



# **CORPORATE BROCHURE**

INGEN: Smart Solutions for Secure Tomorrow

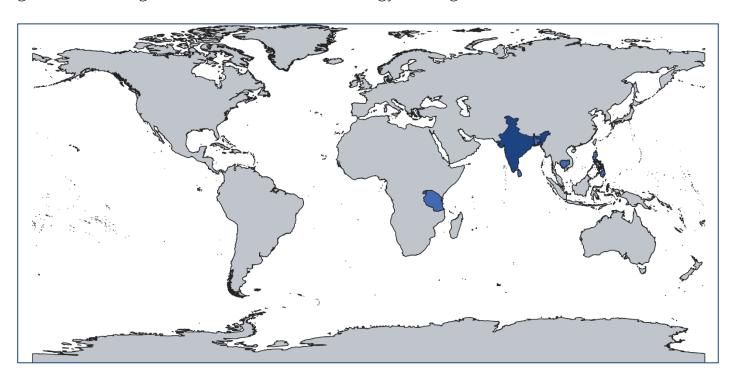




# About the Organisation

Ingen Technologies Private Limited, founded in the year 2008 as a subsidiary of Weather Risk Management Services Private Limited, is a leading weather service provider in India with a supply of more than 15000 Automatic Weather Stations (AWSs) & Automatic Rain Gauge Stations (ARGs) across the globe and more than 10000 installations pan India.

Ingen leverages indigenous & locally-manufactured technology, and its strong inhouse team of meteorologists, remote sensing experts, and IoT specialists to provide weather data & weather forecast services to various corporations and government organizations in insurance, energy, and agriculture sectors.

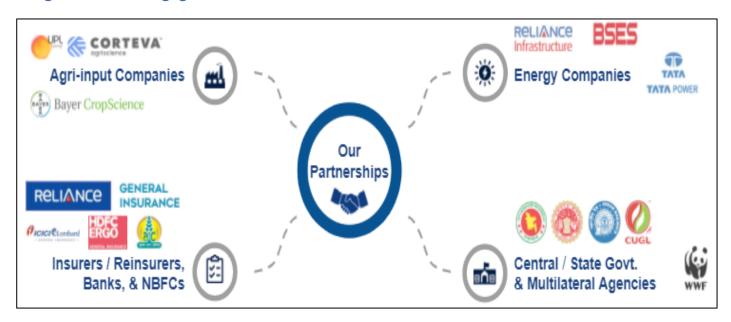


# **Global Footprint**

- 4000+ Automatic Rain Gauges: Bangladesh (Supply)
- 100+ Automatic Weather Stations: Tanzania, Rwanda, Philippines, Cambodia, & Sri Lanka (Supply)
- 10000+ AWS/ARGs: Pan India (Manufacturing & Installation);



## Long-term Client Engagement



#### Weather Data Services

- 2,500+ sites since 2014
- Indian State governments: Rajasthan, Uttar Pradesh, Himanchal Pradesh, Uttarakhand etc.
- Insurance Companies: AIC, HDFC, ICICI, RGIC, SBIGI etc.

## Weather Data & Forecasting Services

Adani Group (formerly, Reliance Infra) since 2016 BSES, REC Group

## Weather Data & Advisory Services

WWF-India, GiZ, GGRC, Bayer

#### AWS Sale & Maintenance

Bayer Bioscience since 2011

Institutions like IIT Kanpur, IIT Delhi, IIT Bombay, IIT Bhilai

## AWS/ARG Supply & Maintenance [Govt. Orders]

70 ARGs to Punjab Hydrology Department for 2014-2020 (as OEM)

1300+ ARGs to Bihar Planning & Development Dept (work in-progress)

3000+ ARGs to Karnataka State Natural Disaster Monitoring Center Dept (work in-progress)

430 AWS to Andhra Pradesh State Development Planning Society (work inprogress)

29 AWS to Bihar Soil Conservation Dept (work in-progress)



# Why Us

## 1. Indigenous Manufacturer of Automatic Weather Stations

We, at Ingen Technologies, take great pride in offering indigenously-manufactured Automatic Weather Stations and other IoT devices, customized for your specific requirements.

- End-to-end Management of AWS:
- Manufacturing Supply Installation Operation
- Manufacturing Capacity of 500 AWSs per month
- Customized Design with state-of-the-art technology
- Continuous Hardware Updation

#### 2. World Standard IoT Sensors

Our sensors conform to the WMO (World Meteorological Organization) standards and are IMD (India Meteorological Department) certified in order to disseminate accurate weather data.

• IMD Certifications: Humidity Sensor, Temperature Sensor, Tipping Bucket Rain Gauge, Silicon Pyranometer, Ultrasonic Wind Sensor

## 3. Top-notch In-house Team

We leverage our strong inhouse team of meteorologists, remote sensing experts, and IoT specialists to provide weather data & weather forecast services.

