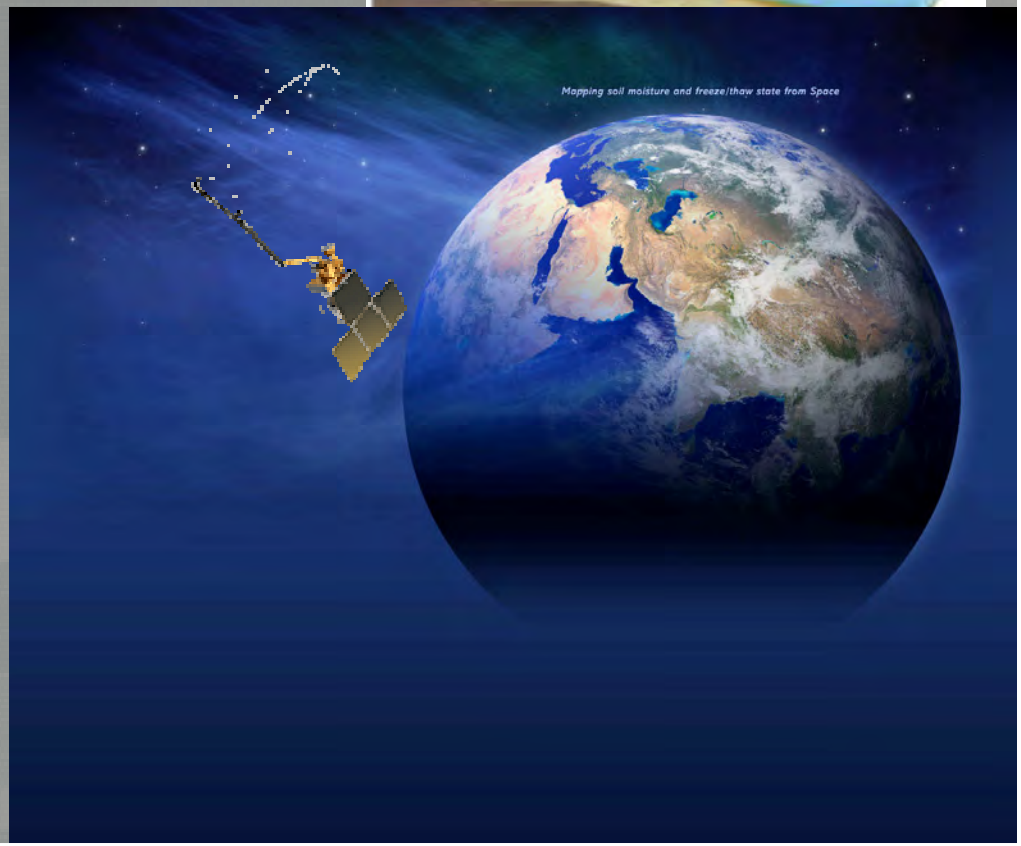
SMAP & National Defense



Dr. Robert E. Davis
US Army Engineer R&D Center

Soil Moisture Active Passive (SMAP)
Applications Workshop 9-10 SEP 2009

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National Defense Interests - Example

CENTCOM Mission Statement:

With national and international partners, U.S. Central Command promotes cooperation among nations, responds to crises, and deters or *defeats state and nonstate aggression*, and supports development and, when necessary, reconstruction in order to establish the conditions for regional security, stability, and prosperity.

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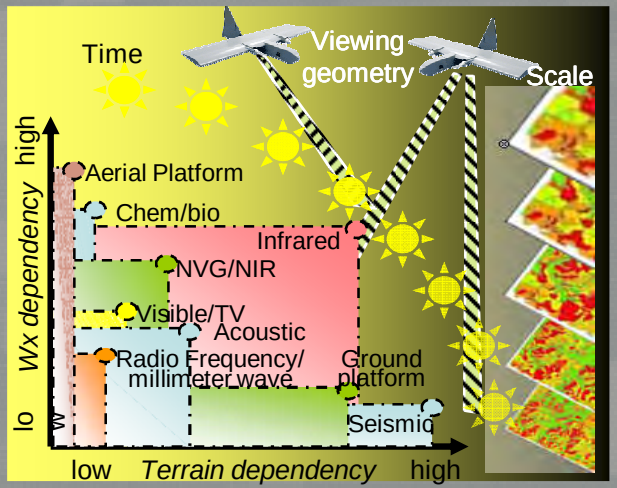
Defeat …

