



# Dynamax

## SAPIP™ - WIRELESS NETWORK REAL-TIME PLANT WATER USE



Photo Credit: The Almond Board

SAP FLOW • ET WEATHER • SOIL MOISTURE

# SAPIP™ WIRELESS MESH NETWORK

## Customizable to fit your needs

- Sap flow, plant water use
- Measure plant stress
- Soil moisture profile
- Weather and ET

Using Dynamax, Inc. SapIP wireless network systems and sap flow sensors, you can measure plant water use directly. Now, you can see in real time how much water your crops are using and know if your plants need irrigation or not. This way, you can manage plant stress and conserve water while maximizing yields.

With the Dynamax SapIP wireless system, graphical data is presented on the internet and accessible anytime by computer, cellphone or tablet. System locations in your fields are displayed on Google™ maps on the Dynamax web page [Agrisensors.net](http://Agrisensors.net).

## Benefits

- Measure plant water use in real-time
- Helps schedule irrigation
- Manage plant stress
- Monitor soil moisture profiles
- Calculate ET at the site
- Text alerts

## SapIP™ Systems Work on:

- Almond
- Avocado
- Cherry
- Corn
- Cotton
- Grape
- Grapefruit
- Lemons
- Limes
- Olives
- Orange
- Peach
- Pecan
- Pistachio
- Plum
- Soybean
- Walnut

- and many other crops



# SAPIP™ NETWORK GATEWAYS

## GSM Modem Gateway

- Works anywhere cell phone service is available
- Collects and forwards all data to Agrisensors.net web page
- Monitor up to 15 SapIP data loggers with one gateway
- Great when the fields monitored are not located near your office
- Uses 12 Volt battery and solar panels

## LAN Modem Gateway Option

- Connects to your local network
- No cell phone fees
- Great when the fields monitored are located near your office
- Uses a power supply plugged into a wall outlet
- No weatherproof enclosure needed

One SapIP Gateway can handle up to (15) SapIP loggers, and each logger can be spaced up to ½ mile (0.8 km) apart. The SapIP loggers can also “hop” up to (4) levels, giving a total distance of up to 2-3 miles (3-4 km). With the SapIP wireless mesh network, it is possible to have SapIP nodes for sap flow, soil moisture and weather with all data available on the Agrisensors.net web page.

## SapIP Node – Data Logger

- 8 Differential channel data logger
- Self-healing, sleeping network
- Wide range of input signals, microvolts up to 2.5 V
- 2 to 8 sensors per node (typical)
- Two versions available – 900 MHz (US) and 2.4 GHz (Europe) spread spectrum
- FCC licensed
- Range: 900 MHz – 1000 m (3280 ft)  
2.4 GHz – 350 m (1148 ft)

## SapIP Attachable Devices

- Soil moisture sensors
- Sap flow sensors
  - EXO
  - Dynagage
- Infrared temperature sensor
- Weather station





# EXO-SKIN™ SAP FLOW SENSOR



After more than 25 years of experience with sap flow sensor manufacturing and design, the Dynamax team brings you the EXO sap flow sensor. This sensor solves many of the commercial irrigation and research application needs.

The new low-cost EXO sap flow sensor is based on a tried and proven energy balance technology. Thousands of these sensors have been used in agriculture, plant physiology, water relations, crop science and numerous ecological, hydrology, and engineering studies worldwide.

Now, the EXO sensors, and the well-established Dynagage SGA, SGB, and SGC sensors, have become the primary tools to use when plant water use or irrigation management is required.

We are confident Dynamax sap flow sensors are the best method for determining plant water use in the field in real-time.

