SEMTECH CASE STUDY

DEKAN

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Enabling LoRa® for Real-Time Termite Detection and Infrastructure Protection, DEKAN Termite Monitoring and Treatment System

Discover how Dekan's intelligent termite monitoring system leverages LoRa® technology to provide real-time, automated termite detection and treatment across large-scale properties. Powered by ultra-low power LoRa connectivity, it delivers reliable data transmission with 3–6 years battery life, supporting LoRa, NB-IoT and Cat.1 communication system for critical infrastructure protection.

QUICKFACTS

Company

DEKAN
zgdekan.com

Customer Profile

DEKAN is an environmental technology company specializing in intelligent termite monitoring and treatment solutions. The company provides innovative IoT-based pest control systems that integrate hardware sensors, wireless networks, PC management software, and mobile applications. Hylin provides communication skills and technical support to DEKAN to achieve intelligent products.

Objectives

Develop an intelligent termite monitoring system with long-range wireless connectivity, ultra-low power consumption, and real-time alert capabilities to protect buildings and infrastructure.

Results

- Deployed intelligent termite monitoring system with ≥95% accuracy rate.
- Achieved 3-6 years battery life through ultra-low power design.
- Won "Top Ten Cultural Relics Products and Services Award in China" (2020).
- Obtained patents in China, Taiwan, Japan, Australia, US, and Malaysia.
- Enabled real-time termite detection with automated alarm system.

Products and Services

- Semtech's LoRa® technology.
- NB-IoT
- Cat.1 Communication
- Signal-triggering sensors (DEMINL)
- Real-time monitoring platform
- Mobile APP management

INTRODUCTION

Zhejiang DEKAN Environmental Technology Co., LTD is a leading provider of intelligent termite monitoring and treatment solutions in China and internationally. The company specializes in integrating IoT technology with pest management, offering comprehensive systems that include monitoring devices, network infrastructure, management software, and mobile applications. DEKAN's innovative approach has earned recognition with their system winning the "Top Ten Cultural Relics Products and Services Award in China" in 2020, reflecting the critical importance of termite protection for cultural heritage sites, residential buildings, and infrastructure.

With a strong focus on technological innovation, DEKAN has secured patents across multiple countries including China, Taiwan, Japan, Australia, the United States, and Malaysia. Their solutions serve diverse markets including cultural heritage protection, smart cities, residential communities, industrial facilities, and agricultural applications.

CHALLENGE

Termites cause billions of dollars in damage annually to buildings, infrastructure, and cultural heritage sites worldwide. Traditional termite monitoring methods rely on manual inspections that are time-consuming, labor-intensive, and often fail to detect infestations until significant damage has occurred.

Key challenges in termite monitoring include:

Wide-Area Coverage Requirements: Properties and heritage sites often span large areas, requiring monitoring solutions that can cover extensive grounds without prohibitive infrastructure costs. Traditional wired systems are impractical and expensive to deploy across such expanses.

Power Constraints: Monitoring devices installed underground, in walls, or in remote locations must operate on battery power for extended periods. Frequent battery replacements are costly and disruptive, especially in hard-to-reach locations or protected historical sites where access is limited.

Real-Time Detection: Early termite detection is crucial to prevent structural damage. However, achieving real-time monitoring across distributed sensor networks requires reliable, long-range wireless communication that can penetrate through soil, concrete, and building materials.

Environmental Challenges: Termite monitoring points face harsh conditions including underground installation, exposure to moisture, temperature fluctuations, and physical barriers that interfere with wireless signal transmission.

Scalability and Cost: Deploying hundreds or thousands of monitoring points across large properties requires a cost-effective, scalable solution that doesn't demand extensive network infrastructure.

SOLUTION

The DEKAN Termite Monitoring and Treatment System leverages LoRa® technology alongside NB-IoT and Cat.1 communication protocols to deliver a comprehensive, intelligent monitoring solution. The system consists of several core components:

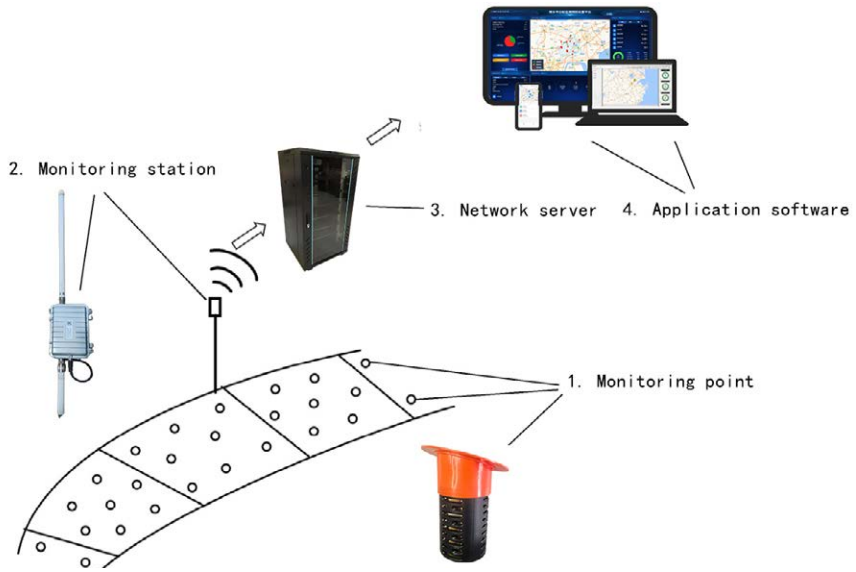
Signal-Triggering Technology (DEMINL): At the heart of the system is Dekan's proprietary "Electromagnetic Induction with non-loop technology" (DEMINL). This electronic monitoring technology uses magnetic induction between two objects to detect the presence or absence of termites based on changes in magnetic quantity. The detected wood pieces are independent of the electrical loop and packaged independently, forming a non-electrical loop state with the detected object, eliminating the need for metallic materials that could attract termites.

