AI Directions

ALDAS
OVERVIEW

1. Introduction

Overview

Water damage is one of the most common and costly issues in both residential and commercial properties. AIDirections presents an advanced solution — the Advanced Leak Detection and Alarming System (ALDAS) — a cutting-edge, integrated solution specifically designed to detect water leaks early, reduce water-related damage, and enhance building management efficiency. Whether used in high-rise towers, commercial spaces, or sensitive environments like data centres, ALDAS helps ensure that leaks are identified before they escalate into significant damage.

ALDAS provides an interconnected, scalable, and efficient approach to monitoring for potential water risks, which communicates using LoRaWAN technology. This allows for seamless communication, rapid and individually designable deployment, and a wide-area network coverage that is well-suited for complex building layouts.

2. Key Benefits and Features

2.1 Proactive Leak Detection and Risk Mitigation

ALDAS is built to detect even the smallest leaks in real-time, ensuring rapid intervention and minimizing the potential for expensive repairs or interruptions to business operations. The early detection system also helps avoid secondary damages like mold growth, compromised electrical systems like lifts, or structural weakening.

2.2 Comprehensive Coverage and Scalability

ALDAS uses LoRaWAN, a secure, long-range wireless communication protocol ideal for environments where traditional WiFi signals may be disrupted. It offers an impressive 15 km radius in open spaces and performs exceptionally well in multi-story buildings with significant amounts of structural steel.

This system's modularity allows it to be easily scaled from small properties to large commercial complexes, adjusting seamlessly to the specific needs of each client. Any number of sensors can be added to increase coverage as needed, ensuring no area is left unmonitored.

2.3 Low Maintenance and Energy-Efficient Design

Thanks to its highly efficient power management system, each sensor in the ALDAS operates on battery power for up to 5 years, drastically reducing maintenance costs. Furthermore, the system's low-energy LoRaWAN network allows for continuous monitoring with minimal power consumption.

2.4 Customizable Alerts and Notifications

The sensors, strategically placed in high-risk areas of the facilities' management choice, detect the presence of water and send alerts through the LoRaWAN network to the ALDAS gateways. The gateways then transmit these alerts to the ALDAS dashboard and can also transmit them to the building's management system. These notifications can be configured to send alerts via SMS, email, in-app notifications, or even direct integrations into building management systems (BMS) through BACnet or other custom protocols. Alarms are localized, enabling facility managers to pinpoint the exact location of the issue for swift resolution.

2.5 Secure and Flexible Integration with Building Management Systems

With the growing complexity of modern infrastructure, ALDAS integrates seamlessly with existing building management systems (BMS), making it compatible with most communication and alert platforms. Utilizing encryption technologies and role-based access control (RBAC), the system ensures that sensitive data is protected while allowing authorized personnel full access to the system's monitoring tools.

3. System Components and Deployment

ALDAS includes the four core components described below, each playing a crucial role in detecting and managing floods; in addition, there are the communication components described in Section 4.

3.1 ALDAS Network

ALDAS uses a typical IP-based network for its functioning. The deployment options from a network perspective include, and can be chosen based on needs:

1. Using the facilities' existing network;
2. Separate internal network, installed independently from other networks in the application site, to avoid any potential conflicts (e.g., RERA compliance);
3. ALDAS can operate without direct internet access. For enhanced capabilities, such as the SMS notification, outgoing internet access is required. For security purposes, no incoming ports should need to be opened for ALDAS.

Deployment

In **Case 1**, AIDirections works with the facilities' IT department to set up the necessary services and install ALDAS. There needs to be a sufficient IP address space on the network to cater for at least 128 IP addresses.

In **Case 2**, the network is installed by a contractor of AIDirections, which has experience in building management and installing networks for ALDAS. The completion of the network installation is assessed by AIDirections as part of the installation process.

3.2 ALDAS System

ALDAS works using a number of servers provided by AIDirections; these servers are used to run ALDAS and to provide seamless redundancy and failover in case of any interruptions. ALDAS includes the provision of a dashboard for interaction of the facility management with ALDAS. This dashboard displays the status of the flood sensing nodes and of their batteries and displays an alarm if there is any water detected, or there is anything wrong with the ALDAS gateways or sensors.

