This presentation premiered at WaterSmart Innovations

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SMART WATER APPLICATION TECHNOLOGIES 2011 UPDATE

Brian E. Vinchesi, President
Irrigation Consulting, Inc.
Pepperell, Massachusetts

Chairman, Irrigation Association
Smart Water Application Technology and Standards Committees

WHAT IS SWAT?

- SWAT is a coalition of water purveyors, equipment manufacturers, and irrigation practitioners with shared interests in the Smart Water Application Technologies (SWAT) initiative.
- Mission: to encourage outdoor irrigation efficiency and water conservation through the use of smart water application technologies.

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SWAT HISTORY

- Started in 2001 at Irrigation Association Meeting
- Initiative of the Irrigation Association Board of Directors
- Meets Every Year at the Irrigation Show (11/6 -11/8)
- Other meetings as necessary
  - February 2002 – Smart Controllers
  - April 2007 – Rain Sensors
  - January 2008 – Soil Moisture Sensors

STRUCTURE

- **Initiative of the Irrigation Association**
  - **Technology Working Group**
    - Kent Sovocool, SNWA
    - Testing Protocols
    - Reports
  - **Promotions Working Group**
  - Jenna Smith, Seattle Saving Water Partnership
    - Marketing & Promotions
    - Fundraising
  - **Executive Committee**
    - Brian Vinchesi, Irrigation Consulting
    - Oversight
    - Communication with EPA, IA Board and other groups
- SWAT participation is voluntary!

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SWAT PROTOCOLS

- Follows the International Standards Organization (ISO) process except for voting.

- Developed by the IA, stakeholders and independent testing groups
  - Each draft receives a 90 day review
  - All comments reviewed by the technical committee
  - Changes made by the entity leading the protocol development
  - Last draft (minor issues) receives a 30 day review

- Intend to have major review of protocols every three years

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COMMENTING

- Notice of comment period being open is posted on website, emailed, announced in E-times and press released
- Comments only through website: www.swatirrigation.org
- All comments are posted and may identify who made the comment
- Reminders are sent to email list
- After technical committee review, decisions on comments are posted

No.	Sec.	Comment or Observation	Accept or Reject	N/A or Question	Explanation
		lamps to be used, dry-out period definitions, etc. The two sub-sections should be consistent.			
6	N/A	If the testing agency purchases the rain sensors from a random irrigation dealer, then must the rain sensor be on the market before being tested. Will manufactures be able to use the SWAT rain sensor protocol to beta test rain sensors? Will they have to retest so the testing agency can randomly purchase rain sensors?		Question	Only devices that are commercially available are to be SWAT tested. While a manufacturer could decide to do beta testing on a product outside of the SWAT testing system using the same protocol (and even lab, if desired), results for such a beta test are not acceptable for SWAT and the manufacturer would have to submit for testing (or retesting) as normal. The current version of the protocol is silent on how the lab actually must acquire the sensors.
7	N/A	I believe that the automatic rain sensors are of critical importance especially in locations like southern California where we are in the third year of drought and saving every drop of water counts. The largest yearly cost the Association has is the cost of water. And sensors like these can make a big difference in helping us not to over water. We would like to do a recycled water irrigation system for the complex in cooperation with our local water district. The idea that I would like to recommend to you is to develop the ability to integrate these sensors into recycled water irrigation systems. That would really help bring about major savings and make irrigation water be used as efficiently as possible.		N/A	Thank you for your insights and your interest in seeing rain sensors subjected to performance testing.
8	2.2	Under 2.2 Problem Statement and Project Need, the first sentence that references Florida Statute 373.62 rain sensor installation, this language has just recently been revised and is effective July 1, 2009. Senate bill 494 has been signed and the new language is as follows: "Any person who purchases and installs an automatic landscape irrigation system must properly install, maintain, and operate technology that inhibits or interrupts operation of the system during periods of sufficient moisture." So owners are not limited to rain sensors, other technology can be used as well.	Accept		Removed specific language in Section 2.2.
9	N/A	The SWAT Rainfall Shutoff Device test should prove to be a valuable, much needed performance gauge and we appreciate the proactive approach on increasing public awareness with this first step protocol.	Accept		Thank you for your insights and your interest in seeing rain sensors subjected to performance testing
10	3.3	The ability of the rainfall simulator to maintain 95% distribution uniformity over the 20 week test and between tests is a concern to us. Will the distribution uniformity across the testing area be validated periodically		Question	Yes, the uniformity will be periodically validated. The rainfall simulator has been measured to have uniformity similar to natural rain events in the 90-95% range

CLIMATE BASED CONTROLLERS

- Drafts: Complete
- Residential and Small Commercial Controllers
- Results: 34 Controllers tested and posted
- Status: EPA to release final specification that incorporates the protocol with some changes on November 3, 2011
- Lead: Center for Irrigation Technology

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Smart Water Application Technology™ (SWAT™) Performance Report

Testing Agency: Center for Irrigation Technology www.californiawater.org

Product: Toro Rain Master Eagle Plus EGP24i/Irritrol RS 1000

Product Type: Climatologically Based Controller

Product Description: The Toro Rain Master Eagle Plus series controllers with Irritrol RS100 wireless rain sensor may use any one of four different ET sources: historical ET data, manually entered actual data, local weather station, CIMIS network (CA residents) or downloaded ET via internet (requires optional hardware).