- Inhouse R&D, Hardware, & Software teams linked with IIT Kanpur, ST Microelectronics, etc.
- Meteorologists & Remote Sensing Experts for improved weather data & forecast services

## 4. Support & Services

Our trained technicians are stationed in most of the Indian states to attend to your requirements at shortest possible time.

- Maintenance: Every 3 months
- Sensor Calibration: Twice a year
- Prioritized Location Visits: Every month
- Component Replacement: Within specified life period
- Error Resolution: Within 72 hours of reporting

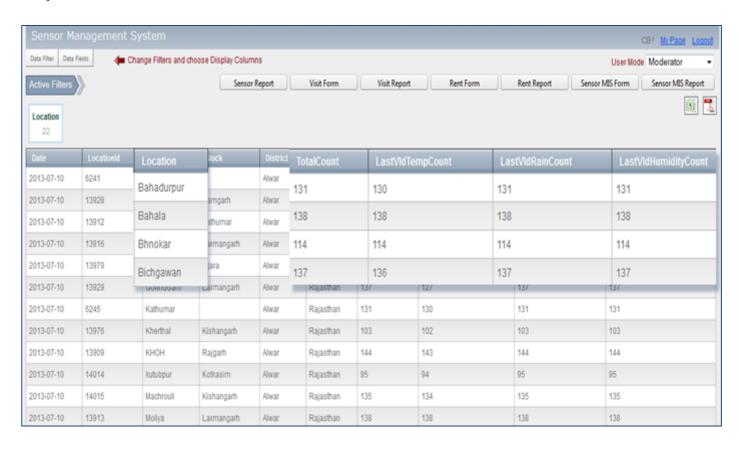
## 5. Focus on Data Quality

- Data is being monitored round the clock
- Advanced algorithms & integrity checks are applied on the data
- Statistical analysis tools capture parameter drifts
- Automated alerts are generated in-case of data failure



## 6. Data Quality Checks

- Syntactic Checks: Data should be as per the sensor resolution and range
- Climate-range Checks: Datum must be consistent with month-wise climatology
- Time-series Consistency: Plausible difference between two successive values based on meteorological heuristics
- Spatial Consistency: Plausible difference between two nearby stations based on variations based on meteorological heuristics
- Device Consistency: Comparison with nearest IMD and state Govt weather stations to avoid systematic errors





# Our USP: High Quality Equipment at Affordable Prices

Ingen's Automated Weather Stations provide continuous automatic observations for weather parameters like air temperature, relative humidity, dew point, precipitation, sunlight intensity, short- and long-wave solar radiation, wind speed & direction, barometric pressure, soil moisture, soil temperature etc. These parameters are the most crucial for weather monitoring.

The INGEN AWS comes in various shapes and sizes. The various components can be installed and erected in a modular format. The base structure is a variable size (from 2 m to 10 m) tripod or on a unipole made of galvanized iron / stainless steel to which various sensors are attached. The support fixtures and frames are made as per client's requirements.

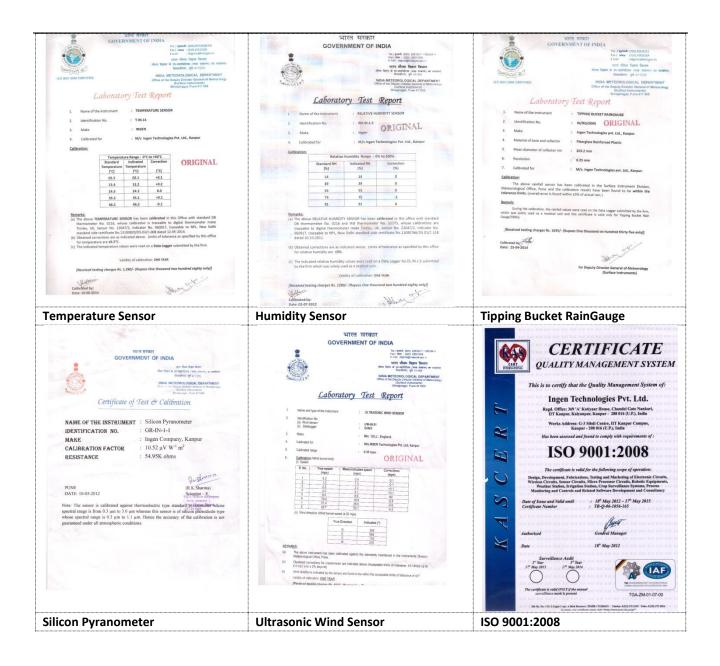
Ingen sensing mechanisms use a wide variety of industry accepted technologies. The main measurement and sensing systems are mentioned below:

- Air Temperature Sensor
- Relative Humidity Sensor
- Precipitation Sensor
- Wind Speed & Direction Sensor
- Solar Radiation
- Barometric Pressure
- Soil Moisture
- Soil Temperature

We have taken huge strides in our endeavor to become lowest cost producer of Automated Weather Stations in India. We have successfully bid for medium-sized installation project of various state governments and institutions. We are also expanding our outreach to segments beyond agriculture – particularly Power and Construction Sectors. We have already proven our capabilities to rigorous demands of the government tenders. With augmenting of capacities, we intend to participate in large government and private sector tenders in India and overseas.



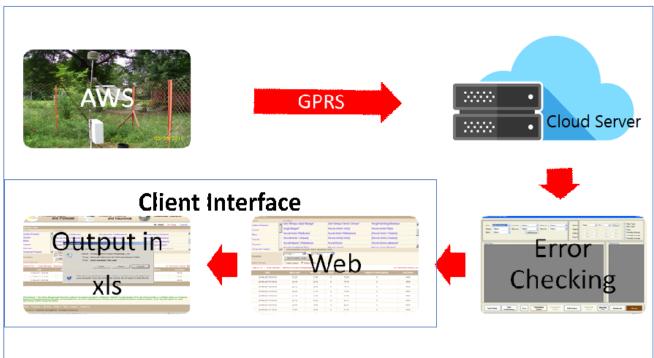
## **IMD** Certification

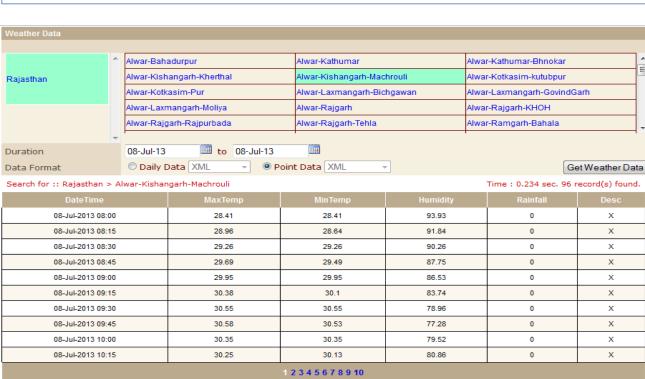




# **AWS Data Flow Diagram**

#### **Data output**







# **Technical Specification of AWS Sensors**

Air Temperature RELATIVE Humidity

Type : Band gap (Si Diode) Type : Solid state Thin Film (CAPACITIVE)

Make : Ingen Make : Ingen Item # : iHMS101 Item # : iTMS101 :-40 to +80°C Range : 0 to 100% Range Resolution: 0.1°C Resolution: 0.1% RH Accuracy: +/-2% RH Accuracy :  $\pm 0.1^{\circ}$ C

Precipitation Solar radiation

Type : TBRG Type : Photodiode
Make : Ingen Make : Ingen
Item # : iRMS101 Item # : iSRMS201

Output : Magnetic Reed Switch Range : 0 to 2000 Wt/m2

Range : Unlimited Resolution: 1 Wt/m2
Resolution: 0.5mm or better Accuracy : ± 3%

Accuracy : ±3% or better

Wind speed Wind direction

: Ultrasonic Type : Ultrasonic Type Make Make : Ingen : Ingen : iWMS2011 : iWMS2011 Item # Item # : 0 to 80 m/sec : 0 to 359 Deg Range Range

Sustainability: Up to 80 m/sec Resolution: 1 Deg Resolution: 0.1 m/s Response Time: 2 Sec Accuracy: +/-0.5 m/s Accuracy: +/-3 Deg Threshold: 0.2 m/s

Barometric pressure Soil Temperature Soil Moisture

: Solid state Piezo Type : Pt100 Type : FDR Type Make : Ingen Make : Ingen Make : Ingen Item # : iBMS102 Item # : iSTS102 Item # : iSMS102 : 600 to 1100 hPa : -20 to +60°C

Range : 600 to 1100 hPa Range : -20 to +60°C Range : 0 to 100% VWC Resolution: 0.1 hPa Resolution: 0.01°C Resolution: 0.01%VWC Accuracy : +/-0.2 hPa Accuracy : +/-0.5°C Accuracy : +/-3%

Output : Digital

Soil Moisture Soil Temperature / Moisture

Type : TDR Type : TDR Make : Acclima

Item #: iSMS202Item #: 310H/305N or betterRange: 0 to 100% VWCTemp Range: -40 to +60°CResolution: 0.01%VWCTemp Resolution: 0.1°C