Deployment

The exact location of the servers will be agreed with the facilities' building management, a typical installation includes servers in the building management room and the security room, as well as redundancy servers in sufficient physical distance. AIDirections will carry out all server installations as part of the installation process.

3.3 ALDAS Gateways

ALDAS's gateways serve as the communication hub, bridging the LoRaWAN network used by the sensors to the ALDAS network through WiFi or Ethernet connections. ALDAS uses the LPS8 gateways, which supports long-range communication, enabling rapid deployment in large buildings or across campuses.

Technical Specifications - Gateways	
Model	LPS8 LoRaWAN Gateway
Frequency Bands	Pre-configured for global use, customizable for specific regions
Technology	Supports 49 LoRa demodulators and 10 programmable demodulation paths
Management	Remote management via Web GUI, SSH via LAN, or Wi-Fi
Connectivity	1x RJ45 port, Wi-Fi 802.11 b/g/n, and USB-C power input
Durability	Reliable in both residential and industrial environments

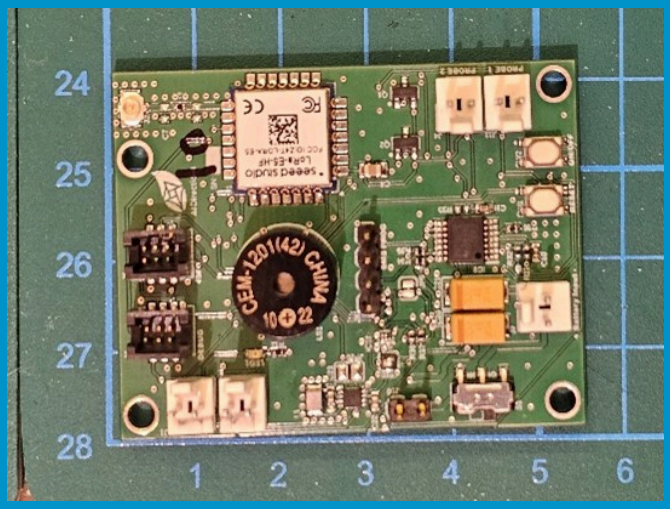
Deployment

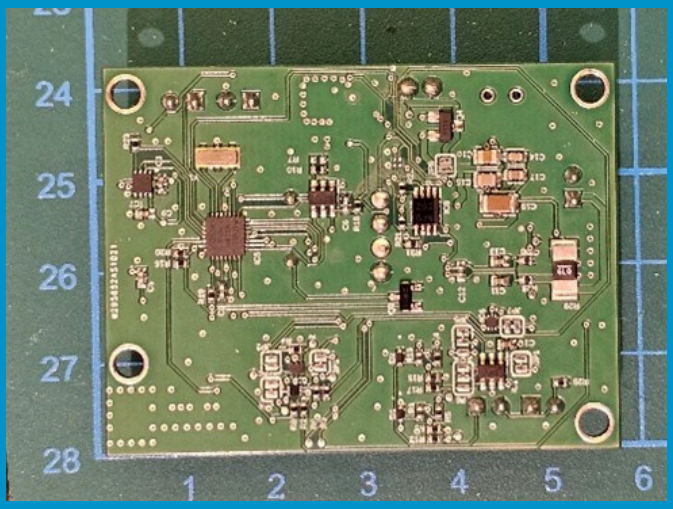
These industry-standard gateways are placed and activated by AIDirections during the installation process. The gateway placement is related to the number of ALDAS sensors that will communicate with the gateway; sufficient gateways will be placed, in accordance with the individual facilities' requirements.

3.4 ALDAS Nodes

3.4 .1 Sensors

The ALDAS sensors are designed to detect the presence of water through conductive ropes and metallic probes, and to communicate this detection to the gateways for further action. These versatile sensors can be installed in various environments, including mechanical rooms, water cabinets, bathrooms, kitchens, HVAC systems, and more. They are highly sensitive, detecting minimal water presence within seconds.