SWAT Protocol*: Turf and Landscape Equipment Climatologically Based Controllers 8th Draft Testing Protocol (Sept. 2008)

The concept of climatologically controlling irrigation systems has an extensive history of scientific study and documentation. The objective of this protocol is to evaluate how well current commercial technology has integrated the scientific data into a practical system that meets the agronomic needs of turf and landscape plants. The evaluation is accomplished by creating a virtual landscape subjected to a representative climate to evaluate the ability of individual controllers to adequately and efficiently irrigate that landscape. After initial programming and calibration the controller is expected to perform without further intervention during the test period. Performance results indicate to what degree the controller maintained root zone moistures within an acceptable range. If moisture levels are maintained without deficit, it can be assumed the crop growth and quality will be adequate. If moisture levels are maintained without excess it can be assumed that scheduling is efficient.

***All SWAT protocols may be viewed at www.irrigation.org**

Rain Master Eagle Plus EGP24i/Irritrol RS 1000 SWAT™ Performance Summary

Irrigation Adequacy	Irrigation Excess
Minimum of 6 test zones: 89.5% **Maximum of 6 test zones: 100%** **Mean/Average of 6 test zones: 95.4%** **Irrigation Adequacy** represents how well irrigation met the needs of the plant material. This reflects the percentage of required water for turf or plant material supplied by rainfall and controller-scheduled irrigations. Research suggests that if this value is between 80% and 100%, the acceptable quality of vegetation will be maintained.	**Minimum of 6 test zones: 0%** **Maximum of 6 test zones: 3.3%** **Mean/Average of 6 test zones: 1.1%** **Irrigation Excess** represents how much irrigation water was applied beyond the needs of the plant material. This reflects the percentage of water applied in excess of 100% of required water according to data from CIMIS station #80 Fresno State, Fresno County during the test period.

Product Detail Supplied by Manufacturer

Rain Master Eagle Plus EGP24i/Irritrol RS 1000 www.rainmaster.com

Installation	Data Source	Data Link	Initial Purchase	Additional Hardware	Additional Fees
Replaces an existing controller or installed on a new system.	SWAT tested with wireless Internet link to CIMIS weather station #80.	2-way wireless communication	Purchase price based on number zones and options	❑ Rain Sensor ❑ Optional iCentral communication card via Internet	Monthly/annual subscription fees thereafter. Mulit-year service plans available.

Additional Features

Zones	Time of Day	Day of Week	Other	If Data Link is Discontinued
8, 16, 24, 32, 40 or 48 stations in conventional wire configuration or up to 200 stations as a two-wire system.	Capable of independently restricting the time of day for watering for each of 8-16 programs	Capable of restricting watering days by selection or interval	❑ Smart Alert ™ email & text messaging ❑ Flow measurement & monitoring ❑ Cycle and soak ❑ Sensor ports ❑ Programmable rain delay ❑ Diagnostic and fault detection ❑ Non-volatile memory ❑ Review feature displays total runtime	Defaults to historical ET database if communication with real time ET data is lost. Monthly ET values may also be entered manually.

Smart Water Application Technology™ (SWAT™) Performance Report

Irrigation Adequacy	Irrigation Excess
Minimum of 6 test zones: 100% **Maximum of 6 test zones: 100%** **Mean/Average of 6 test zones: 100%** **Irrigation Adequacy** represents how well irrigation met the needs of the plant material. This reflects the percentage of required water for turf or plant material supplied by rainfall and controller-scheduled irrigations. Research suggests that if this value is between 80% and 100%, the acceptable quality of vegetation will be maintained.	**Minimum of 6 test zones: 0%** **Maximum of 6 test zones: 2.3%** **Mean/Average of 6 test zones: 0.5%** **Irrigation Excess** represents how much irrigation water was applied beyond the needs of the plant material. This reflects the percentage of water applied in excess of 100% of required water according to data from CIMIS station #80 Fresno State, Fresno County during the test period.