Accuracy: +/-3%

Temp Accuracy: +/-0.5°C

Moist Range: 0 to 100% VWC

Moist Resolution: 0.1%VWC

Moist Accuracy: +/-3%



# iNGEN Integrated Data logger

#### Processor:

- Dedicated 32 kHz oscillator for RTC with calibration
- Ultra-Low power
- Communication Interface: timers, ADC, SPIs,I2Cs and USARTs
- 16-bit, 1 µs A/D converter (12-channels, +/- 1 LSB), Conversion range: 0 to 3.6 V
- 10 digital/Analog channels
- System Clock Stability 1 ppm per year, real time clock synchronized with GPS
- Watchdog timer available
- Sample intervals configurable from 1 sec to 24 hours
- 16x4 alphanumeric LCD
- System Reset option available

Memory: 1GB, extendable upto 64GB.

External Power: 12V to 24V DC (48 V maximum)

Power Consumption: < 50mA

Basic Communication Interface: RS232, RS485

Main Power option: 220V AC with suitable AC-DC

adapter

Operating Temperature: -40 °C to +60 °C

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Operating Humidity range: 0% to 100%





# iNGEN Communication Unit (IDCU) for AWS iDAS101

Weather Station sends the summarized weather data at programmable intervals of 1 minute to several hours. The messages are sent automatically via GPRS to the central server. In case of non-availability of GPRS signal, data is sent to the central server through SMS. In the extreme case of no mobile signal, data is stored in the internal memory unit having a capacity of 1GB sufficient to store minimum 12 month weather data.

Communication: We guarantee for GSM/GPRS modules with:

- Proper IMEI number
- Fully IPR-paid for use of intellectual Property in using GSM/GPRS specs or patented.

The IDCU is able to intelligently prioritize data communication based on:

Priority of data transfer: For instance, ability to configure priority of communication for sensor data / alert / even log data

Network Availability: Auto-switch between SMS/GPRS during long periods of inactivity of a specific channel

Optimal Cost: Ability to configure size of data packet & connectivity options based on data usage plan offered by Network Operator

### Data transmission through GPRS

- The IDCU is able to send the weather station data in a compressed format to the central server using secured HTTPS protocol.
- The data transmission interval will be configurable over the air and any new transmissions will happen as per the newly configured interval.
- Any failure in GPRS data transmission to the Primary IP will automatically attempt data transfer to the Secondary IP. Further failure will be intimated to the data server through the SMS alert.
- During a signal loss condition, the IDCU will keep trying for the transmission and resume the transmission once the GPRS network is available.
- The IDCU will allow the remote access from the base station to know the status of sensors and check log files through a software solution as required and shall have selectable options.

Optional Periodic Reporting via SMS (in the absence of GPRS coverage)

- The IDCU shall be able to send weather station information to the data server through SMS periodically.
- The reported SMS will denote the unit id of the IDCU and the recorded data along with the other events or alerts (battery voltage, signal strength) noticed by the system.
- The IDCU will support a minimum reporting interval of 1seconds.
- The periodic interval will be configurable over the air (OTA) from the authorized base station
- In case of GSM network unavailability the IDCU will store the messages internally and send the reporting message after the signal resumes.



# **Power Supply**

The weather station is a standalone wireless unit powered by Solar Panel (10W to 75 Wt) charged Battery of 3.7V, 20AH. Li-cell battery is preferred to ensure consistent power supply. Sensor can work for 30-35 days in extremely rainy weather with fully charged batteries.

Charged through appropriate Solar Panel or AC supply. Compatible with solar panels which have rated capacity of 10W - 75 W, Open Circuit Voltage - 21 V, Short circuit current 0.5A -5.0 A, compatible with 3.7V-10AH to 40AH Li-cell battery.

#### POWER REQUIREMENTS

Battery 20Ah/3.7V Power consumption <100mA/3.7V Battery can be charged through 230V AC Height: 1.5 m to 10 m depending on (with suitable adaptor) Or a 10W-75 W solar panel.

#### PHYSICAL SPECIFICATIONS

Materials: Stainless steel, Plastic, Anodized

Aluminum, Iron

requirement

Enclosure: 2\* 2 sq m to 5\*5 sq m Weight: approx 7 kg - 20 Kg

# **Application Software**

### **Portal Software**

Portal Software aggregates, manages, analyzes, organizes and distributes weather information into single system tailored to the preferences of the different users groups (farmers, agri officers, insurance companies, administrator etc).

It broadly does the following:

- Data acquisition (from IDCU)
- Data management & display (real time, history and forecast)
- Administrator (manage the web content based on the role based authorization model)
- Support section (statistics, SMS/ email alerts, data export etc)
- Resources high speed networking, high performance computing and large data Storage



## Clientele



























