



शिक्षा मंत्रालय
MINISTRY OF
EDUCATION



INDIAN INSTITUTE OF
TECHNOLOGY ROPAR

 **annam.ai**

भारतीय प्रौद्योगिकी संस्थान रोपड़ Indian Institute of Technology Ropar

Center of Excellence for AI In Agriculture

Alliance for Next-Gen Nourishment through Agriculture
Modernization

ANNAM.AI

Automatic Weather Station

IMD-Certified Indigenous Innovation for Climate-Smart Agriculture & Smart Cities

IIT Ropar | ANNAM.AI Foundation

<https://annam.ai>



PROBLEM STATEMENT

Accurate weather data is crucial for agriculture, disaster management, and climate resilience.

Current challenges include:

- Inconsistent data collection
- High maintenance costs
- Lack of real-time monitoring

These gaps lead to:

- Inefficient resource utilization
- Increased climate risks
- Economic losses for farmers and policymakers

AUTONOMOUS WEATHER STATION: SMART CLIMATE MONITORING SOLUTION

The Autonomous Weather Station is an advanced, cost-effective, and self-sustaining climate monitoring solution designed for continuous and reliable data collection. It operates on a solar-powered system with battery backup, ensuring uninterrupted performance in remote locations. Equipped with IoT-enabled sensors, real-time data transmission, and AI-driven analytics, the system delivers precise weather insights for agriculture, urban planning, and climate research while minimizing maintenance costs through over-the-air (OTA) updates and smart power management.

IMPACTS

99%

Data Uptime:

Reliable weather monitoring validated by IMD.

70%

Maintenance Cost Reduction:

Due to OTA updates and intelligent power management.

30%

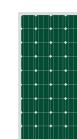
Carbon Footprint Reduction:

Lower emissions per unit compared to traditional stations.



Weather Station

A precision forecasting tool that enables farmers to make data-driven decisions on irrigation, sowing, and crop management, minimizing weather-related risks