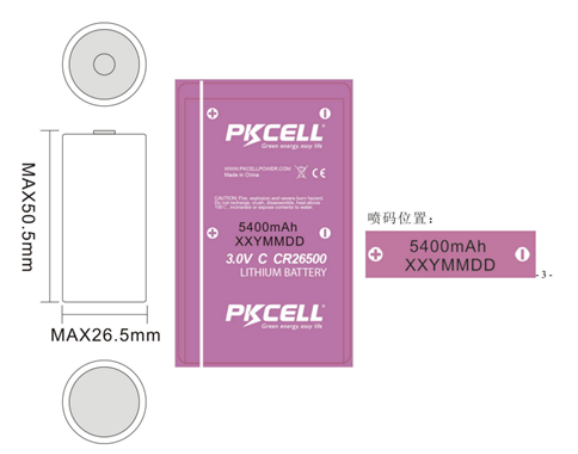




Technical Specifications - Sensors	
Detection Method	Conductive Ropes and Metallic Probes
Input Channels	2 for dual-sensitivity detection
Operating Voltage	2.1V (Low power consumption)
Current Consumption	20µA (sleep mode), 1mA (idle mode), 7-110mA (during transmission)
Operating Temperature Range	-40°C to +85°C, suitable for extreme environments
Response Time	Less than 1 minute
Alarm Output	Audible, visual alarms, and LoRaWAN-communicated alerts
Durability	Operates under harsh conditions with excellent resilience to environmental factors (IP 65 approved)

3.4.2 Battery

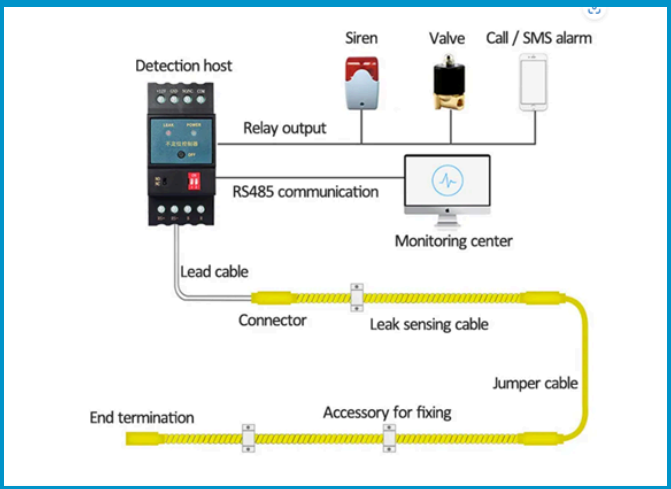
The sensors are powered by a highly efficient lithium manganese battery, known for its reliability and long operational life.



Technical Specifications - Battery	
Model	CR26500
Capacity	5400mAh, providing up to 5 years of operational life
Voltage	3.0V
Characteristics	High capacity, stable discharge, long-lasting performance even in challenging conditions

3.4.3 Water Detectors

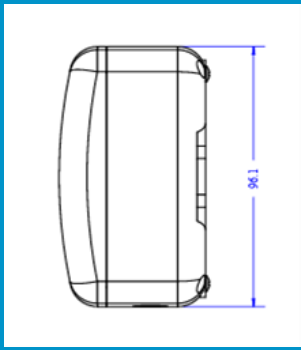
For expanded coverage, ALDAS includes water-sensing rope detectors, which are highly sensitive to any water presence along their length. These detectors are particularly useful in larger areas for distributed water detection.

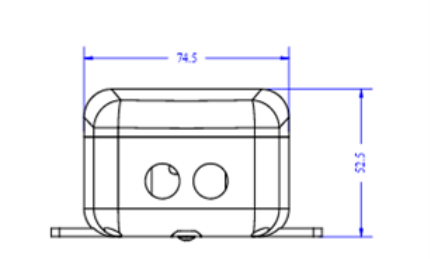


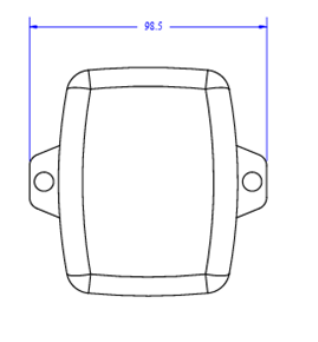
In addition to the ropes, a water-detecting probe can be located to pinpoint to a particular sensitive area.