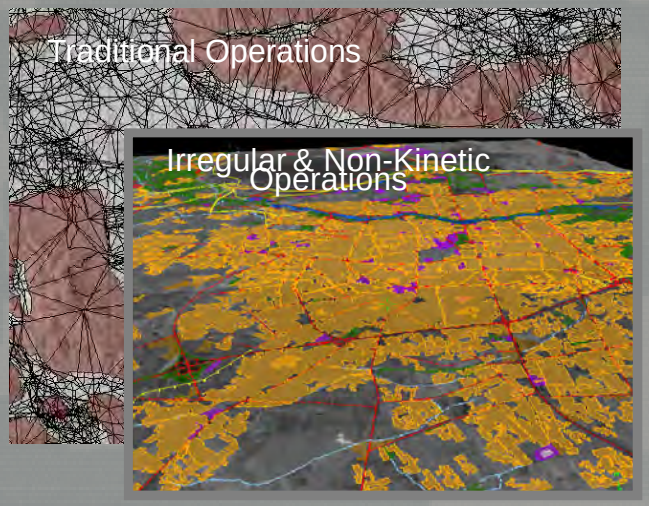
1. Cross Country Mobility
2. Weather Effects Decision Aids
3. Terrain Reasoning / Awareness
4. Opportune Landing Selections
5. Integrated air/space operations support analysis

Challenge: Mismatch between spatial and temporal scales of SMAP and mission planning / decision aids ~ 10^4 m.

Technical Preparation of Joint Operating Environment



Geo-Intelligence Preparation of Joint Operating Environment



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Civil Military Operations: Stability, Security, Transition and Reconstruction

- Cooperative security, stability operations and irregular warfare missions require a better understanding of the complex operational environment, notably through rich contextual understanding of the factors affecting regional stability.

We will assess regional stability through different dimensions, such as the lens of crises in:

water -- food -- changing climate -- energy -- economy -- demographics -- epidemics

Employ decision support tools to think through complex situations!

Example: Afghanistan

Three objectives:

- Provide security for and engage AF-PAK population
- Marginalize Insurgency
- Increase government capacity and legitimacy

A population-centric approach, enabled by a rich contextual framework, providing development that people need.

Example: Afghanistan Winter Snow Assessments

Example: Afghanistan

Snow Mapping

Operational Support:
For the past 4 winter seasons we have provided bi-weekly assessments of the snowpack to U.S. Military personnel in Iraq and Afghanistan.

Mission Relevance:

- Operation planning
- Supplies/Transport
- **Flood forecasting**
- **Water supply**