Solar Powered



Dual SIM



GSM 4G



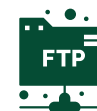
1 Week Internal Storage



Wireless Connectivity



SMS FOTA



FTP Server Storage



30 Days Battery Backup



Data Aggregation



UTC Settings



Low Power Consumption

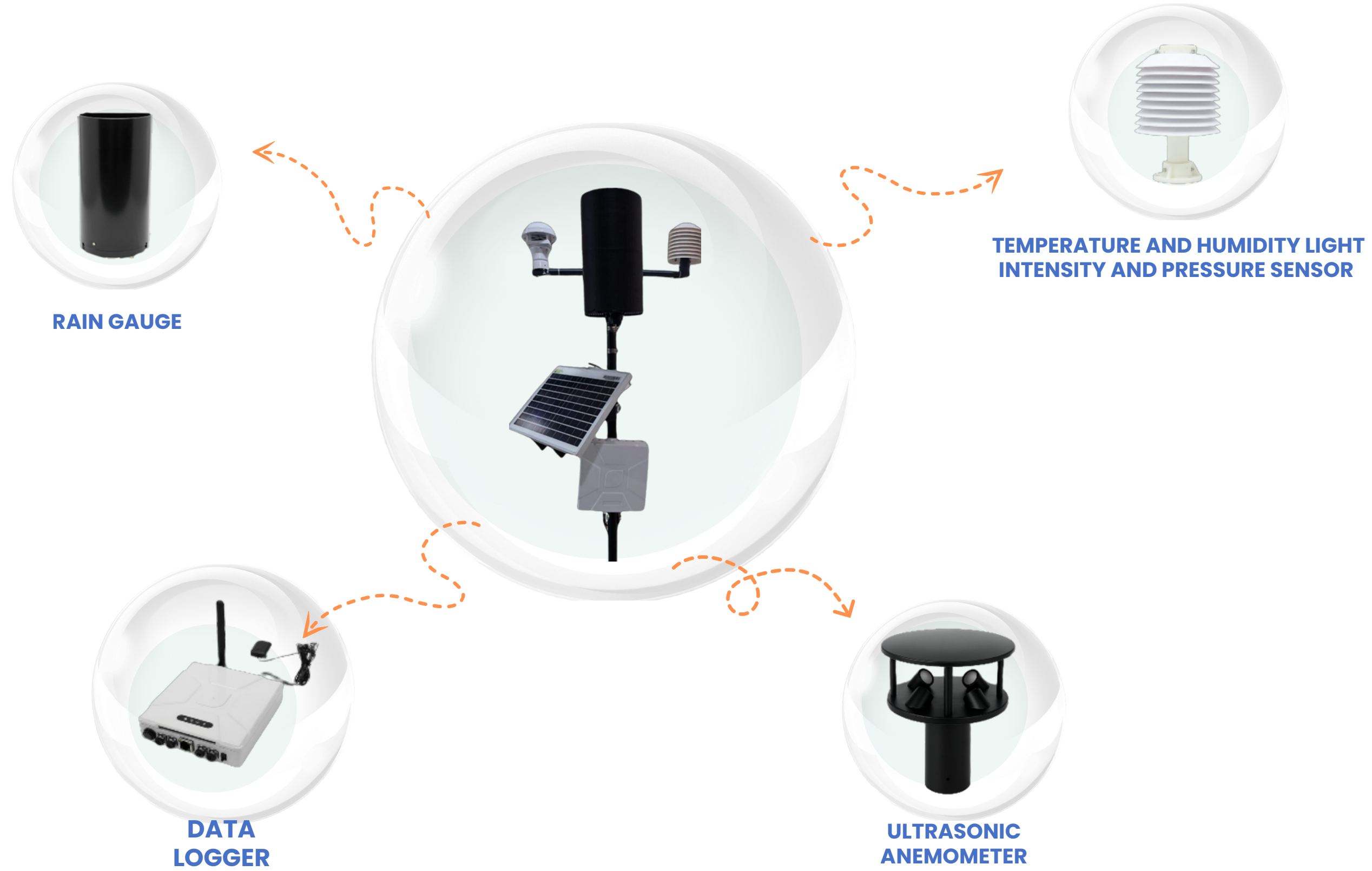


IP67 & Compact Design



Real-Time Monitoring

COMPONENTS OF WEATHER STATION



TEMPERATURE AND HUMIDITY LIGHT INTENSITY AND PRESSURE SENSOR



KEY FEATURES

- Accurate Environmental Measurements
- Wide measurement range
- Maintenance-free for long-term field deployment
- Low power consumption, suitable for remote station
- Robust, IP66 Compact design
- All-weather protection
- Compact & lightweight, easy to install with radiation shield

APPLICATIONS

- Agriculture and smart irrigation system
- Environmental monitoring
- Healthcare & Medical Facilities
- Greenhouses and Indoor Farming
- Industrial Process monitoring (HVAC, Food processing)
- Safety and Security

RAIN GAUGE



KEY FEATURES

- Balanced tipping bucket mechanism ensures high accuracy
- Minimal moving parts → long-term reliability with low maintenance
- Reed switch / magnetic sensor for precise detection
- Accurate even under varying rainfall intensities
- Durable ABS body with weather resistance
- Easy integration with data loggers and weather stations for automated rainfall recording

APPLICATIONS

- Meteorological stations for rainfall monitoring
- Agriculture & irrigation planning
- Environmental monitoring & climate research
- Suitable for precise/general purpose rain monitoring

DATA LOGGER



KEY FEATURES

- 4G Dual SIM connectivity
- 25–30 Days Data Backup
- Support Multi-protocol communication interfaces
- Robust IP66 enclosure for harsh weather conditions
- Solar and Battery Powered option for remote use

APPLICATIONS

- Remote weather monitoring stations
- Smart agriculture and irrigation management
- Industrial and environmental monitoring
- Smart cities and IoT projects
- Cold storage management