3.4.4 Enclosures

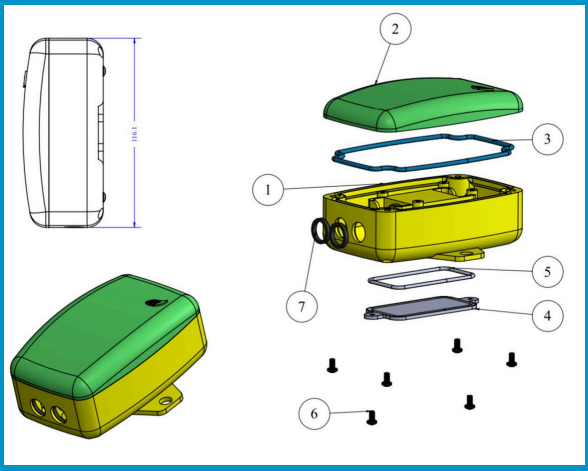
To protect sensors and other sensitive hardware, ALDAS enclosures are designed to be both dust and waterproof, ensuring reliable performance in harsh conditions.







Technical Specifications – Enclosures	
Material	3D printed, high-quality polymer resin
Waterproof Rating	IP67, ensuring splash and dust protection
Dimensions	98.5 x 69.1 x 49.5 mm for main body, 22 x 33.5 x 9.55 mm for probe enclosures
Mounting Options	Wall mounting via screws or adhesive with durable 3M patches



Deployment

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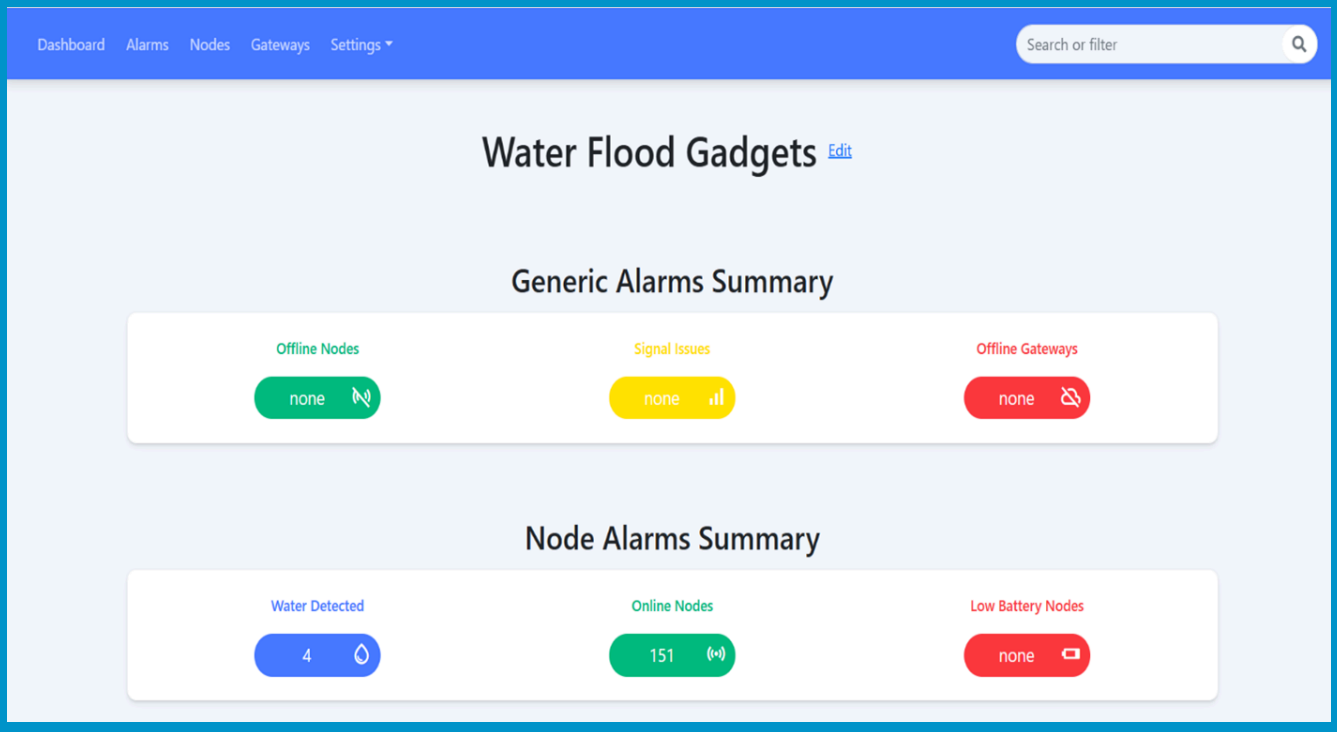
4. ALDAS Dashboard and Mobile App