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Smart Water Application Technologies (SWAT) Performance Report

Testing Agency: Center for Irrigation Technology	**www.californiawater.org**
Testing Date: February 5 to March 6, 2011	**Weather Station:** CIMIS 80 Fresno State, Fresno
Product Type: Climatologically Based Controller	**Reference #:**

Product: **Toro® TMC-212 with Irritrol® Climate Logic™ Kit**

Product Description: The Toro TMC-212 series controller with Climate Logic Kit (CL-100 Wireless includes CL-M1 receiver module and CL-W1 wireless weather sensor/transmitter) to convert conventional controller to smart controller.

SWAT Protocol*: Turf and Landscape Equipment Climatologically Based Controllers 8th Draft Testing Protocol (Sept. 2008)

The concept of climatologically controlling irrigation systems has an extensive history of scientific study and documentation. The objective of this protocol is to evaluate how well current commercial technology has integrated the scientific data into a practical system that meets the agronomic needs of turf and landscape plants. The evaluation is accomplished by creating a virtual landscape subjected to a representative climate to evaluate the ability of individual controllers to adequately and efficiently irrigate that landscape. After initial programming and calibration the controller is expected to perform without further intervention during the test period. Performance results indicate to what degree the controller maintained root zone moistures within an acceptable range. If moisture levels are maintained without deficit, it can be assumed the crop growth and quality will be adequate. If moisture levels are maintained without excess it can be assumed that scheduling is efficient.

***All SWAT protocol may be viewed at www.irrigation.org.**

Toro TMC-212with Irritrol Climate Logic Kit Full Technical SWAT Performance Report

Input Data: CIMIS #80 reference crop is turfgrass using the Penman-Monteith formula
For more information: www.cimis.water.ca.gov

Parameters: For field installation, these values would normally be collected during a landscape audit.	**Zone #1**	**Zone #2**	**Zone #3**	**Zone #4**	**Zone #5**	**Zone #6**
Soil Type: Affects how water is absorbed and amount of water storage in the soil reservoir	Loam	Silty Clay	Loamy Sand	Sandy Loam	Clay Loam	Clay
Vegetation: Determines the crop coefficient and therefore the water required for healthy plant growth	Fescue 75% Shade	Bermuda Full Sun	Ground Cover Full Sun	Woody Shrubs 50% Shade	Trees & Ground Cover Full Sun	Bermuda Full Sun
Slope,%: Affects run-off potential	6%	10%	8%	12%	2%	20%
Root Zone Working Storage (inches): Affects water available to plant and watering intervals	0.85	0.55	0.90	2.00	2.25	0.55
Precipitation Rate (inches/hour): Affects duration of watering time	1.60	1.60	1.40	1.40	0.20	0.35
Application Efficiency,%: The percent of water applied by irrigation distribution system that is absorbed in to the root zone working storage and is not lost due to spray drift and pattern loss	55%	60%	70%	75%	80%	65%
Area (square feet): Frames a virtual yard. Is not used in efficiency calculations.	1000	1200	800	500	650	1600
Soil Intake Rate (inches/hour): Affects watering duration & soak intervals of watering time	0.35	0.15	0.50	0.40	0.20	0.10
Allowable Surface Accumulation (inches): Affects watering duration & soak intervals of watering time	0.25	0.16	0.26	0.24	0.26	0.10
Maximum Allowable Run Time (minutes): Limits run time options to avoid potential runoff	12.0	6.6	17.3	14.4	N/A	24.0

Performance results are only valid if the controller must make adjustments for varying weather conditions such as rain and evapotranspiration (ET_O). Therefore actual time undergoing testing may be longer than one month. Valid performance data is then downloaded from the 30 consecutive day period exhibiting the required minimum 0.40 of gross rainfall and minimum 2.50 inches of ETo.

