

CLOSED-LOOP LANDSCAPE IRRIGATION SYSTEM. A. *Gutterman*, R. *Press**, G.A. *Takacs*, *Departments of Biological Sciences and Chemistry*, gutterman@gmail.com, rjpsch@rit.edu, gatsch@rit.edu

High demands for fresh water necessitate more efficient usage of this limited natural resource. As population increases and higher land yields are required, irrigation water must be applied in a precise manner to maximize its effectiveness.

The dielectric constant of a particular soil water mix is a function of the water to soil ratio. An algorithm which deduces the dielectric constant of the mixture would allow autonomous decision-making capability. The addition of a water control mechanism interface would complete the system and provide an optimized, hands-off irrigation system.

A unit consisting of a dielectric constant probe coupled with a controller was developed that determines the moisture content of the soil. When the moisture content falls below a pre-selected threshold value, the unit commands the start of irrigation. The system was tested in a variety of local soils and its effectiveness evaluated.

The complete system will be useful where regular watering of flora is required to maintain healthy plant growth. Potential applications include residential and commercial landscaping, home gardens, greenhouses, and larger scale agricultural installations. The current success of the device and planned future development will be discussed.