4.1 ALDAS Dashboard

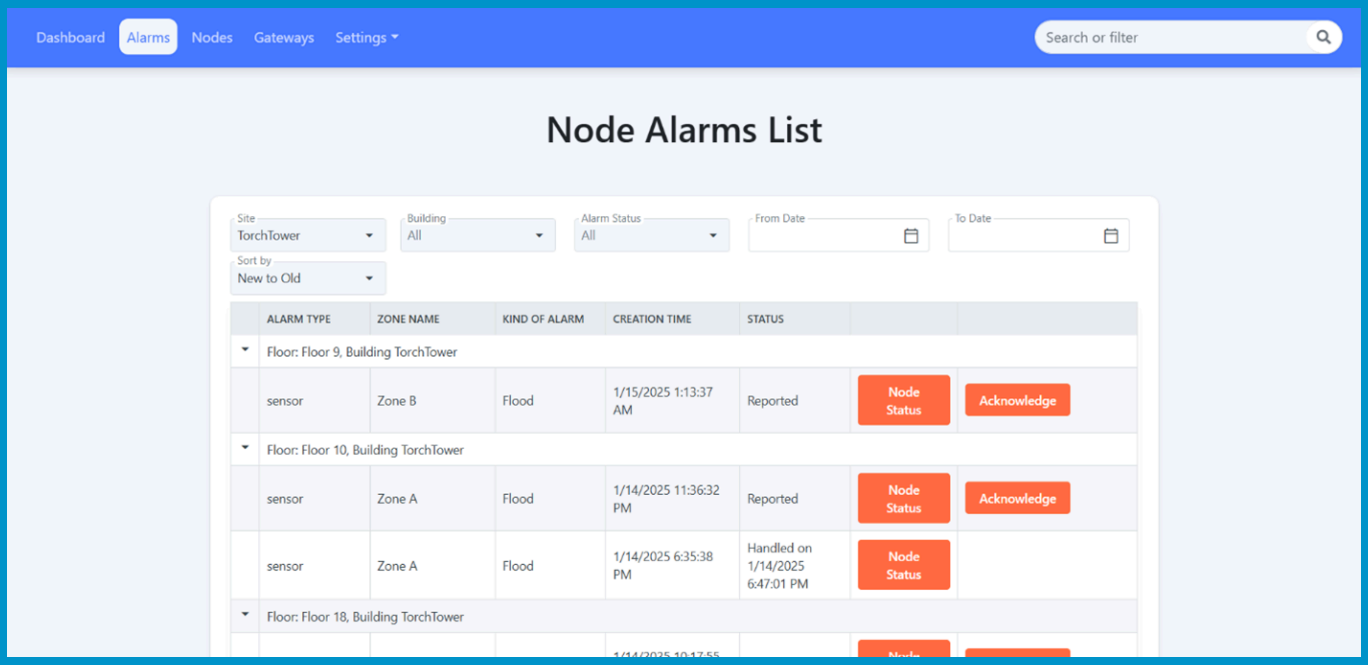
As mentioned in Section 3.2, ALDAS includes a dashboard, which is used to display the status of the gateways, the flood sensing nodes, and their batteries, as shown below. This dashboard also indicates an alarm whenever there is a flood event happening and allows to check on all relevant situations just by one glance.

Below is the initial page of the dashboard, and if this look is not to the liking of the building management, it can be changed using the 'Edit' button.



It is recommended to place the dashboard in a room under constant surveillance, such as the security room. In case of an alarm, the dashboard notifies the people watching.