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Toro TMC-212 with Irritrol Climate Logic Kit Full Technical SWAT Performance Report						
Evaluation Summary: Evaluation summary of performance during a 30-day period in which the controller was required to adjust for actual weather conditions including significant ETo and rain events without intervention.						
Performance Parameters: Total inches for the test period are listed for each zone/crop	**Zone #1**	**Zone #2**	**Zone #3**	**Zone #4**	**Zone #5**	**Zone #6**
ET_O (inches): Actual ET from weather station, reference crop is cool season grass. (CIMIS)	2.51	2.51	2.51	2.51	2.51	2.51
ET_C (inches): ETo requirement modified by the crop coefficient (determined by the vegetation in each zone)	1.17	1.60	1.41	1.03	1.48	1.60
Rainfall (inches): Rainfall recorded at the weather station	1.57	1.57	1.57	1.57	1.57	1.57
Net Rainfall (inches): Allows an arbitrary loss of 20% R(net) = 0.8 (R).	1.26	1.26	1.26	1.26	1.26	1.26
Effective Rainfall (inches): Rainfall that was effectively stored in root zone working storage for use by crop.	0.61	0.45	0.96	1.26	1.26	0.54
Gross Irrigation (inches): Actual water applied	2.03	2.64	1.32	0.63	1.65	2.13
Direct Run-off (inches): Water applied that exceeded maximum allowable runtime	0.00	0.00	0.00	0.00	0.00	0.00
Soak Run-off (inches): Runoff loss attributable to scheduling multiple irrigation cycles without allowing sufficient soak time between cycles.	0.00	0.00	0.00	0.00	0.00	0.00
Effective Irrigation (inches): Water applied that was added to root zone working storage and usable by crop	1.10	1.51	0.87	0.50	1.17	1.44
Deficit (inches): Required water that was not available in the root zone working storage	0.00	0.00	0.00	0.00	0.00	0.00
Surplus (inches): Water applied in excess of root zone working storage	0..13	0.16	0.09	0.00	0.00	0.03
***Irrigation Adequacy,%:** Reflects how well irrigation met the consumptive use of vegetation. $Irrigation\ Adequacy\,(\%)=\left(\frac{ETc,in-Deficit,in}{ETc,in}\right)100$	100%	100%	100%	100%	100%	100%
Schedule Efficiency,%: Reflects how well irrigation cycles avoided direct, soak runoff and exceeding the root zone working storage capacity. Scheduling Losses (in.) = Direct Runoff (in.) + Soak Runoff (in.) +Surplus (in.) $Sch.eff\,(\%)=\left(\frac{Irr.(Net,in)-Sch.losses(in.)}{Irr.(Net,in)}\right)100$	87.7%	89.6%	90.2%	100%	100%	97.7%
***Irrigation Scheduling Excess,%:** Reflects water applied in excess of consumptive use of vegetation. Irr. Excess = 100 - Schedule Efficiency, %	12.3%	10.4%	9.8%	0%	0%	2.3%

*Listed on Performance Summary Report

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Toro TMC-212with Irritrol Climate Logic Kit Full Technical SWAT Performance Report

Overall Irrigation Efficiency Evaluation

The efficiency of an irrigation system is a function of four considerations: efficient irrigation controls, efficient application hardware, well-designed irrigation installation, and consistent maintenance. If all considerations are optimal in these four areas the irrigation system can be considered to be efficient over all.

Scheduling Efficiency is the only criteria tested by the Climatologically Based Controller protocol. This value is listed in the Performance Parameters part of this report.

Application Efficiency listed in the input parameter takes into account application hardware, installation and maintenance. This value is listed in the Input Parameters part of this report. These values are generally representative of industry norms and do not relate directly to any specific manufacturers product.

Overall Efficiency,% = [Schedule Efficiency,% x Application Efficiency, %]

Performance Parameters: Total inches for the test period are listed for each zone/crop	**Zone #1**	**Zone #2**	**Zone #3**	**Zone #4**	**Zone #5**	**Zone #6**
Schedule Efficiency,%: Reflects how well irrigation cycles avoided direct, soak runoff and exceeding the root zone working storage capacity. Scheduling Losses (in.) = Direct Runoff (in.) + Soak Runoff (in.) +Surplus (in.) $Sch.eff\,(\%)=\left(\frac{Irr.(Net,in)-Sch.losses(in.)}{Irr.(Net,in)}\right)100$	87.7%	89.6%	90.2%	100%	100%	97.7%
Application Efficiency,%: The percent of water applied by irrigation distribution system that is absorbed in to the root zone working storage and is not lost due to spray drift and pattern loss	55%	60%	70%	75%	80%	65%
Overall Irrigation Efficiency,%:	48.3%	53.7%	63.1%	75%	80%	63.5%

Manufacturer's Declarations on Crop Coefficient Application and Adjustability

Toro TMC-212 with Irritrol Climate Logic Kit: Crop coefficients are not directly programmable but are accounted for by the user in other scheduling parameters.

Of the following two statements: A and B do not apply.

A) Crop coefficients are remotely programmable or updateable for a single controller.

B) Crop coefficients are remotely programmable or updateable for a global application to numerous controllers.