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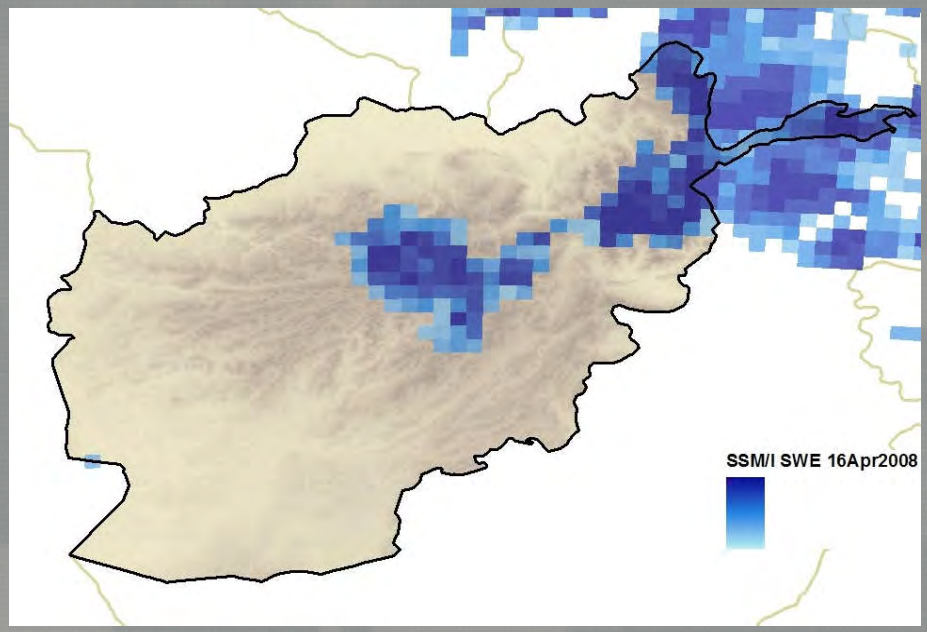
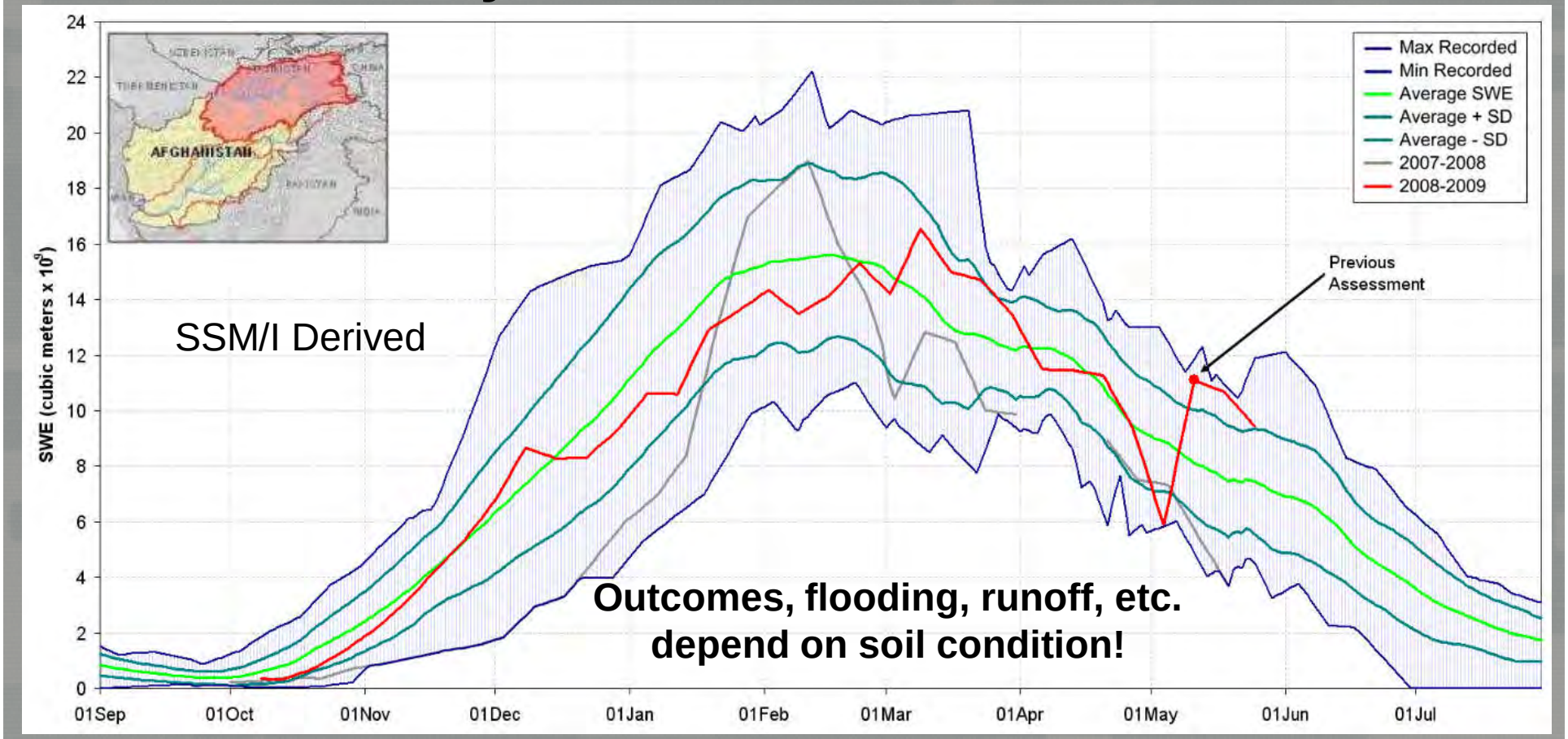
Example: Afghanistan Winter Snow Assessments

- Assessments based on:
  - AVHRR / MODIS: snow extent
  - SSM/I: spatial SWE index
  - Temporal patterns
  - Limited ground information



Example: Afghanistan Winter Snow Assessments

Amu Darya Water Volume and Outlook



Example: SSM/I Supported Snow Assessments

Quantitative Bracketing:

- **Framework:**

  past year x < this year < past year y

works with local knowledge to support decisions, as well as closer ties with population.

