SoilSCAPE Wireless Network
in-Situ Observations
at Tonzi Ranch, CA

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Site Description

• Tonzi Ranch, eastern Sacramento Valley
  – Western Savanna ecosystem: grassland, pine, oak woodland
  – Complex hydrologic behavior

• Type of site
  – Flux tower site (Ameriflux)
  – **Core validation site with capability to span 3-9-36 km coverage**
    • 150 sensor nodes, 3-4 sensors per node
    • **Unique in terms of # of nodes, flexibility in spatial sampling design, L4 product validation capability**

• Measurements provided
  – SM (5-100cm)
  – Decagon EC-5 (baseline plan)
  – Meteorological data through existing flux tower site infrastructure
Project Description and Research Focus

- Data available since at least 2001
- Idea is to set up an extended network with wireless comm, no data loggers, solar-powered, scalable
- One base station, multiple local coordinators that are commanded by the base station
- Funded through ESTO/AIST
- Prototype installed in Canton, OK; will keep as testbed
Location

- Tonzi Ranch
  - N 38°25.867’, W 120°57.970’, eastern Sacramento Valley

Topography; 50m range
Vegetation height: 0-20m
Issues

• Flux tower site exists
  – Soil moisture in-situ sensor network to be installed within next year

• Data latency:
  – near-real-time, data uploaded to web site and available for download

• Plan for GSM 0-5 cm validation for SM:
  – 2-3 profiles at each soil type in installation domain; 2-3 times annually

• Plan for scaling points to footprints
  – Network will have 150 nodes; placement designed based on modeled statistics and will cover 3-9-36 km pixels
  – two 3km cells and two 9km cells instrumented with in-situ sensors; each 36km cell is to have at least 9 points
  – Translates into 36 nodes for each of two 3km cells, and 39 nodes for each of the two 9km cells; cells arranged to fall in 36km pixel

• What do we want from SMAP?
  – Consider this architecture as baseline for future in-situ networks