SOIL MOISTURE SENSORS

Smart Water
Application Technologies™
(SWAT)

Turfgrass and Landscape Irrigation System Smart Controllers

SOIL MOISTURE SENSOR-BASED CONTROLLERS

Laboratory and Operational Tests
3rd Draft August 2011

Phase 1: Laboratory Screening Tests
(8th Draft Protocol—August 2009)

Phase 2: Operational Test on a Virtual Landscape
(4th Draft Protocol—October 2008)

Developed by

Irrigation Association™

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- Drafts: 2 (combined)
- Sensor and Controller
- Results: 8 Sensors Tested and Posted
- Status: Protocol Released for Testing
- Provided to EPA in September
- Lead: Center for Irrigation Technology

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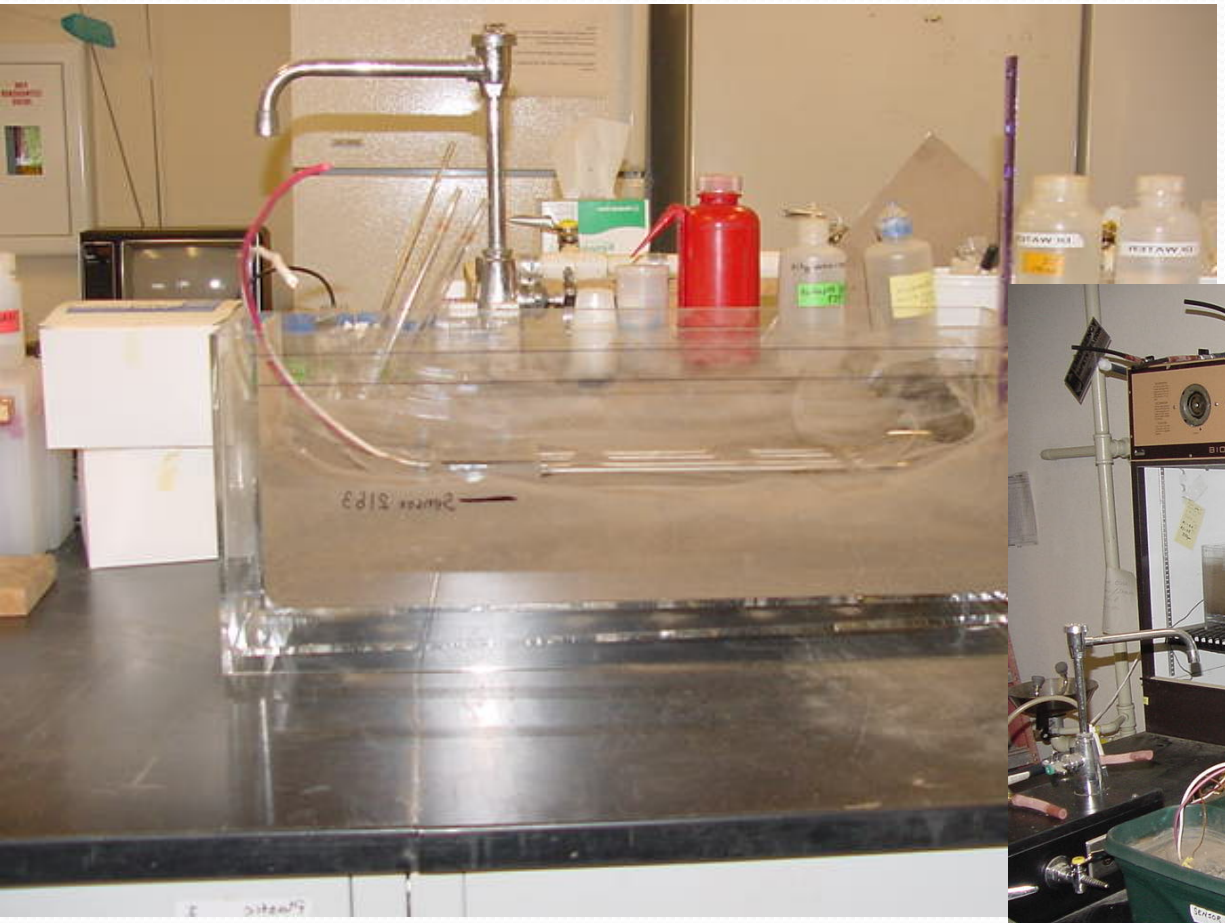
SOIL MOISTURE SENSORS



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Smart Water Application Technologies/SWAT Calibration Report

Testing Agency: Center for Irrigation Technology http://cati.csufresno.edu/cit/

Testing Period: January 2009 to January 2010

Product Type: Soil Moisture Sensor

Product Make and Model: Baseline BL-5315B biSensor

Product Description: Sensor measures moisture content in Time Domain Transmissometry

SWAT Protocol*: Turf and Landscape Irrigation Equipment - SOIL MOISTURE SENSORS
Phase 1: Indoor Lab Screening Tests - 7th Draft Testing Protocol

The concept of soil moisture sensors has an extensive history of scientific study and documentation. The objective of Phase 1 lab tests is to determine sensor calibration curves over a range of conditions that affect soil moisture, including soil type, temperature and salinity. Phase 1 testing determines sensor response over manufacturer specified test ranges to continue into Phase 2. At that time the soil sensor will be integrated with an irrigation controller to measure irrigation adequacy and efficiency in a virtual landscape using the current performance criteria of 0.40 inches of rainfall and 2.50 inches of ETo.