Quantitative Mapping:

- **Finer-scale remote sensing, modeling, ground-based observation all serve to refine the framework.**

Example: SSM/I Supported Snow Assessments

Clients

- Marine Corps Intelligence Agency
- American Embassy in Iraq
- Iraq Ministry of Water
- U.S. Central Command
- US Army - 82nd Airborne Division
- US Navy
- US Air Force
- Canadian Forces
- British Forces
- NATO
- Dept of Disaster Response
- National Geospatial-Intelligence Agency

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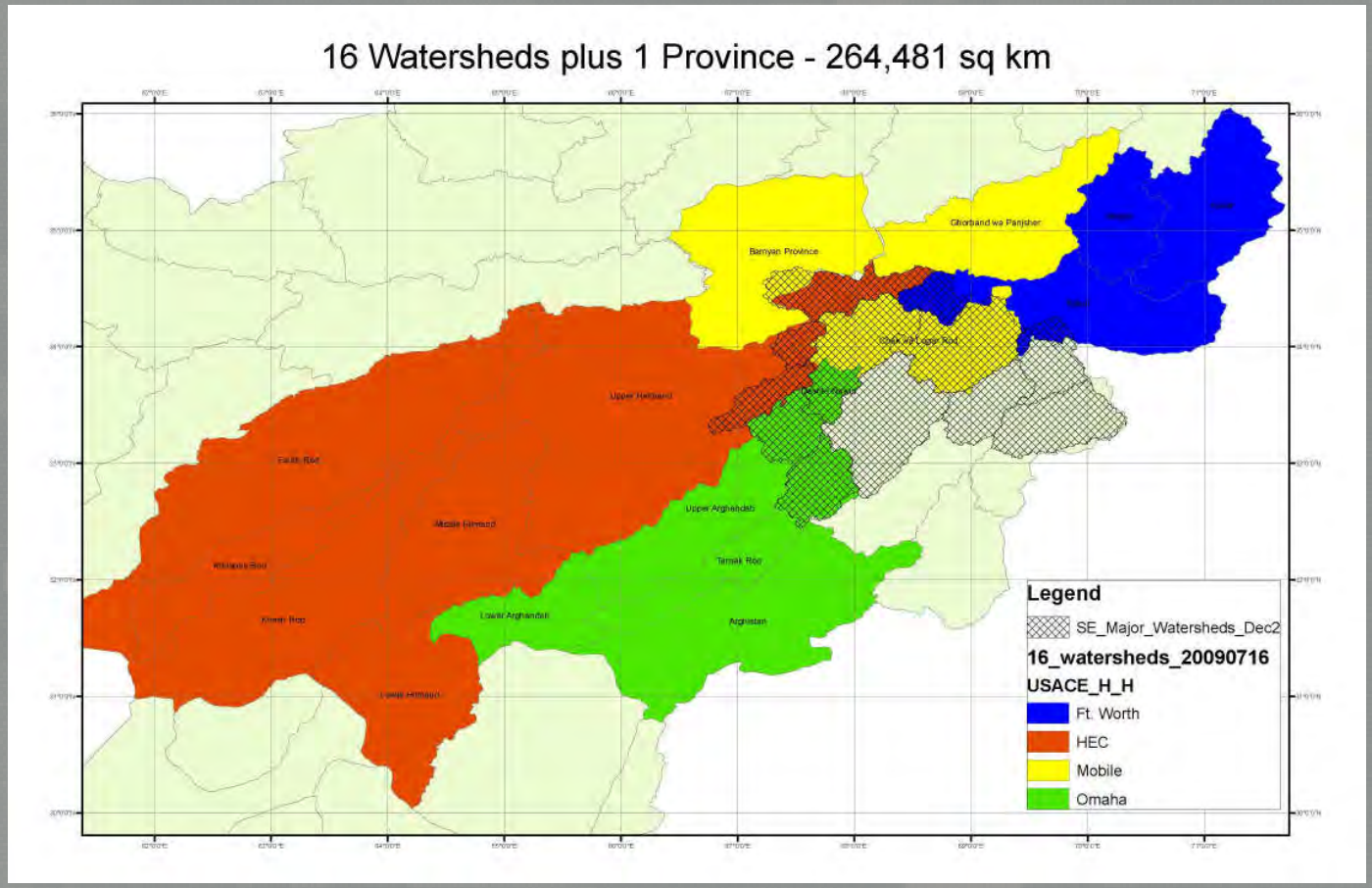
Example: Afghanistan