## EXO Sensor Features

- Easy installation
- Low maintenance
- Allows for plant growth and expansion
- Sealed electronics
- Flexible for oddly shaped plant stems
- Water shedding layer wicks out water vapor
- Insulation and weather shield provided
- For research or commercial applications
- Proven technology used worldwide

SGEX-9	.35" (9 mm) EXO-Skin Sap flow sensor
SGEX-10	3/8" (10 mm) EXO-Skin Sap flow sensor
SGEX-13	1/2"(13 mm) EXO-Skin Sap flow sensor
SGEX-16	5/8" (16 mm) EXO-Skin Sap flow sensor
SGEX-19	3/4" (19 mm) EXO-Skin Sap flow sensor
SGEX-25	1" (25 mm) EXO-Skin Sap flow sensor

EXO Sensors are available for any plant stems 3/8" to 1" in diameter. For larger stems use SGA or SGB Dynagage sensors, which can be used on plants up to 6" in diameter.



# SAPIP™ SOIL MOISTURE NETWORK

- (4) or (6) SM150 soil moisture sensors per SapIP
- (3) ML3 Theta Probes with Temperature per SapIP
- Excellent for soil moisture profiling
- Agrisensors.net web data access
- Access raw and calculated data with averages, charts and graphs
- 30,000 records saved to flash memory
- 12 V battery pack & 10W solar panel required
- Use the SapIP Soil Moisture network to monitor fields up to 2 miles away
- 25 SapIP nodes can monitor up to 150 soil moisture sensors



# SAPIP™ MICRO WEATHER



- RH & Air Temperature, with Radiation Shield
- Wind Speed & Direction
- Rainfall
- Solar Radiation
- Calculate ETp at your location
- Uses 12 V battery and small solar panel
- Wide variety of environmental sensors possible
- Pre-configured before shipping
- Complete packages available

	Range	Accuracy
Solar	360 nm to 1120 nm	±5%
RH	0 to 100% RH	±3% at 0-90% RH ±5% at 90-100% RH (20° C, 68° F)
Air Temp	-40° to +60°C	±0.6°C
Wind Speed	0 to 50 m/s (112 mph)	±0.5 m/s (1.1 mph)
Wind Direction	Mechanical: 360° Electrical: 352° (8° open)	±5°
Rain Gage	0-50 mm/hr (0-2"/hr)	±4, 1 count Resolution .25 mm (.01")

## You may also add:

- **Frost detection**
- **Soil moisture**
- **Soil temperature**
- **Leaf wetness**

# IRT - INFRARED LEAF TEMPERATURE



IRT sensors may be used as a complete stand-alone system, or as part of a SapIP wireless mesh network. With the SapIP wireless network, you can monitor plant water use, soil moisture profiles, weather and ET, and IRT leaf temperature, all through one SapIP system.

The new IRT wireless infrared temperature system is the latest development in IR leaf temperature sensing for use in irrigation scheduling and plant stress detection. This new system allows for IRT nodes to be distributed throughout a field.

You may also add:

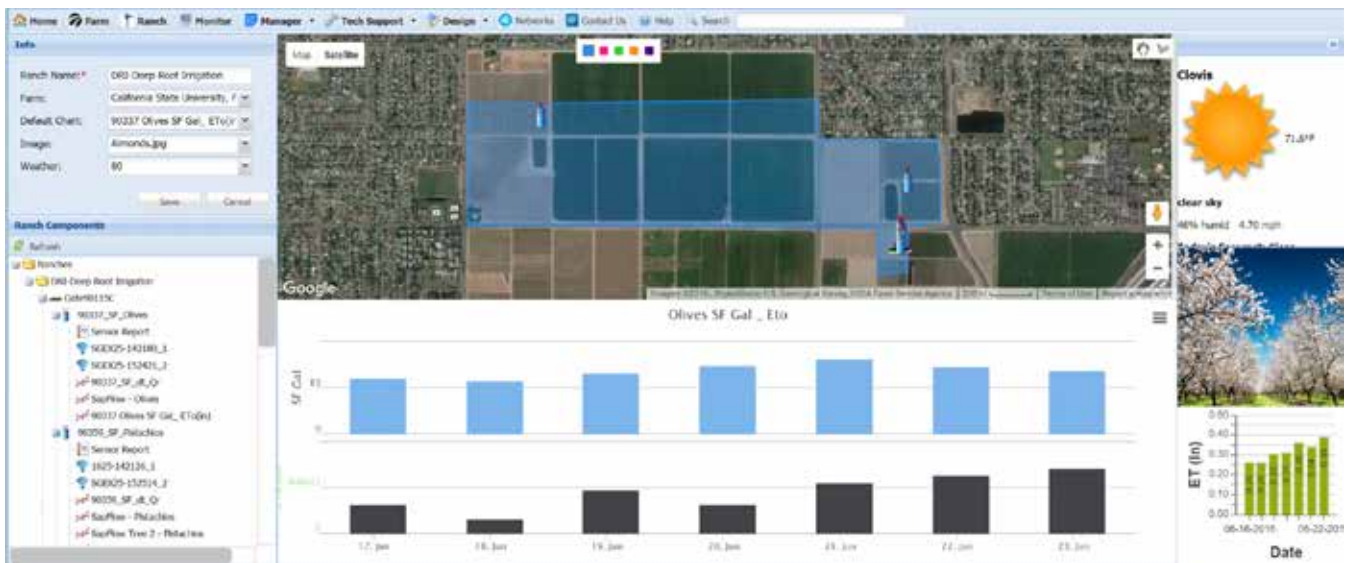
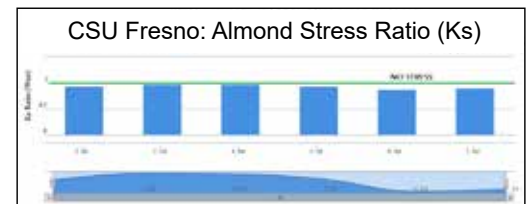
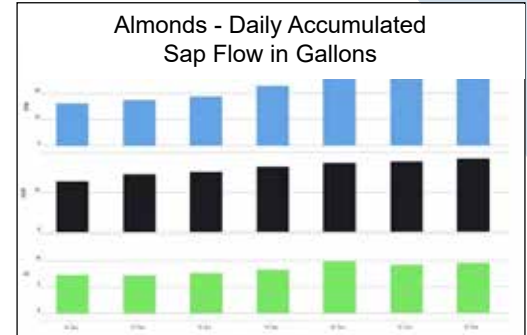
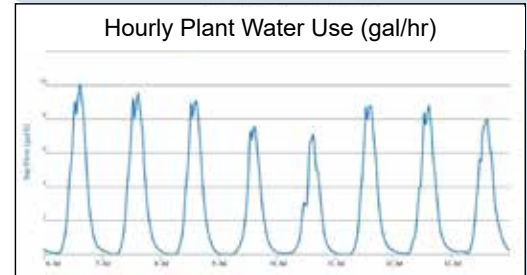
- Growing degree day
- And more

## Features

- SapIP-IRT nodes may be spaced up to ½ mile apart
- Weatherproof enclosures, 2.5" X 2.5" X 14" long
- ±0.5 C accuracy over wide range of ambient (0-60° C)
- Each SapIP node may have up to 8 IRT each
- IRT has 20 degrees field of view
- No calibration required
- Secure data collection, password protected
- Rechargeable batteries included

# AGRISENSORS.NET DASHBOARD

- Account management with password account protection
- Field specific data
- Multiple user access
- Data history saved for a full year or growing season
- Plant water use with soil moisture and field weather data displayed
- Stress Factor for easy crop stress management
- See water use every 15 minutes