ULTRASONIC ANEMOMETER



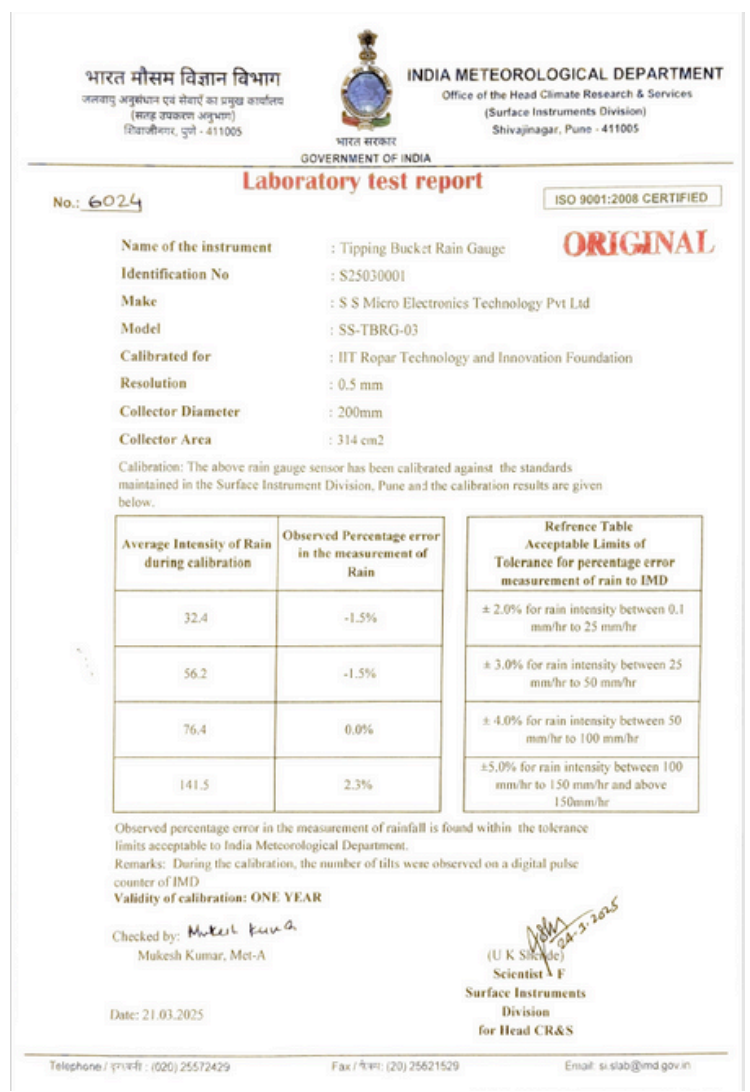
KEY FEATURES

- High Quality measurement up to 60m/s (216km/h)
- High accuracy with fast response time
- 0°–360° wind direction coverage with 1° resolution
- Low Maintenance, ensuring low cost of ownership
- Robust design for all weather conditions

APPLICATIONS

- Weather monitoring stations
- Smart agriculture and precision farming
- Ports and harbours
- Runways and helipads





Deployments

This initiative is aimed at enhancing the decision-making capabilities of farmers by equipping them with timely and precise weather information, ultimately improving productivity and resilience against climate uncertainties.



Krishi Vigyan Kendras (KVKs), Ropar

Indian Meteorological Department (IMD) validated, with 98% certified accuracy for Tipping Bucket Rain Gauge.

IMPACT NUMBERS

12
REAL-TIME WEATHER
PARAMETERS

70+
CITIES
COVERED

1 min
REFRESH
RATE

~98%
SIGNAL
ACCURACY

750+
AUTOMATED WEATHER
STATIONS

Users



Award and Recognition



SICA 25 Award presented to ANNAM.AI Foundation For "Autonomous Weather Station: Smart Climate Monitoring Solution" by The CSR Universe.

Value Proposition

ACCURACY :

- 98% By IMD(Certified)

DIFFERENTIATORS:

- OTA firmware updates
- AI-based weather analytics
- 4G-enabled real-time transmission.

INNOVATION:

- Self-sustaining solar operations
- intelligent power use
- modular sensor design.
- Cloud-based dashboard with an open API for integration.

Applications



Enhances climate resilience by enabling accurate sowing, irrigation, and pest management decisions..



Supports location-specific advisories for farmers, especially smallholders.



Promotes digital weather insurance and forecasting models.



Provides data inputs for AI in Agriculture

Technology Status

TECHNOLOGY READINESS LEVEL **9**

- Currently in IMD-validated pilot deployment.
- The technology design is proprietary, while its components and protocols are compliant with IMD norms.

Thank you



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Let's Collaborate!

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