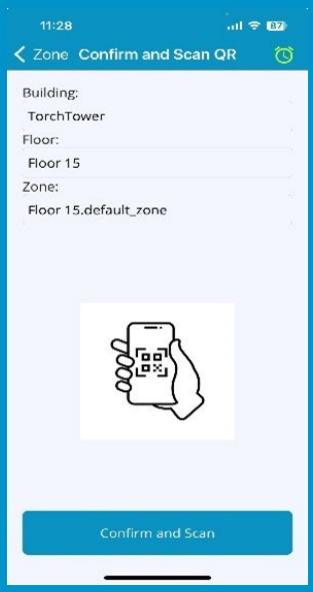
Once an alarm occurred, the user of ALDAS having logged in goes to the alarms page:

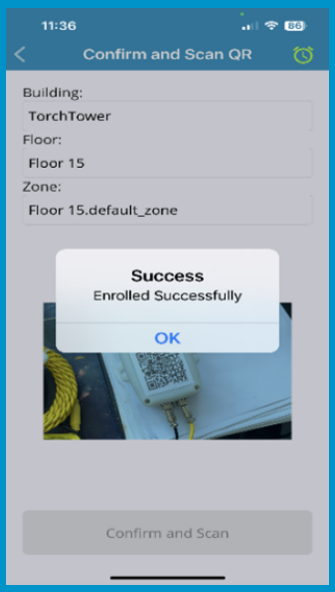


The user should then acknowledge the alarm to inform ALDAS that the flood event has been notified and will be dealt with. The user should then initiate the handling of the alarm. Once the handling is complete, this should also be registered on the dashboard by clicking on the ‘Handled’ button, and the alarm is dealt with. Records of these actions are kept, and the flood sensing node is ready to indicate new alarms.

4.2 ALDAS Mobile App

The ALDAS Mobile App supports the installation or de-installation of the ALDAS gateways and flood sensing nodes. It can be used to scan the QR code on the devices after identifying the building, floor, and zone they are situated in. This makes the whole installation process very fast and easy. After the process is completed, the ALDAS Mobile App shows the gateways and nodes enrolled.





In the same way, gateways or nodes can also be deleted, and the ALDAS Mobile App also allows to search for gateways or nodes, and provides further information about the devices.

5. Applications Across Industries

ALDAS is designed to provide value across multiple sectors:

Residential Buildings: Protects high-rise towers, apartments, and homes from water damage, minimizing costly repairs and insurance claims.

Commercial Properties: Ensures office buildings, shopping centers, and warehouses are safeguarded against water-related interruptions.

Data Centres: Provides critical protection for server rooms and IT infrastructure where water damage can result in catastrophic data loss.

Industrial Facilities: Monitors for leaks in factories, manufacturing plants, and other industrial settings, ensuring safety and operational continuity.

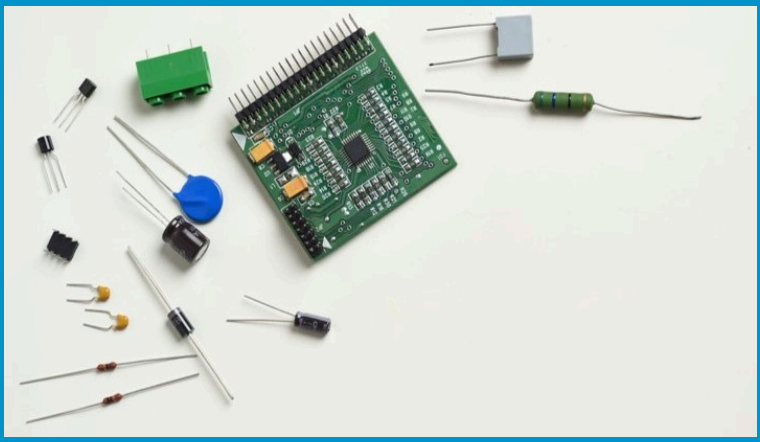
6. Maintenance and Support

Long-Term Maintenance

ALDAS is built for low-maintenance operation, thanks to its long battery life and robust communication system. With automated monitoring, ALDAS continuously checks the status of all sensors and gateways, ensuring the system remains operational. Role-based access control ensures that only authorized personnel can make changes or view sensitive information. ALDAS also provides an alarm if any of the batteries are running low, and if a gateway is out of communication for a longer time. AIDirections provides the necessary maintenance.

Support and Updates

Firmware updates and system diagnostics can be carried out remotely, ensuring the system remains up-to-date without the need for frequent on-site visits. AIDirections provides support and updates as required.



For further information or to discuss your specific requirements, please contact us:

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