Water supply & drought: sustainable projects



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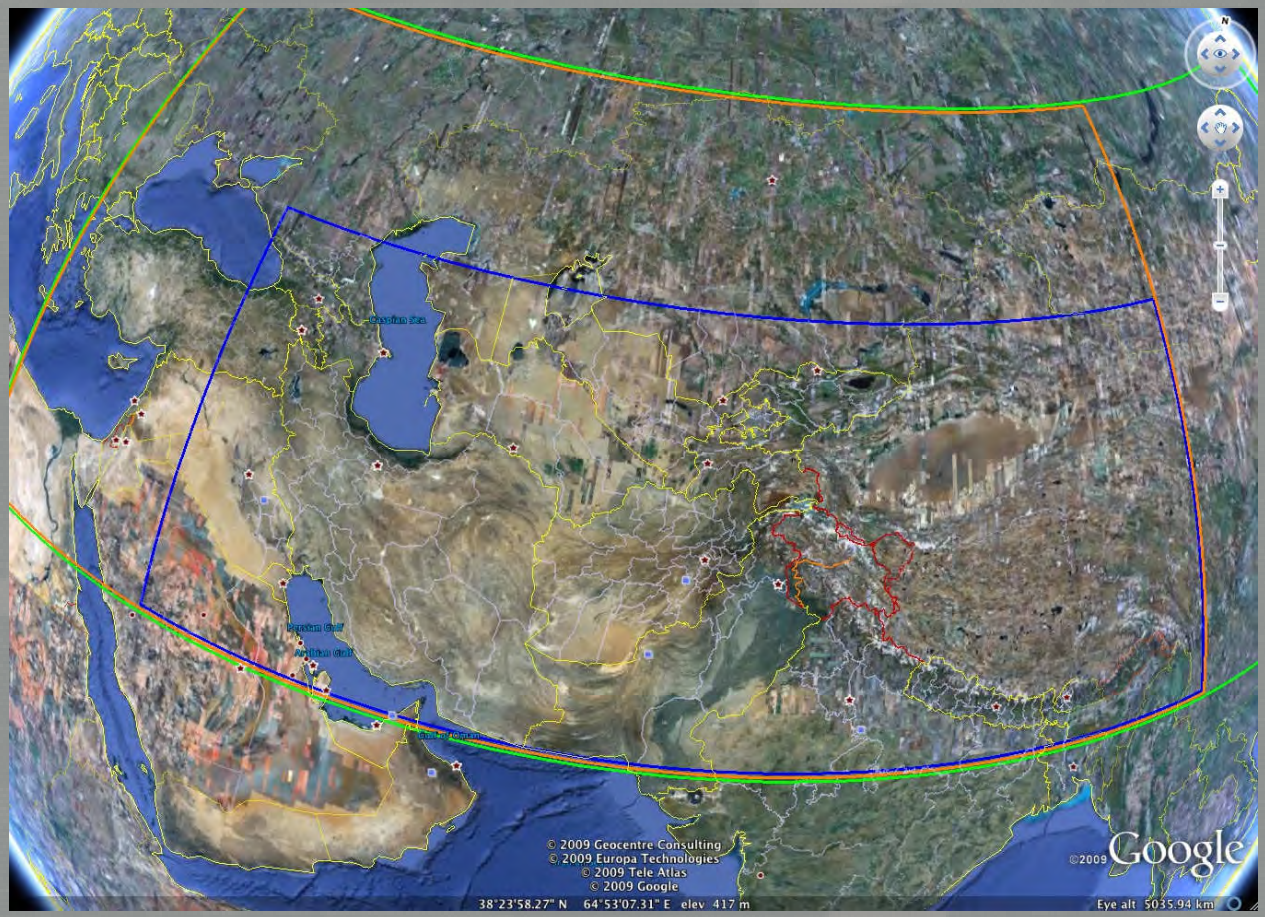
USACE currently manages an assessment to scope and prioritize (AED – end user: Provincial Reconstruction Teams)

Example: Afghanistan

Water supply & drought



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NOAA NWS has initiated a snow/soil modeling effort to support USGS/USAID drought assessment.

SMAP: National Defense

- New potential applications involve “non-traditional” considerations.
- Data would inform policy and planning of interagency effort.
- Efforts cross new ground, so long-term need unclear, right now anyway.

SMAP & National Defense Summary

- Changes to balance DoD response in national security brings opportunity to consider SMAP applications in different ways.
- Presentations today have outlined these interests.
  - Weather, Climate, Flood & Drought
  - Agriculture, Health