Phase 1 Soil Moisture Sensor testing does not test the efficacy of a sensor over the entire range of soil moisture conditions possible and do not measure the integration of a soil sensor with a controller to manage irrigation.

Sensor performance curves were developed to determine the relationship between sensor readings and soil moisture content for a soil filled container. Relationships are determined for a range of soil textures, ambient temperatures and water conductivity values.
***All SWAT protocols may be viewed at www.irrigation.org**

Phase 1 SWAT Calibration Summary: Baseline BL-5315B biSensor

Measures are between field capacity (i.e. practical soil water holding capacity) and a selected drying range specified by the manufacturer over which the sensor was tested.	**Equation (Linear)**
Test of Soil Moisture Sensor	**Response Function Developed[1]**
Response in Fine-Textured Soil	Linear (y =0.1687x + 0.2518)
Response in Medium-Textured Soil	Linear (y =0.5042x + 0.1198)
Response in Coarse-Textured Soil	Linear (y =0.6613x + 0.0902)
Response in Soil at 15 °C (59 °F)	Linear (y =0.5066x + 0.1334)
Response in Soil at 35 °C (95 °F)	Linear (y =0.4897x + 0.1229)
Response in Soil Susceptible to Freezing	Linear (y =0.4370x + 0.1404)
Response in Fine-Textured Soil to Irrigation with 2.5 dS/m salinity water	Linear (y =0.1263x + 0.2727)
Response in Fine-Textured Soil to Irrigation with 5.0 dS/m salinity water	Linear (y =0.1105x + 0.2849)
Response in Medium-Textured Soil to Irrigation with 2.5 dS/m salinity water	Linear (y =0.5541x + 0.1221)
Response in Coarse-Textured Soil to Irrigation with 2.5 dS/m salinity water	Linear (y =0.8550x + 0.0940)
Response in Medium-Textured Soil for six wet/dry cycles	Linear (y =0.5014x + 0.1418)

[1]Regression equations of the data gathered vs. moisture content as measured by gravimetric sampling, or the measured weight of water in the soil samples. The dynamics of variable manufacture selected calibration endpoints preclude the applicability of correlation coefficients for inter-test or inter-sensor comparisons. A Nonlinear designation means a regression equation other than a straight line was used to best describe the relationship.

Product Detail Supplied by Manufacturer

Baseline BL 5315B biSensor **www.baselinesystems.com**

Operation	Features	Additional Hardware
Digital Absolute-reading Time Domain Transmissometry	• Provides stable readings across a wide range of soil temperature and EC conditions • Ability to act as a moisture transducer in a closed loop irrigation system. • No post-install adjustments needed. • Can measure soil and irrigation system properties for automatic setup • No electrically conductive components having earth contact.	• Natively communicates via highly reliable digital protocol to Baseline controllers and monitors over two-wire or over conventional field valve and common wires in parallel with standard 24vac solenoids. • BL6000 Controller Family: Combination two-wire and/or conventionally wired Internet ready smart irrigation control system capable of expanding to 4000 zones. • BL3200 Controller Family: Combination two-wire and/or conventionally wired Internet ready smart irrigation controller capable of expanding to 200 zones.

RAIN SENSORS

- Drafts: 2
- Equipment Functionality
- Results: Testing
- Status: 1st Round Complete. Waiting on Report Formatting and Manufacturer Release
- Lead: University of Florida

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RAIN SENSORS

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PRESSURE REGULATING SPRINKLERS

Smart Water
Application Technologies™
(SWAT)

Turf and Landscape Irrigation Equipment

PRESSURE REGULATING
SPRAY HEADS

Equipment Functionality Test
2st Draft Testing Protocol (September 2011)

Developed by the

Irrigation ASSOCIATION™

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- Drafts: 2
- Equipment Functionality
- Results: None
- Status: 2nd Draft released for public comment
- Lead: North Carolina State University

