Proposal for establishing an In Situ Testbed

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Why do we need a testbed?

1. Co-location and comparison of multiple in situ technologies

2. How do measurement techniques with different scales compare?

3. Investigate profile measurement comparison (how do we extend surface measurements to root zone)

4. How to different installation techniques affect measurements?
Measurement Scales

- **Long Term**
  - Satellite Scale: 100 km
  - Field Scale: 1 km
  - Vehicle: SMAP

- **Short Term**
  - Satellite Scale: 5 km
  - Field Scale: 200 m
  - Vehicle: Aircraft

- **Measurement Scale**
  - Satellite Scale: 50 cm
  - Field Scale: 5 cm
Measurement Methods-Gravimetric

**Individual**
- Gravimetric Collection
- Neutron Probes

What are the pertinent depths?
- 0-1 cm
- 0-5 cm

How do we extend the measurements through the vadose zone?
Measurement Methods-Automated

Automated
  TDRs
  FDRs: Hydras, Thetas, Echo
  Capacitance: Sentek
  GPS
  COSMOS

At what depths?

Orientations?

Replications?

Reporting increment?

Instantaneous or averaged?
Measurement Methods - Intensive Campaigns

Intensive
   Truck/Tower Mounted
   UAV
   Aircraft
   Satellite

What types of coordinated activity should there be?

How big should the test bed be?

Is it necessary to have this site embedded in a validation site?
To be Decided

Monitoring Depths and Replications
   Depths: 5, 10, 20, 50, 100 cm?

Size of Testbed?

Sampling Frequency?

Land cover type?

Multiple Sites?

Where?
Ideal Nested Testbed

- Field Scale
  - 16 Stations
- Multi-Field Scale
  - +11 Stations
- Watershed
  - +19 Stations
- Regional
  - +16 stations

= 62 sites total
Permanent, Semi-Permanent, and Temporary Sites

- **Permanent**
  - Measurement Duration: Years
  - Cost: $15K

- **Semi-Permanent**
  - Measurement Duration: Months
  - Cost: $2K

- **Temporary**
  - Measurement Duration: Months
  - Cost: $2K