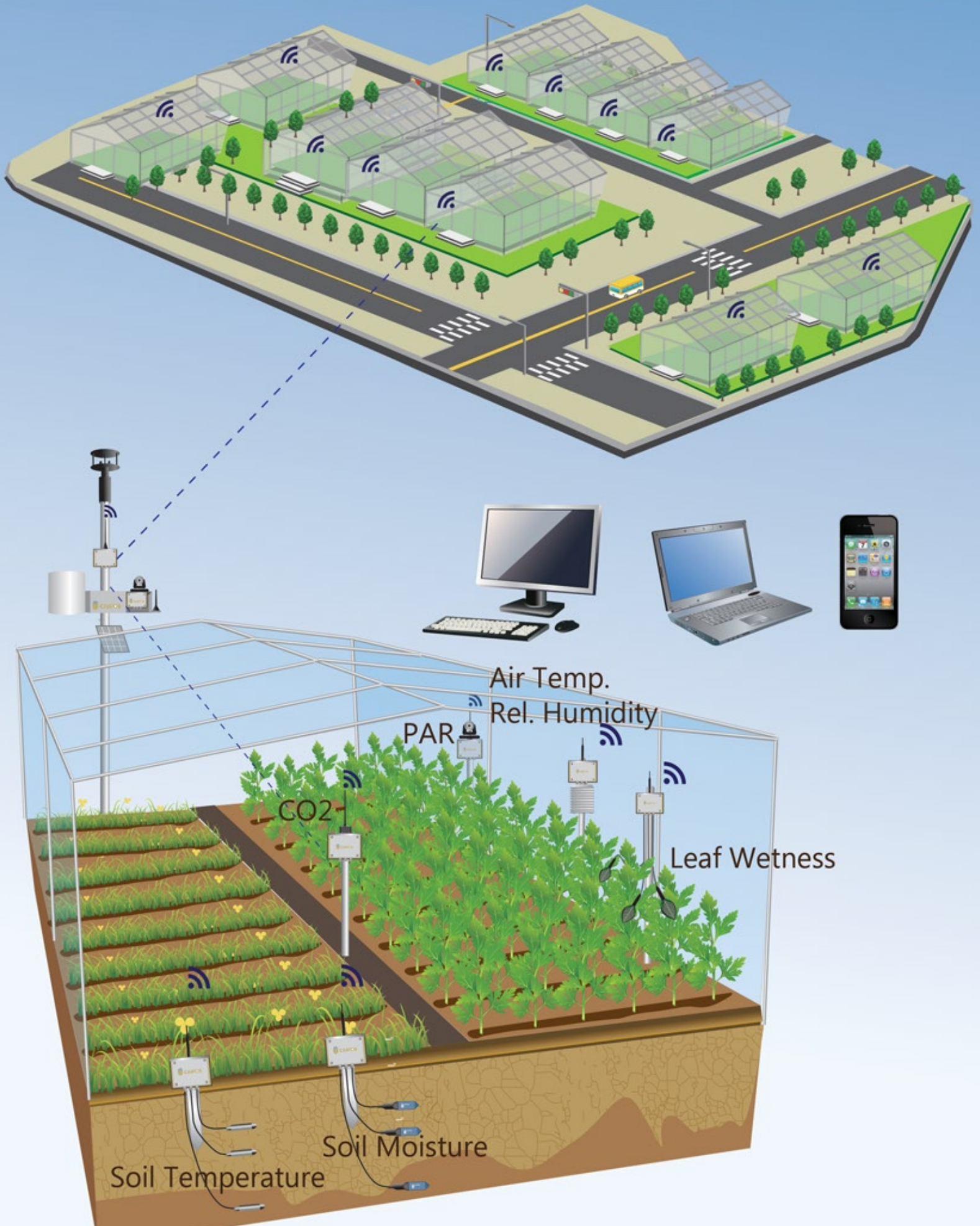




# Greenhouse Monitoring





# Greenhouse Monitoring

## Advantages

### Advanced Technologies

Caipos Systems use only latest developments in wired/wireless measurements and data transfer technologies.

### Wide Range

Different wired and wireless sensors can be connected to one base station.

### Ultra Low Power Consumption

Thanks to advanced design and optimized data processing, all Caipos systems have very low power consumption and long time of autonomous operation.

### Internet Enabled

Data is sent via GSM/GPRS to central data platform every hour, or according the user's settings, or if alarm conditions happen.

### Reliability

Caipos systems can operate in harsh weather and difficult geographical conditions.

### Low Cost

High quality, low power consumption, minimal maintenance make Caipos systems one of best cost effective solutions.

### Central Web Platform

Web application on the central data platform receives and processes data and controls operation of stations. Constant backups make sure that data is always protected.

### Easy and Fast Installation

All devices come pre-configured and ready to use. Installation is fast and easy. Wireless sensors can be installed, uninstalled or reallocated any time.





# Greenhouse Monitoring

## Technical Data

### Elements of greenhouse monitoring system

1. Air temperature and relative humidity sensor: high accuracy and stability, low power consumption, equipped with UV radiation shield, no special maintenance.
2. Soil moisture sensor: FDR frequency domain reflectometry measurement of soil moisture, high precision and stability, and wireless communication with base station
3. Soil temperature sensor: stainless steel protective shell, can be used to measure soil, water and air temperature.
4. Leaf wetness sensor: measurement range from 0 to 20. 0 is completely dry, 20 is completely wet.
5. CO2 sensor: low power carbon dioxide meter. Measure range 0 to 2000 ppm
6. PAR sensor: Photosynthetically active radiation 400 to 700 nanometers, 0 to 0-2500  $\mu\text{Mol}/\text{m}^2$
7. Base station: main unit, solar panel, battery, GPRS.