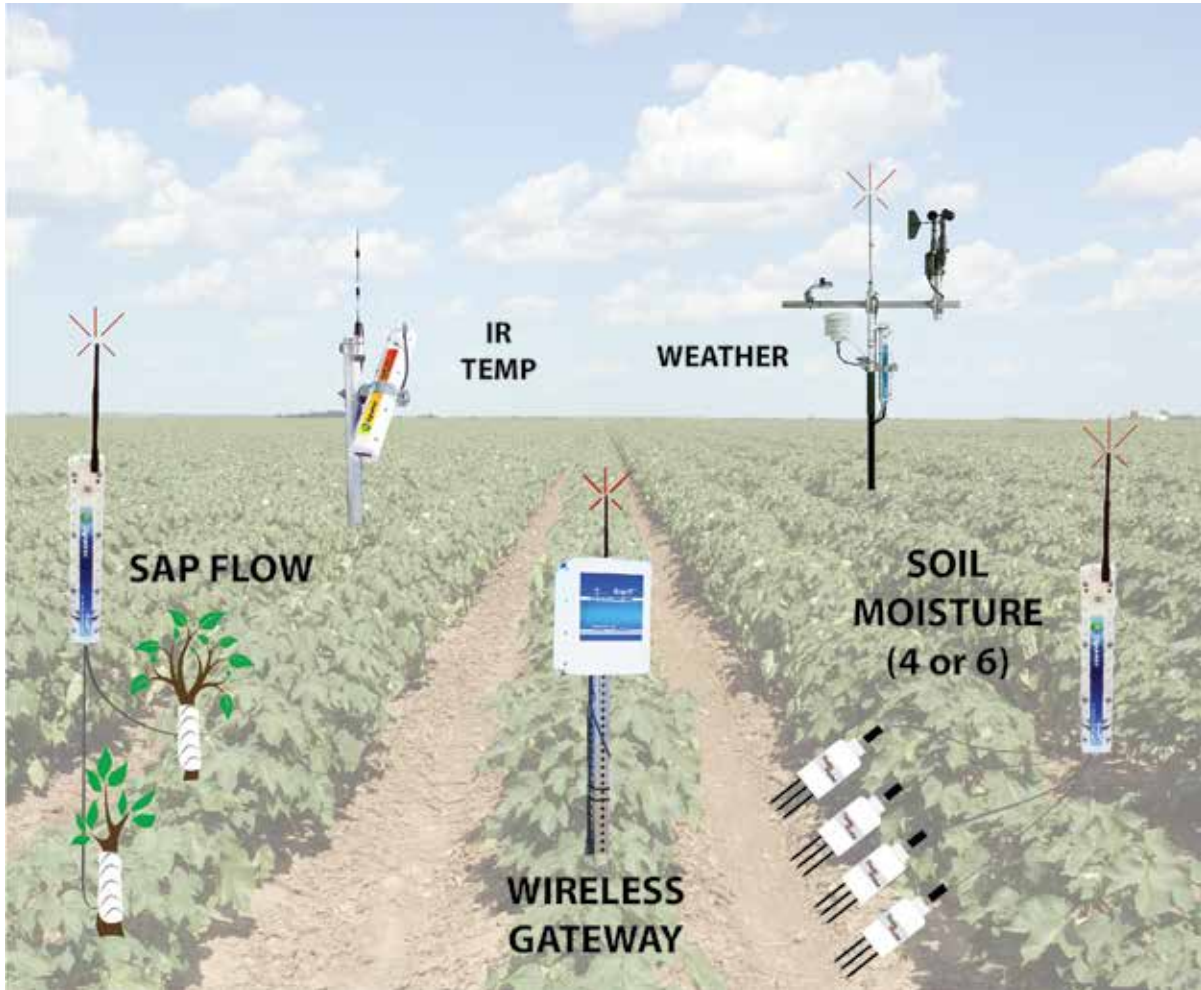
## Detailed Irrigation Block Field View

- As you review sensors in each block, the location is identified in a satellite image
- Moisture trends can be compared to sap flow, transpiration, plant stress, or weather
- You can make projections for water use or harvest needs





# Dynamax



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