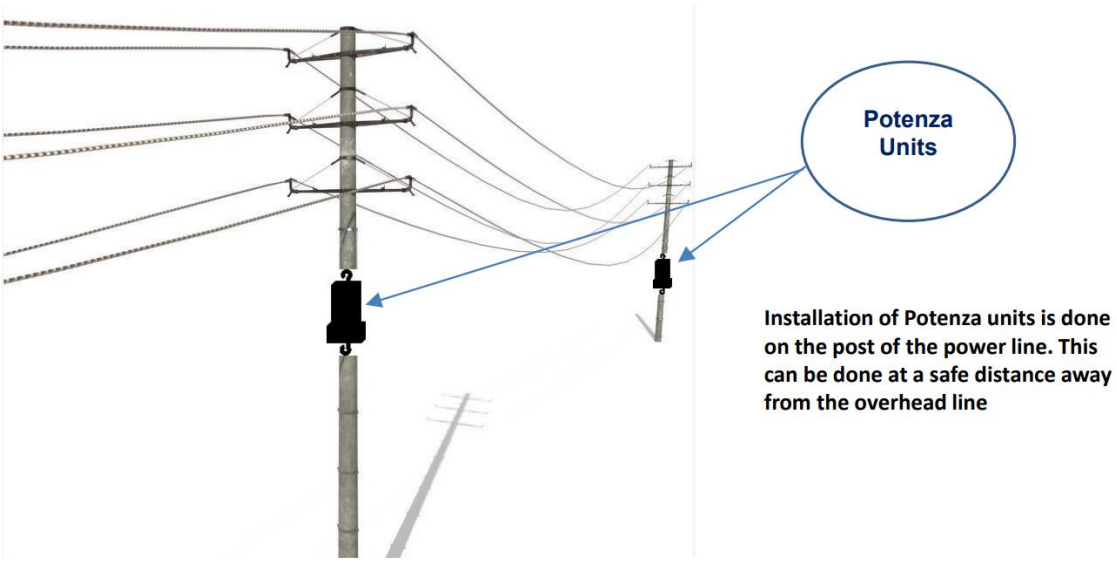
OVERHEAD LINE MONITORING

- The Potenza is a device built specifically for monitoring overhead power lines. Typically, a Potenza is installed at regular intervals on a transmission line, and GPS coordinates of each device is captured with installation. Once the power line is vandalized (i.e. lines cut, links cut, lines removed), the Potenza will send an alert. This enables response to a specific location.

Benefits include

- Detects power loss and restore on high voltage overhead lines
- Reports:
- Power lost
- Power restored
- Low battery voltage
- Wirelessly via RF to the SigFox network
- Available in LoRaWAN
- The RAMAC™ Potenza sensor is powered by one 1.5V D-cell battery. Battery life is estimated at up to 4 years. For reliable operation of the RAMAC™ Potenza Sensor, the battery should be replaced every four

POTENZA INSTALLATION



EVENT DETECTION

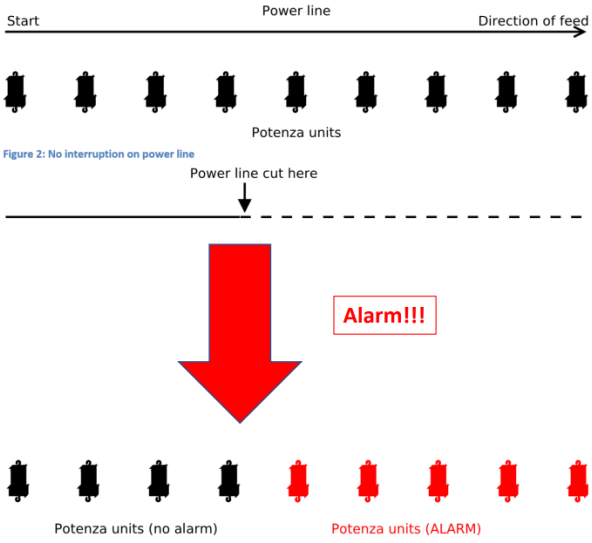


Figure 2: No interruption on power line

UNDERGROUND CABLE MONITORING

- The Motion Detect Sensor is a SigFox Ready device specifically designed to monitor movement. The 3 Axis accelerometer allows the Movement Sensor to enter an ultra-low power state yet still wake up immediately on detection of movement. This will enable customers to use the device to monitor motion or tilt on any assets that should be stationary. The rugged sensor allows for real-time monitoring and incorporates Bluetooth Low Energy (BLE) functionality, enabling the device to be wirelessly configured, set up, and commissioned.

