SWAT Frequently Asked Questions: Smart Controller Testing Protocols

Q 1 How was the protocol developed?

The effort is based on a number of SWAT committee meetings dating from 2003. Drafts are posted on the IA website and offered for comment by IA members and the public in general. Over a period of months, comments are received, considered and responded to. In general concerns are vetted by the SWAT committee in an effort to reach a consensus. The protocols are living documents updated as necessary. Established protocols are officially reviewed every three years.

Q 2 Since the protocol defines parameters and formulas as used by the testing agency, does the protocol effectively tell the vendor how to get a perfect score?

No. The only variable that the vendor's product has control of is timing and duration of irrigation events.

Q 3 Does the CIMIS Station data represent the 'real world' as relates to rainfall?

The CIMIS Station data was considered by most reviewers as the best data generally available at this time. CIMIS weather stations measure rainfall over a period of time (hour, day, month, etc.). The measurement is specific to the CIMIS station location and accurately reflects the real world in that location. Since the bench test protocol tests the effective irrigation scheduling according to inputs the CIMIS data is real world. Field testing will further refine our understanding of the relationship between remote climatological inputs and the microsite specific to the location of field tested equipment.

Q 4 Which is more representative of the 'real world', the weather station rainfall data or an on-site rain click device?

Due to its ability to precisely measure rainfall over time, weather station data is more real world that an on site rain click device.

Q 5 Does the SWAT protocol give an unfair advantage to controllers that use data from a CIMIS weather station?

No, the protocol prescribes a test to measure the ability of a controller to automatically control the irrigation system to meet the crop's demand for water. CIMIS weather stations accurately collect weather data, cover a large area, the data is easily accessible and it is unbiased. The Penman-Montieth formula is used to convert the weather data into an evapotranspiration rate, which is the industry accepted method for estimating a crop's demand for water. Therefore, CIMIS and the Penman-Montieth formula are used as the standard against which products under test are compared.

Products that use other means or methods are not at a disadvantage as long as they accurately estimate the crop's demand for water.

Q 6 The protocol appears to be designed to favor California conditions, what about other states?

CIMIS was chosen for the quality, range and accessibility of its weather records. The fact that this weather station system is in California is coincidental. If reviewers determine that other weather station systems are of commensurate quality, range and accessibility, the testing agency may add such weather stations to the menu of available weather stations to vendors.

Q 7 How will units with their own weather sensors be evaluated?

At this time, controllers with their own weather sensor (e.g. temperature and rainfall) will be tested at the CIT office in Fresno. This site uses CIMIS Station 80 as a weather data source. If other third-party testing agencies begin express an interest in SWAT testing in the future, guidelines will be developed to assure valid weather measurements are used to gauge the candidate controllers' irrigation efficacy. They are expected to gauge performance of controllers with their own weather sensor to an on-site weather station of commensurate quality.

Q 8 How will a controller that generates its own ETo and rainfall records compare in performance to a controller that relies on weather data from a remote source?

The protocol makes no statement about the quality of the weather data. The protocol characterizes the ability of the controller to effectively deal with a representative range of weather variables. It also makes no statement about the efficiency of the sprinkler. The protocol evaluation characterizes the ability of the controller to control irrigation system start and run times. The question posed could only be answered by additional studies.

Q 9 Are the test results indicative of real-world situations if you don't live next to a CIMIS Station?

The testing protocol uses naturally developed weather sequences as measured by CIMIS weather instruments and characterized by their formulas. The absolute accuracy of the CIMIS characterization is not a concern of the protocol. The protocol needs are met if the range of weather variables encountered during the test period is broad enough to represent actual situations and are randomly generated.

Q 10 If perfect protocol scores are possible, how does this help consumers decide on which controller to purchase?

Consumers can make their buying decision according to many criteria (e.g. price, service, useful life, special features, etc.). Protocol scores indicate that the tested unit is capable of providing the published adequacy and efficiency results. Therefore the buying decision will depend upon other criteria.

Q 11 Would it be desirable to have water purveyors use the protocol testing results from which to select controllers for use in actual field tests to determine water savings?

The current bench testing protocol could be used to select the controllers considered worthy of field-testing. The water purveyors and other interested agencies could then decide on the range of conditions to be included in the field test. CIT and the University of Florida Institute of Food and Agricultural Sciences (IFAS) are in the process of developing field-testing protocol that may be used by any interested agency, recognizing that some local baseline data will need to be inserted. For example, CIMIS data tables, specific to California weather will need to be replaced by local climate baseline data of commensurate integrity.

Q 12 How is the efficacy of on-site measurements of sunlight, temperature and rainfall measured?

During testing the effects of all controller climatic measurements are ultimately compared to CIMIS system measurements. Controllers with on-site sensors must be tested in the CIT laboratory and compared to CIMIS Station No. 80 on the CSUF campus.

Q 13 Are manufacturers allowed to make adjustments to their controllers during the test period?

No. No human intervention is permitted after initial product set up. While physical intervention restrictions can be monitored, electronic intervention, (wireless or hard wired) cannot be monitored at the present time. It is likely that controller manufacturers participating in rebate programs will be asked to sign affidavits attesting to the 'no human intervention' requirement. This requirement will be written into the SWAT program philosophy.