

Field Monitoring System for Irrigation Control with ECH₂O and Field Server

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◆ Introduction

- ☀ Importance for agricultural products
 - **Observation of environment factors in farms**
temperature, solar radiation,
rainfall, soil moisture ...
 - **Control of culturing conditions in farms**
irrigation, drainage, fertilization ...

→ **Field monitoring system**

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◆ Field Server

- ☀ Distributed sensing device (NARC)
- ☀ Strong body
- ☀ Camera
- ☀ WiFi



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◆ Field Server

- ☀ Some sensors
 - Temperature
 - Humidity
 - Solar radiation
- ☀ Interface for external sensors
 - Leaf wetness
 - CO₂ concentration
 - **Soil moisture** ...



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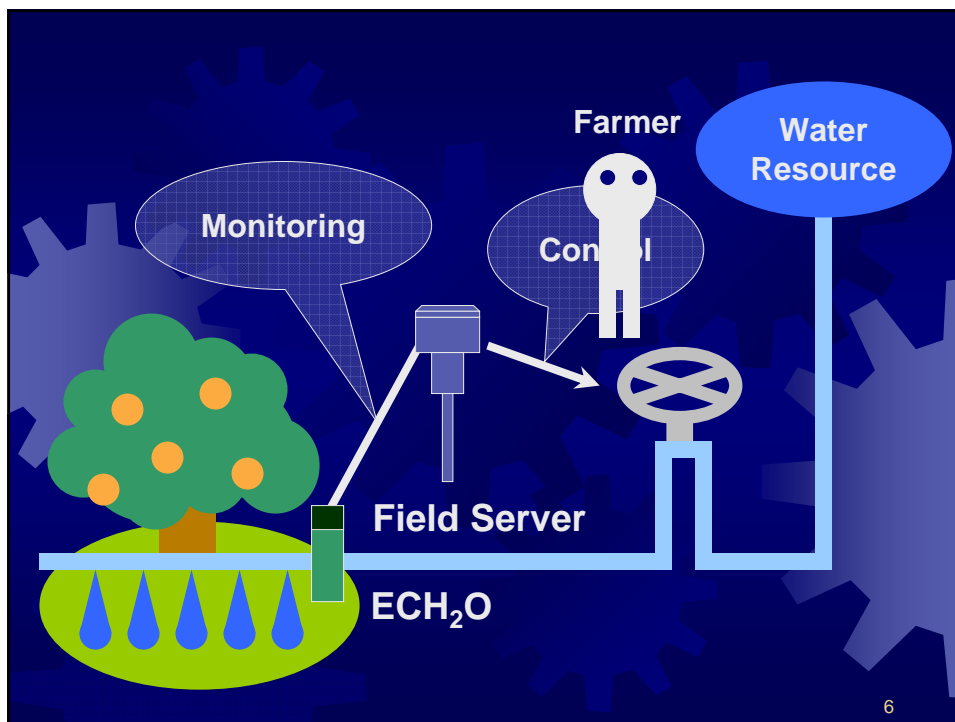
◆ Field Server + ECH₂O



Monitoring of soil moisture in farm

Automatic irrigation system

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◆ Test Farm

☀ Sowa Fruit Farm in Arida City, Wakayama Pref.



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◆ Maru-Dori

☀ Drip Irrigation and Liquid Fertilization System with Year-round Plastic Mulching
(National Agricultural Research Center for Western Region)

- Mulching
 - Reduce weeding
 - Protect surplus rainfall to crops
- Drip irrigation
- Liquid Fertilization

➔ High quality mandarin orange products

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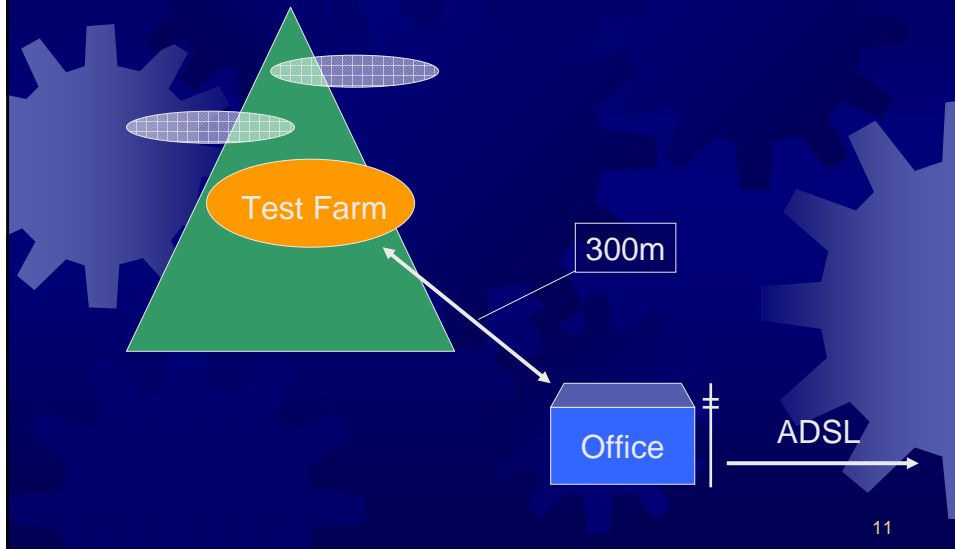