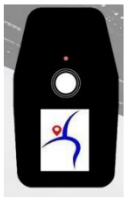
Benefits include

- Improve service delivery
- Eliminate 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
- Improve the financial health of the company
- Increase awareness of financial risks (12 MONTH FORECAST)

SMART LOCATION BUTTON

- The Smart Location Button is a mobile Application, the button can be tailored to meet the specific needs of the clients by configuring it for different modes. This level of customization allows the Smart Location Button to provide unparalleled intelligence and efficiency to it users. Whenever you need to track your vehicles, equipment, or personnel, The P2 has got cover.

Benefits include



- The P1 is designed to be resilient to jamming, making use of global SigFox communication. With RC1 certification and RC4 readiness, the button is capable of ensuring uninterrupted communication, providing peace of mind to its users.
- Extended Range Real-Time Communication: The button uses SigFox Compliant radio networks to enable extended-range real-time communication. This capability allows for seamless and continuous communication, even in areas where cellular network coverage is limited.
- Easy to use and Upgrade: The button is USB-C rechargeable, and its firmware can be upgraded via the mobile application, making it convenient and user-friendly. Additionally, daily self-diagnoses via a heartbeat message ensure the button is always in top working condition.
- Cost-Effective and Low-Maintenance: With a long battery life of up to 8 months on one charge, the P1 offers a low total cost of ownership, thanks to its maintenance-free autonomy. This means that users can enjoy significant cost savings in the long run.
- Versatile and Compact Design: The button's small form factor and multi-functional capabilities make it a versatile and adaptable solution for various use cases. It can be easily integrated into any system, offering seamless connectivity, even in remote or challenging environments.
- Flexible and Open Integration: The button's API and SDK are available for IOS and Android, providing flexibility and enabling easy integration into existing systems. Additionally, the button is offline logging capable, enabling it to store additional points that could not be sent in LPWAN messages.

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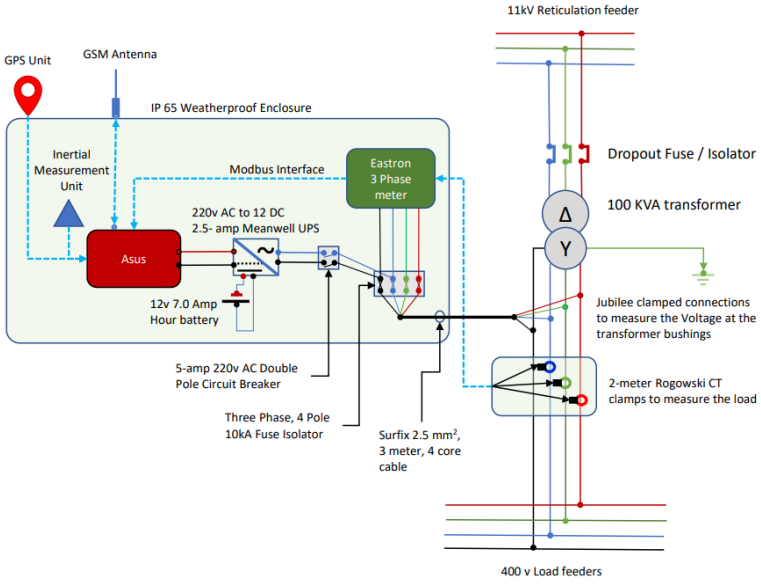
Transformer Health Monitoring and Tamper Detection

