Annual Maintenance Contract (AMC) for IoT Sensors and Data Loggers

Background

An Annual Maintenance Contract (AMC) is proposed for the IoT-enabled hardware and sensors installed under the project “A Blockchain-Powered Traceability System for Plant Tissue Culture Facility” at the Biotechnology and Model Floriculture Centre (BMFC), Kazhakuttam, Thiruvananthapuram.

The installed system is used for monitoring and recording critical environmental and operational parameters in the Plant Tissue Culture laboratory. The warranty period of the installed hardware and sensors has expired. Regular maintenance, troubleshooting, calibration/replacement of faulty components and technical support are therefore required to ensure the continued and reliable functioning of the system.

Objective

The objective of this AMC is to ensure the continuous and reliable functioning of the installed IoT hardware, sensors and data loggers, and to minimise interruptions in data collection and monitoring.

Installed Hardware

The AMC requirement covers the following installed equipment:

Sl. No.	Equipment	Quantity
1	Data Logger – ESP32-C3-WROOM	4 Nos.
2	ESP32 + Current Transformer (CT) Sensor	18 Nos.
3	ESP32 + SHT31 Temperature-Humidity Sensor	16 Nos.
4	Battery – Saft LS17500	As required

The installed system comprises data loggers, temperature and humidity sensors, current sensors and associated components for data collection and monitoring.

Scope of AMC

The AMC shall broadly include the following activities:

- Preventive maintenance and periodic inspection of all installed hardware and sensors.
- Diagnosis and rectification of hardware and communication-related faults.
- Checking and servicing of ESP32-based data loggers and sensor nodes.
- Checking the functioning and accuracy of temperature, humidity and current sensors.
- Repair/replacement of defective components, wherever required, as per the AMC terms.
- Monitoring of data transmission and connectivity with the RealMeds Cloud platform.
- Troubleshooting of data logging and sensor-related issues.
- Assistance in configuration and reconfiguration of devices through the RealMeds Cloud platform.
- Monitoring and replacement of batteries, wherever required, as per agreed AMC conditions.
- Technical support for maintaining uninterrupted data collection from the growth rooms.
- Periodic inspection and reporting of the operational status of the installed devices.
- Any other associated technical support required for maintaining the IoT-based monitoring system.

Details of Hardware Installed

The equipment installed for the project **"A Blockchain-Powered Traceability System for Plant Tissue Culture Facility"** includes Barcode Printers, Temperature & Humidity Sensors for environmental monitoring, and Current Sensors for monitoring the status of lights in the growth rooms, along with Data Loggers for centralized data collection.

1. **Data Logger (ESP32-C3-WROOM):** 4 Nos

   A microcontroller module with built-in Wi-Fi and Bluetooth, used to collect data from sensors and communicate with the RealMeds cloud platform. It serves as the central processing unit of the IoT system.

   Specifications:
   Operating Temperature: -40°C to +85°C
   Recording Duration: Up to 10 days at 30 minutes frequency
   Power: 5V, 5A, Standard C Type
   Upload: Current (in amps), On/Off State, Temperature, Moisture,Battery Level, time stamp
   Communication: Bluetooth (BLE), Wi-Fi, LAN
   Weight: Approx 250 gms
   Configuration: via RealMeds Cloud platform

2. **ESP32 + Current Transformer (CT) Sensor:** 18 Nos

   The ESP32 was integrated with CT sensors to measure electric current flowing through the tube light circuits in the growth rooms.

   Specifications:
   Operating Temperature: -40°C to +85°C
   Recording Duration: Up to 10 days at 30 minutes frequency
   Power: 5V, 5A, Standard C Type
   Upload: Current (in amps), On/Off State, Temperature, Moisture,Battery Level, time stamp
   Communication: Bluetooth (BLE), Wi-Fi, LAN
   Weight: Approx 250 gms
   Configuration: via RealMeds Cloud platform

3. **ESP32 + SHT31 Temperature-Humidity Sensor:** 16 Nos

The integration of the ESP32 with the SHT31 sensor to measure the temperature and humidity in the growth rooms.

Specifications:
Operating Temperature: -40°C to +85°C
Measuring Range Temperature: -40°C to +85°C
Humidity: 0 to 100%

Accuracy: ± 0.5 °C, ± 0.5%
Resolution: 0.1°C
Upload: Temperature, Moisture, Battery Level, Time stamp
Communication: Bluetooth (BLE)
Battery Operated: Yes
Weight: Approx 54 Gms

- **Battery (Saft LS17500)**

Replaceable Primary lithium Li-SOCl2 3.6V 3600 mAH Battery**.** A high-performance lithium-thionyl chloride battery used to power the temperature-humidity sensors.

BLE Data Transmission Interval**:** Once every 60 minutes (24 transmissions/day)