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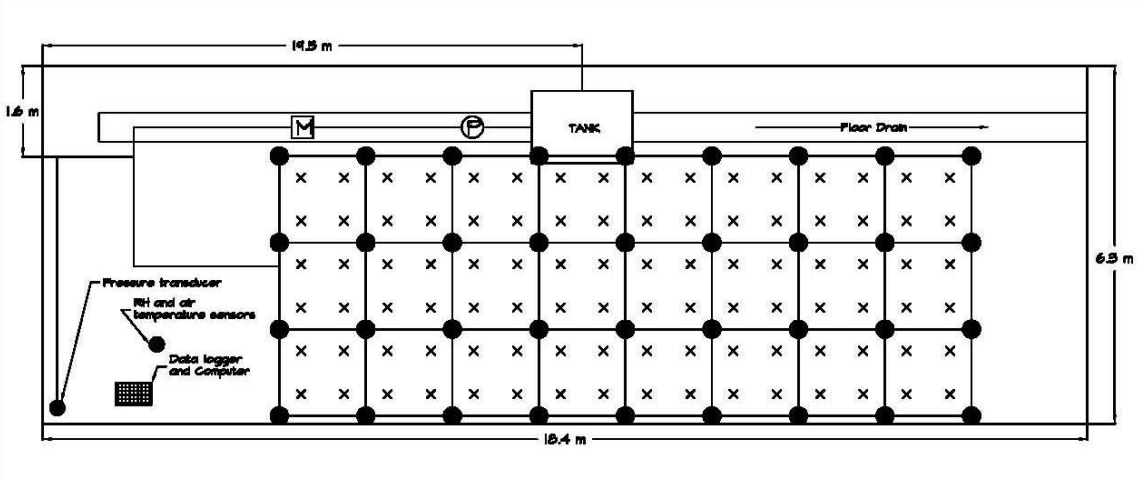
HIGH PERFORMANCE NOZZLES

- Drafts: Pending
- Equipment Functionality
- Results: None
- Status: Compiling first draft protocol
- Lead: Utah State University



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NEW TECHNOLIGIES

- The technology must:
  - Be an irrigation technology that improves the water efficiency of irrigation systems, specifically for urban landscapes.
  - Be available to both the residential and commercial market.
  - Be able to be used on an existing or new, automatic sprinkler or drip irrigation systems.
  - Improve the water efficiency of automatic irrigation systems, without negatively impacting customer satisfaction.
  - Be easily installed by a trained irrigation professional.

TO GET SWAT SUPPORT

- Technologies must meet the following criteria:
  - Require the development of a technology promotion strategy and testing protocols to increase market acceptability.
  - Are able to be tested and measured for water efficiency based upon SWAT-approved testing protocols.
  - Show potential for widespread market acceptance.
  - Have general consensus that the technology will improve water efficiency.

NEXT TECHNOLOGY

- Check Valves
- System Interruption Devices
  - Flow Switches
  - Wind Switches
  - Temperature Switches
- Sensors
  - Flow
  - Programmable

SWAT TOOLS FOR WATER PROVIDERS

- **Marketing toolkit**
  - Smart controller statement stuffers
  - Homeowner smart controller direct mail package, self-mailer and jumbo postcard
  - Contractor smart controller self-mailer and jumbo postcard
- **Customizable web template**
  - Web pages to promote smart technologies
  - Website resources – www.swatirrigation.org

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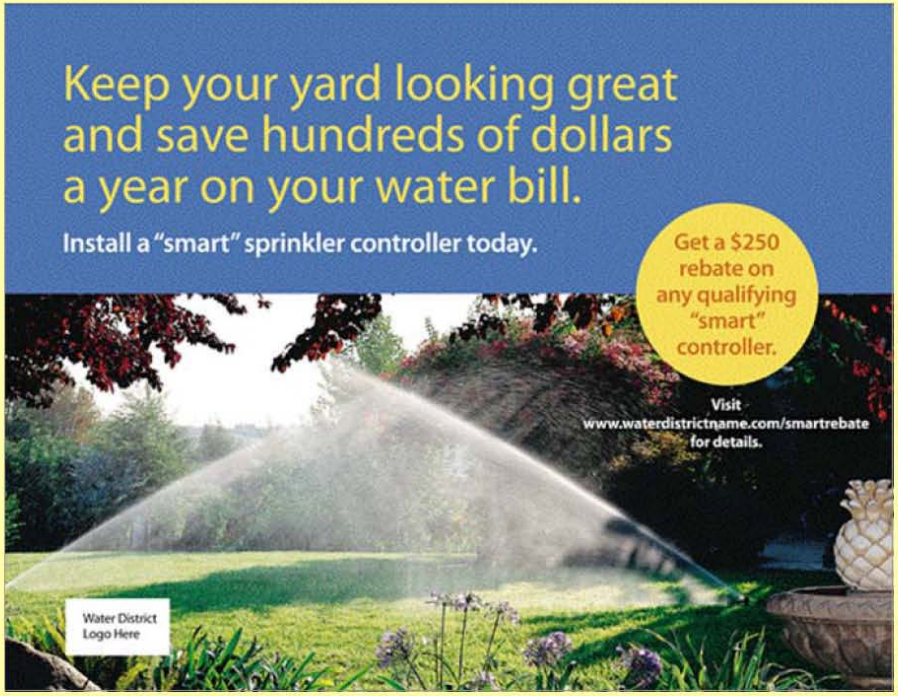
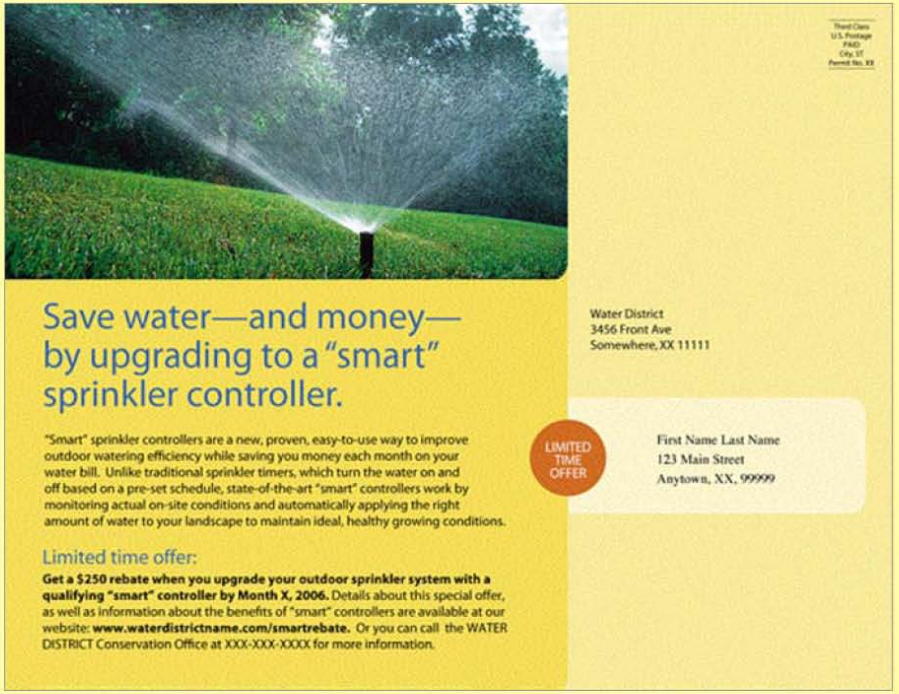
Homeowner Direct Mail