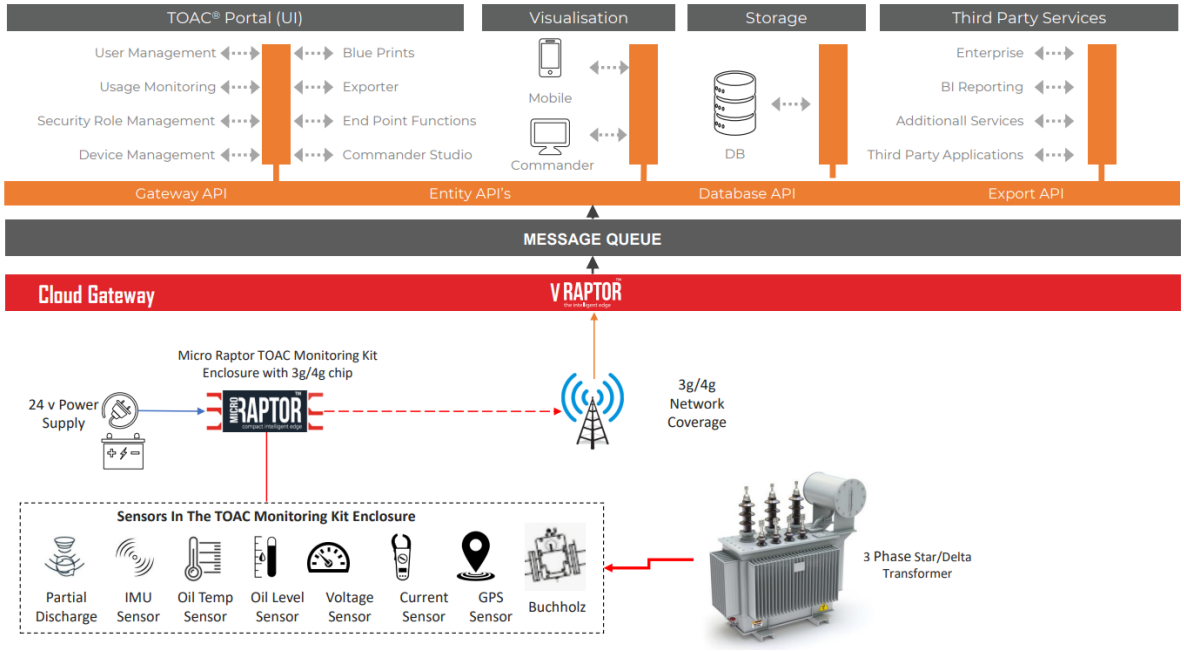
Monitor the Following aspects

- LV Energy loading
- LV Phase Loading and Balancing
- Partial Discharge
- HV Fuse state
- Oil level via a pressure sensor
- High Impedance Earth Faults

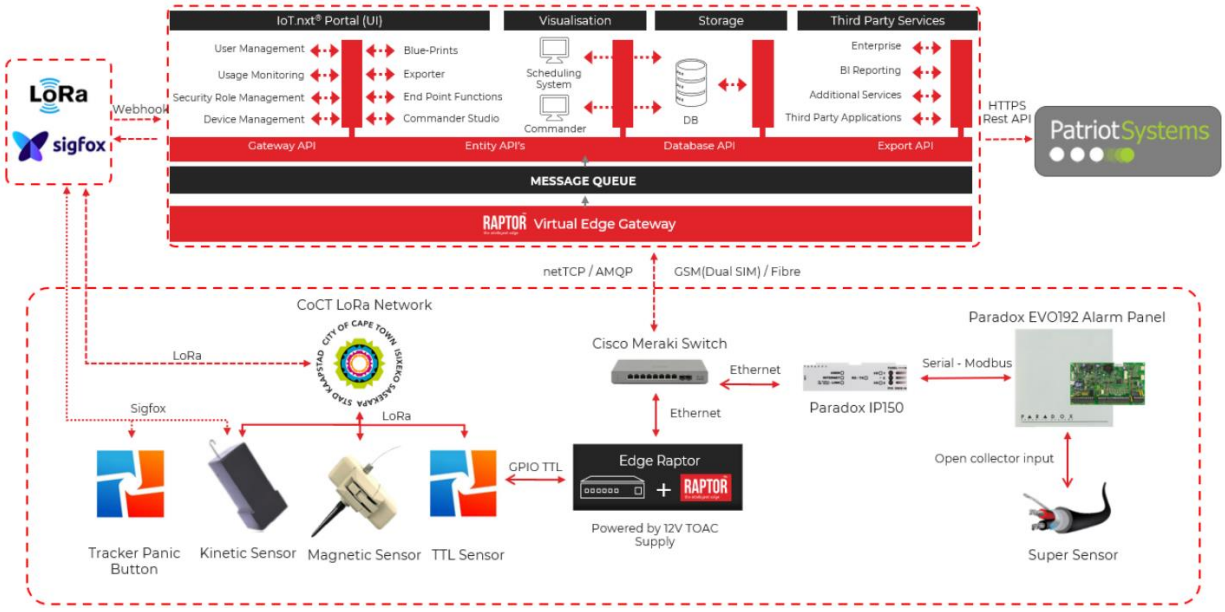
Transformer and Streetlight Control – All in One