Ultra-Low Power Monitoring Devices: Powered by LoRa connectivity, the monitoring points feature IP68 waterproof-rated hardware designed for harsh environmental conditions. The signal acquisition module is a non-contact module with non-metallic material, and the electronic circuit board achieves a remarkable service life of 3-6 years on battery power.

Multi-Protocol Communication: The system supports LoRa for long-range, low-power communication, complemented by NB-IoT and Cat.1 options to solve signal collection, uploading, and transmission challenges across diverse deployment scenarios. This flexibility ensures reliable connectivity regardless of terrain or infrastructure.

Intelligent Management Platform: The system includes PC management software and mobile APP for real-time monitoring, data visualization, and alert management. The platform displays various states including initial status, termites detected, insecticide treatment, relocation of termites, offline status, disconnection, and lost devices.

Comprehensive Deployment: Shell modules are designed for different scenarios with anti-aging plastic that lasts more than 10 years. The system includes underground, indoor, and ground-type monitoring points to provide complete coverage.



KEY APPLICATIONS:

- **Cultural Heritage Protection:** Monitoring historical buildings, temples, ancient structures, and archaeological sites
- **Smart Cities**: Integration into urban infrastructure monitoring systems
- **Residential Communities:** Protecting homes and apartment complexes
- **Industrial Facilities:** Safeguarding warehouses, factories, and commercial buildings
- **Agricultural Applications:** Monitoring timber storage, agricultural structures, and processing facilities
- **Critical Infrastructure:** Protecting bridges, utility poles, and transportation infrastructure

BENEFITS

Long-Range, Reliable Connectivity: LoRa technology provides exceptional signal penetration through soil, concrete, and building materials, ensuring reliable data transmission from underground monitoring points, within walls, and across large properties. This enables comprehensive coverage without gaps in monitoring.

Extended Battery Life: With ultra-low power consumption optimized through LoRa connectivity, monitoring devices achieve 3-6 years of battery life. This dramatically reduces maintenance costs and ensures continuous operation in hard-to-access locations, including underground installations and within historical structures where frequent maintenance is impractical.

Real-Time Detection & Automated Response: The system automatically detects termite activity and immediately transmits alerts to the management platform and mobile app. This enables rapid response to termite invasions, preventing extensive damage. The system provides real-time location data, allowing pest control teams to target specific affected areas precisely.

High Accuracy & Durability: The system achieves ≥95% accuracy rate in termite detection, with a durability of ≥3 years under harsh environmental conditions. The IP68-rated components withstand moisture, temperature variations, and underground installation challenges.

Scalable & Cost-Effective Deployment: By leveraging LoRa's ability to support hundreds of monitoring nodes per gateway, the system reduces infrastructure costs significantly. The solution scales easily from small properties to large cultural heritage sites and urban developments without prohibitive network investment.

Multiple Communication Options: Flexible support for LoRa, NB-IoT, and Cat.1 protocols ensures the system can adapt to different deployment environments, network availability, and customer requirements. This multi-protocol approach maximizes reliability and deployment flexibility.

Comprehensive Management: The integrated PC and mobile management platform provides intuitive monitoring, historical data analysis, maintenance records, and treatment tracking. Users gain complete visibility into termite activity patterns and can manage large-scale deployments efficiently.

Proven Track Record: With patents in six countries and recognition as a top cultural relics protection product in China, the DEKAN system has demonstrated its effectiveness in protecting invaluable historical assets, residential properties, and critical infrastructure.

Learn More: www.semtech.com/lora

About Semtech

Semtech Corporation (Nasdaq: SMTC) is a high-performance semiconductor, IoT systems and cloud connectivity service provider dedicated to delivering high-quality technology solutions that enable a smarter, more connected and sustainable planet. Our global teams are committed to empowering solution architects and application developers to develop breakthrough products for the infrastructure, industrial and consumer markets.

To learn more about Semtech technology, visit us at **Semtech.com** or follow us on **LinkedIn** or **X.**