

SMAPEx: Soil Moisture Active–Passive Experiment for SMAP Algorithm Development

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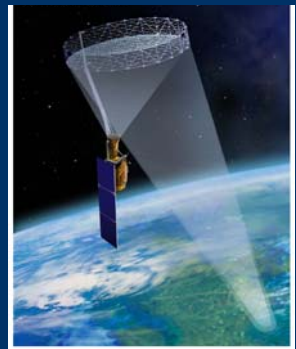


Motivation

NASA's Soil Moisture Active Passive (SMAP) mission will use noisy, high resolution (3km) active microwave observations together with more accurate, low resolution (40km) passive microwave observations to enhance the accuracy and resolution of current global soil moisture products.

Airborne and ground field data are needed to develop and test active microwave and joint active/passive microwave retrieval algorithms in preparation of SMAP launch

Fig. 1. An artist Impression of the SMAP platform



The SMAP Airborne Simulator

A low-cost, low-weight airborne facility including L-band active microwave radar, passive microwave radiometer, and ancillary sensors is available in Australia to simulate SMAP observations for SMAP algorithm development.

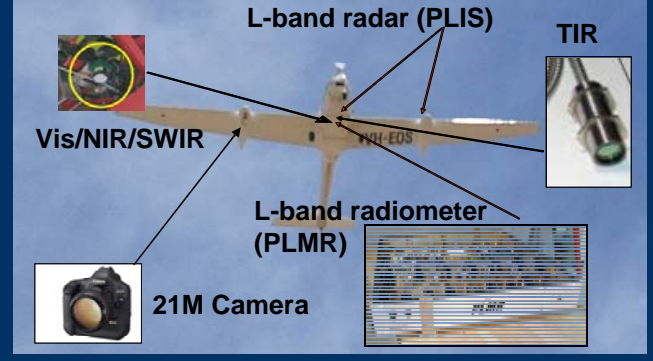


Fig. 2. The airborne facility configuration

Airborne Field Experiments

4 field experiments for SMAP algorithm development will be undertaken in 2010 (Table I) to capture seasonal soil moisture variability and crop growth

Study Area

An instrumented semi-arid agricultural area in the Murrumbidgee catchment, NSW, Australia. The area presents 6 experimental farms and a mix of irrigated crops, dryland crops and dryland pasture



Fig. 3. Location of the study area, experimental farms and monitoring stations

Monitoring Strategy

Each campaign will provide SMAP-like observations of one SMAP pixel (~36km x 36km) by aggregation of airborne observations with scaled SMAP radar/radiometer resolution ratio. Concurrent ground continuous and spatially distributed (250m) soil moisture measurements of 6 simulated SMAP radar pixels (3km) will be used for algorithm verification

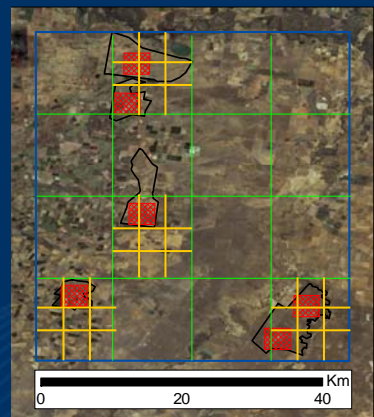


Fig. 4. Airborne monitoring strategy and simulated SMAP pixels

- Legend
- SMAP Radiometer Pixel - 36km
- SMAP Radar pixels - 3km
- SMAP joint Radiometer/radar soil moisture - 9km
- Experimental Farms
- Ground soil moisture sampling

Table I. SMAPEX Calendar

2010	
Campaign	Dates
SMAPEX-Sum10	Jan 11 - 15
SMAPEX-Aut10	Apr 5 - 10
SMAPEX-Win10	Jul 19 - 23
SMAPEX-Spr10	Oct 26 - 30

The SMAPEX site monitoring network is under consideration by NASA for SMAP cal/val activities.