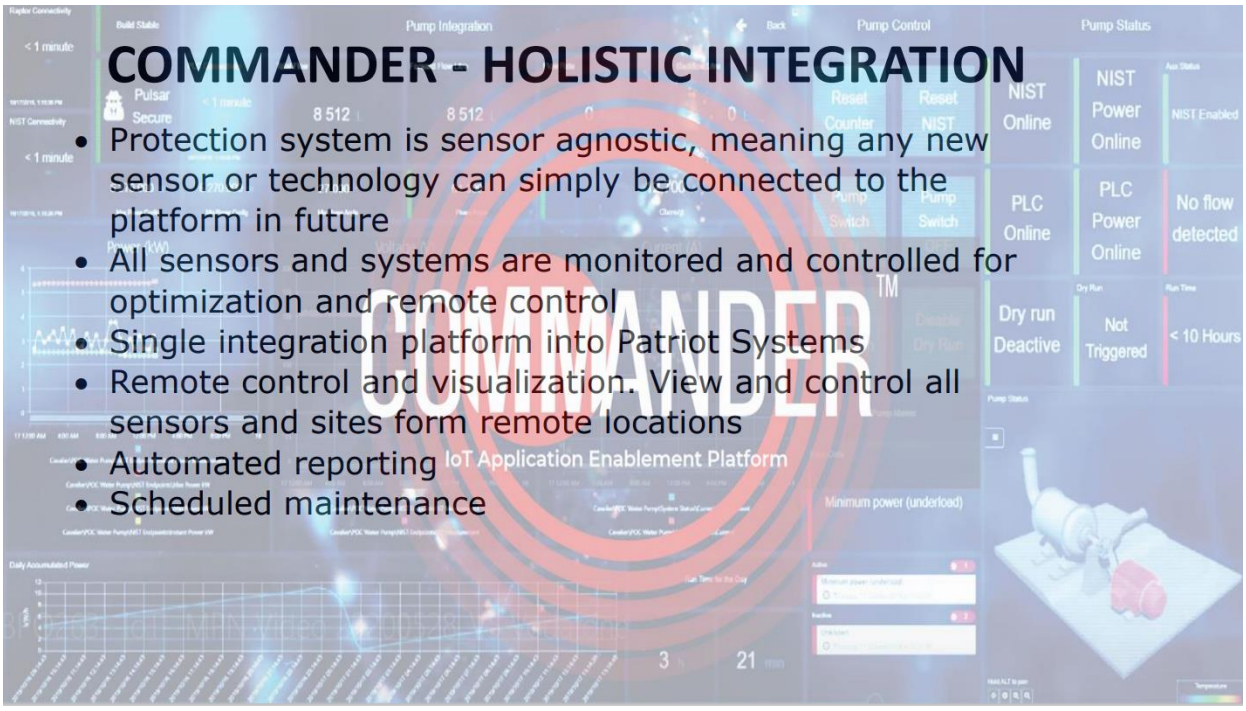


Proposed Architecture



SYSTEM LAYOUT





COMMANDER - HOLISTIC INTEGRATION

- Protection system is sensor agnostic, meaning any new sensor or technology can simply be connected to the platform in future
- All sensors and systems are monitored and controlled for optimization and remote control
- Single integration platform into Patriot Systems
- Remote control and visualization. View and control all sensors and sites form remote locations
- Automated reporting
- Scheduled maintenance

IoT.nxt® Platform Deployment Landscape Scenario B

FUTURE EXPANSION

- Building management systems
- HVAC control
- Generator control
- Smart metering
- Environmental monitoring
- Security and access control
- Energy consumption and monitoring
- Asset tracking
- Predictive maintenance

We thank you for the opportunity to quote, and look forward to your further advices. Should you require any further details please contact me.

If we can be of any assistance in ensuring the success of your next project, please do not hesitate to call.

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I hope you find this email in order and looking forward to your response.

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