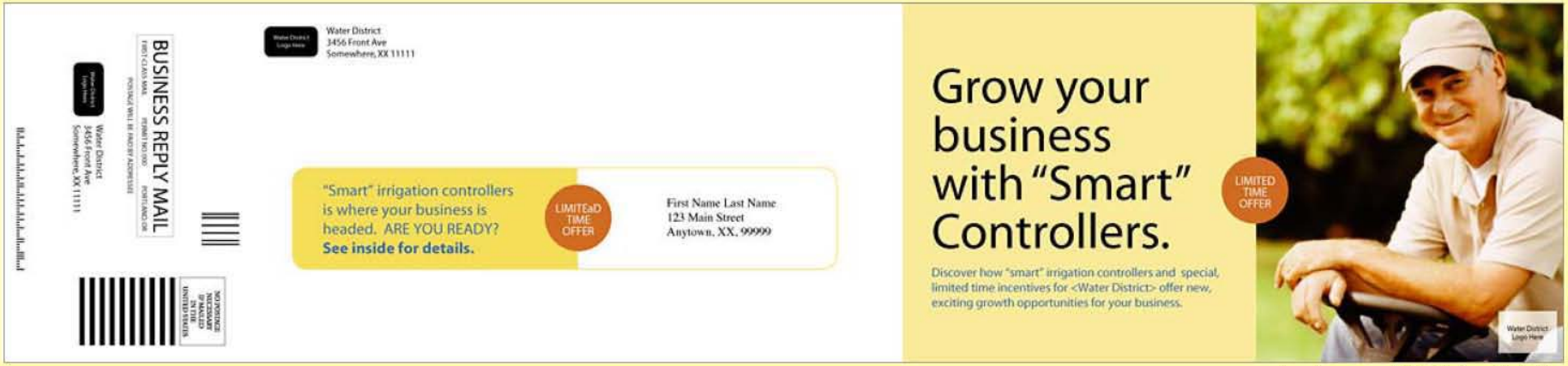
Homeowner Jumbo Postcard-Front



Homeowner Jumbo Postcard-Back

Homeowner Direct Mail #3: Jumbo Postcard

Landscaper Direct Mail



Landscaper Self-Mailer-Outside

Landscaper Self-Mailer-Inside

Landscaper Direct Mail #1: Self-Mailer

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LEARNING MORE

- To participate in the SWAT working groups and task teams, contact me.
- To receive periodic SWAT email updates on technical and/or marketing efforts, sign-up at www.irrigation.org/swat.
- Keep an eye on our website: www.swatirrigation.org
- To contribute to SWAT, contact the Irrigation Association at 703-536-7080.

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QUESTIONS

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