### Technical Data Of CaipoBase



|                         |                       |
|-------------------------|-----------------------|
| Dimensions of Main Unit | 130x150x120mm,        |
| Battery                 | 6V 4.5AH, 7.2AH,12AH  |
| Solar Panel             | 149x199x3.2mm, 1.08W  |
| Max. Sensors Quantity   | 32 wired, 64 wireless |
| Power Consumption       | 20-70 uA              |
| Flash Memory            | 4MB (2 years of data) |
| Communication           | GSM/GPRS, USB         |
| Logging Interval        | 10 min – 2 hours      |
| Data Transfer Interval  | 10 min – 2 hours      |
| Operating Temperature   | -40°C - +80 °C        |
| Protection Class        | IP65                  |
| Operation without Sun   | more than one month   |
| Lighting Protection     | built in protection   |

### Technical Data Of CaipoWave

|                        |                               |
|------------------------|-------------------------------|
| Dimensions             | 100x320x62mm,                 |
| Weight                 | 150 g (without sesnors)       |
| Battery                | Lithium AA 3.6 V, 2.4 Ah      |
| Battery durability     | 4-5 years                     |
| Interfaces             | 4 x analog, 1 x digital       |
| Operating temperature  | -40°C to +85°C                |
| Operating humidity     | 0 – 100 %                     |
| Max. number of sensors | 5                             |
| Communication range    | Up to 1km <sup>1</sup>        |
| Radio Standard         | IEEE 802.15.4 783/868/915 MHz |
| Supply voltage         | 2.7 V – 5.5 V                 |



Communication range is given for a free line of sight. In case of obstacles, like plants, communication range may be shorter



# Greenhouse Monitoring

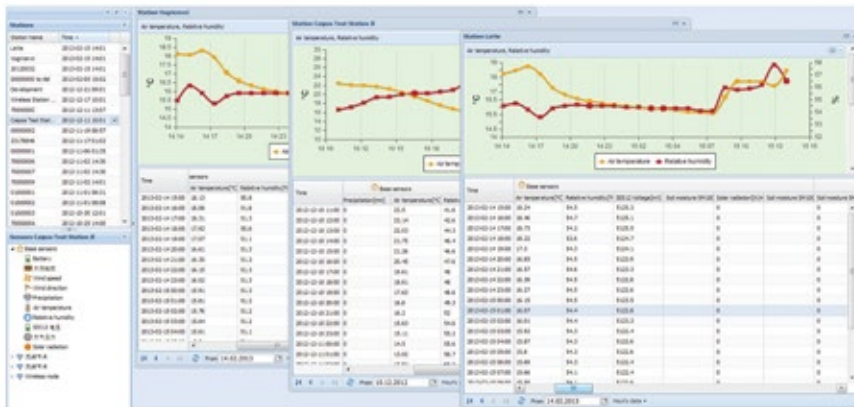
## Central Web Platform

Caipos Central Web Platform CaipoWeb is a control center for all weather stations. All parameters can be set remotely via web interface. Logging interval, transfer interval, calibration curves and other settings are available.

Applications of Caipoweb include data presentation in table and chart, pest and disease models, warnings, degree days, water balance and others.

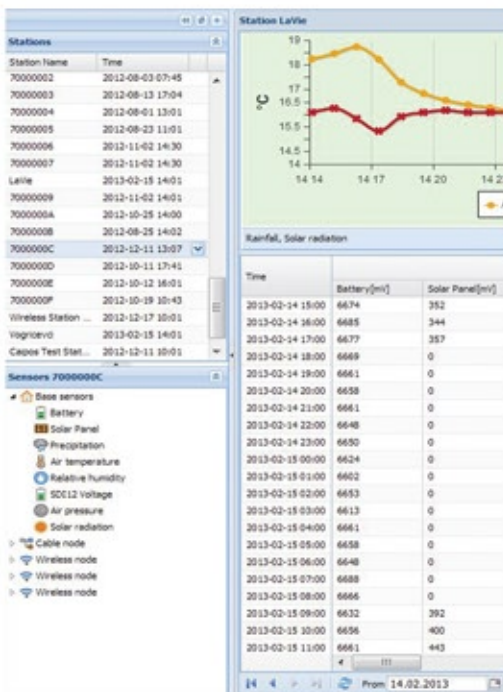
Data is instantly available on laptop, mobile phone or tablet.

For more control and security, CaipoWeb can be installed on customer's hardware.



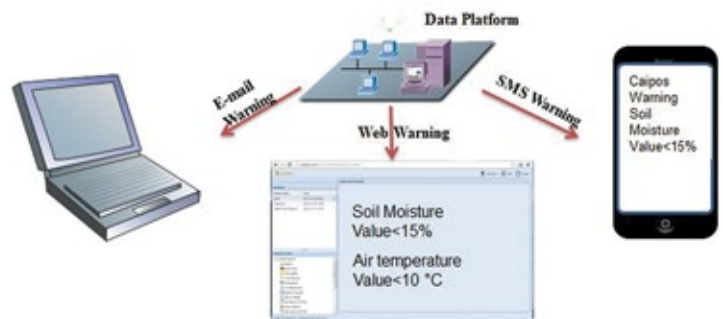
Central Data Platform

Stations can send data to 4 different servers at the same time. Customer can specify addresses of the servers via web interface.



List of Stations and Sensors

Additional Servers Setting



Caipos Warning System

Warnings can be configured for any sensor, like low or high temperature, critical change of soil moisture, high humidity and other conditions.

Warnings are sent via email or SMS.