SMAP Field Campaigns Discussion

Tom Jackson (USDA)

May 3-4, 2011
SMAPVEX12

• Overall field experiment plan (context)
  – ComRAD Tower System

• Aircraft options
  – CARVE/PALS
  – UAVSAR
  – Australia, Canada, and other systems
  – AirMOSS

• Site options

• When

• Basic design and logistics
SMAP Field Campaign Plans

• FY11
  – ComRAD: Tests at BARC
  – CARVE/PALS
    • Transits: Reynolds Creek on return flight
    • Alaska: Potential use of CARVE data collected
    • Oklahoma: ISST and LW (only if scan mode is operational)

• FY12
  – ComRAD: Crop growing season at BARC
  – SMAPVEX12
    • Impacts of CARVE and alternatives

• FY13
  – CanEx-FT
  – ComRAD: Available if supported
    – CARVE related campaign

• FY14
  – ComRAD: Available if supported
    – CARVE related campaign

• FY15
  – SMAPVEX15
    • Impacts of CARVE and alternatives
## SMAP Instrument Simulator Options

<table>
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<tr>
<th>System</th>
<th>Contact</th>
<th>Platform</th>
<th>Configuration</th>
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<tr>
<td>ComRAD</td>
<td>Peggy O’Neill (GSFC) / R. Lang</td>
<td>Tower</td>
<td>Active and Passive</td>
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<td>PALS</td>
<td>Steve Dinardo (JPL)</td>
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<td>PLMR/PLIS</td>
<td>Jeff Walker (Australia)</td>
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<td>UAVSAR</td>
<td>Scott Hensley (JPL)</td>
<td>Aircraft</td>
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<td>EC L-Band</td>
<td>Anne Walker (Canada)</td>
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<td>Passive</td>
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SMAPVEX12

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CARVE

- Description of program objectives
- Experiment design
  - Timeline
  - Aircraft/instrument configuration
  - Flight lines
- Potential use and availability of CARVE data to SMAP
- CARVE add-ons (Transits, flights in AK, ISST)
- PALS Scanning Status and Plan
- 2012 and 2015 conflicts
How Much Does a Field Experiment Cost (During Carve)?

- Assume all salaries are covered by other programs.
- Aircraft mapping of a 36 km by 36 km area with PALS in scan mode (6 hours @ 1K/hour=6K/day + MSC 1K/day) = 7K/day (cost is ~1K/day with no flight).
- Ground sampling 40 fields by 20 people. Per diem/person = 120/day = 2.4K/day + 10 cars @ 0.06/day = 0.6/day) Total = 3K/day.
- Aircraft integration (25K) and transit cost (50K) (Assumes this will be during CARVE/AK).
- Travel for ground team at 0.5K each = 10K
- Equipment = 10K
- Total cost for 10 flights over 20 days = 235K + contingency
  - 10*6+20*1+20*3+75+10+10=235K
- Based from Grand Junction, CO = 200K + contingency
SMAPVEX12: Site Options

- Little Washita, OK
- Walnut Gulch, AZ
- Iowa TBD (Would this be ready?)
- Little River, GA
- Kenaston, SK
- Other
Approximate Time Periods Available for SMAP

- April 27 - June 6
- June 27 - August 8
- August 21 – Feb. 15
When? Time Periods Available for SMAPVEX12

- April 27 - June 6 (Misses part of winter wheat green up)
- June 27 - August 8 (Misses early corn growth and later stages of soybeans)
- August 21 – Feb. 15
SMAPVEX12: Scheduling Example

- Swap CARVE PALS installation to SMAP PALS installation (2 – 3 days)
- Transit Fairbanks to OKC (3000 miles at 150 mph~20 hours~3 days)+1 day rest+1 day checks
- 22 – 25 day deployment at OK
- Schedule based on generic satellite overpass frequency

<table>
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<th>June 26</th>
<th>27</th>
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<th>Transit</th>
<th>Available Flight Day</th>
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- Installation
- Transit
- Available Flight Day
- Scheduled Flight Day
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SMAPVEX12

• Some basic options and considerations
  – One or more locations?
    • Spring wheat in Midwest
    • Summer crops in Midwest
    • Late summer monsoon in Arizona
    • GPM sites (Arizona, Oklahoma?, Iowa?)
  – One or more time periods?
  – Constraints imposed if we use PALS
  – Dress rehearsal?
  – Budget constraints?
FY-13 CanEx-FT

• Objectives
  – SMAP: Algorithm or rehearsal?
  – CSA: Stephane’s presentation

• Constraints/Logistics
  – FY13 (Funding and planning)
  – Canadian location
    • CSA collaboration
    • Compatible with FT product
  – Aircraft simulator
    • Considering CARVE and the fact that the FT algorithms only require radar data, the UAVSAR is the best choice
      – EC L-band Radiometer will support broader science objectives
Backup
Iowa
Grand Junction
LW
WG
Mexico
Umiujaq
Frozen-Released
March 21-April 11
UAVSAR

Winter Wheat
April 15 – May 6
PALS

Corn and Soybeans
June 20-July 11
PALS

Sparse Rangeland (Monsoon)
Sept. 1-Sept. 20
PALS

Assumes
Nov. 2014
Launch

Approximate
Cost
200K/site

SMAPVEX15 Concept A