Proposal of a decentralized autonomous environment control system from Japan

Ubiquitous Environment Control System®

UECS®

- UECS can be designed to work with horticultural production facilities of any size—from large to small.
- UECS can be installed in the latest facilities plus introduced to existing facilities on an as-needed basis.
- All UECS products within each company can work and communicate each other by our standardized communication protocol in the greenhouse LAN.
- The newest information technology can be installed in greenhouses at lower cost, and can be operated entirely through portable remote devices (gadgets) without any PCs.
- Convenient high-interchangeability software applications can be used for precise cultivation management and improved production.

Ubiquitous Environment Control System® (UECS) Consortium
Its nickname is UECS (pronounced [wécks]). Developed in Japan in 2005, the Ubiquitous Environment Control System® is an epoch-making computerized technology for producing crops in greenhouses.

Japan, 1985–1995. Systems that managed the environments of greenhouses and other horticultural facilities included environmental control actuators, environmental measurement sensors, the microcomputers that controlled them, and personal computers to manage the system—which were running monitoring software and connected by raggle-taggle cables. Each company that made and sold these components created their own standards and protocols, which were not consistent with one another. This meant that producers were forced to use only the specialized products and software approved by companies in the same group. Faced with demands for large-scale technological development ability and saddled with the heavy burden of sales and support work, companies were crippled by the vast amounts of management resources they continued to consume. As fierce competition heated up, companies could not sell enough units to keep pace, and most of them folded. Since then, crop producers have wanted to better control the environments in their facilities, conserve energy, and increase their production—but with the dwindling number of systems on the market and high price of software and devices, they have not been able to increase their performance in the slightest. Greenhouse horticultural production is made possible by combining a host of technologies from a wide variety of disciplines, and no one company can handle them all. This puts producers in a tight spot…

We’ve got it! We’ll create a scheme, everyone can collaborate each other, that is UECS.

How does the Ubiquitous Environment Control System® work?

Let U-kun and the CCM dog explain—it’s simple!

Before...

Switchboards and other components requiring complicated electrical work

Controlling the system required an expensive dedicated microcomputer, which could not be repaired if the manufacturer withdrew from the market

PC could not be operated without specialized high-priced software

With UECS...

Install me on your devices and sensors. I don’t cost much and allow them to communicate with the system.

Just install UECS software on an internet-enabled PC or smartphone. You don’t need me!

All information is carried by the CCM dog, so only one type of network cable is needed. Easy!

The CCM dog can travel anywhere in the network, so information can be shared among all linked devices

Use Wi-Fi to connect to the system
What’s so good about the standardization in the Ubiquitous Environment Control System®?

Devices and software compatible with the Ubiquitous Environment Control System® can work together

Each company makes the most of the unique strengths to carry out indoor plant production. Getting started is easy! Producers start by putting together the devices they like and phasing in the system step by step.

More on the Ubiquitous Environment Control System® protocol

UECS information is transmitted using the CCM (common correspondence message) protocol. The one currently in use is the application communication protocol book version 1.00-E10, known as the “E-10” protocol for short. This is an open protocol that can be used not only by Consortium members but that can be accessed by anyone via our website. Download it today and try it for yourself!

Website: http://uecs.jp/

How will UECS expand in the future?

Several UECS technologies are now being researched as the UECS processing method shifts to a cloud-computing model, including advanced control systems that can be operated using only a smartphone and devices that can handle plant biological information, work information, and tweets.