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◆ Test Farm



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◆ System Components

Monitoring

- ☀ Field Server, Field Server II
+ EC-10 : Soil moisture

Network

- ☀ Farm \leftrightarrow Office = WiFi
- ☀ Office \leftrightarrow Mie Univ., NARC = VPN

◆ System Components

Data Logging

☀ From NARC (via the VPN)

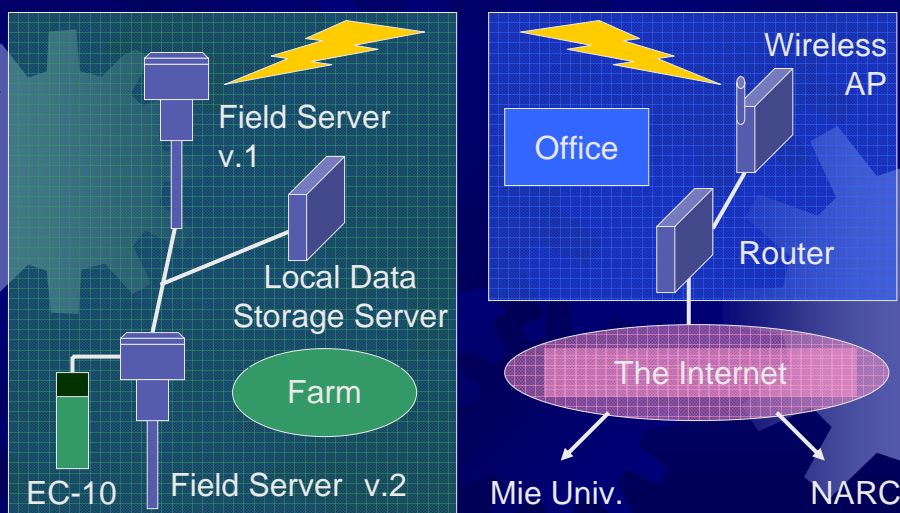
- Field Server Agent System
- Data Storage Server

☀ In Farm

- Local Data Storage Server (Linux BOX)

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◆ System Components



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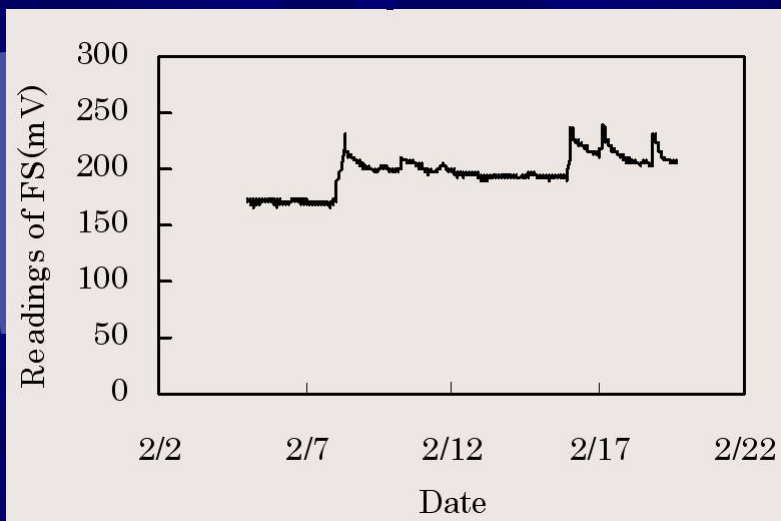


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◆ Soil Moisture



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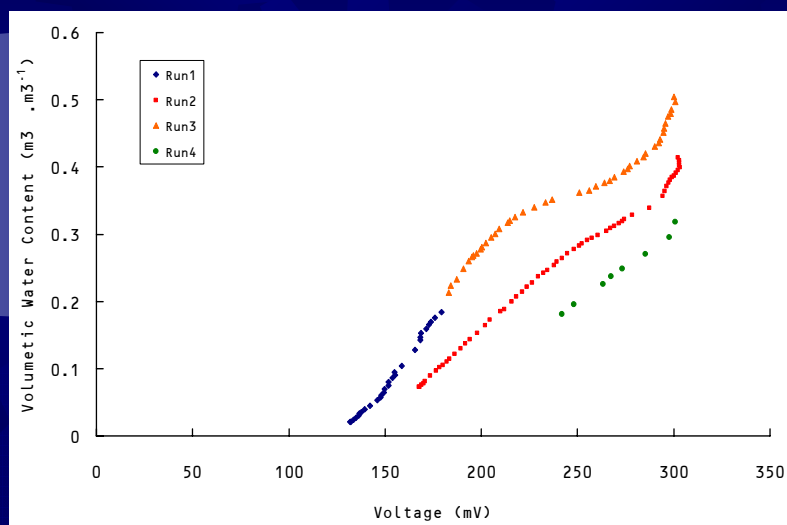
◆ Calibration for EC-10

- ☀ Output voltage of EC-10(mV)
→ Volumetric water content



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◆ Calibration for EC-10



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◆ Results

- Field monitoring system for soil moisture with Field Server and ECH₂O

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◆ To Do

- Continue calibration for EC-10
- Develop the software for control of the irrigation system by Field Server

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