



Agriculture and
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Workshop Agenda

Emerging Technologies and Methods in Earth Observation for Agricultural Monitoring

Dates: February 13-15, 2018

Emerging Technologies and Methods in Earth Observation for Agricultural Monitoring is a joint workshop sponsored by Agriculture and Agri-Food Canada (AAFC), the United States Department of Agriculture (USDA), the NASA Earth Observations for Food Security & Agriculture Consortium (EOFSAC), and North American Tripartite Committee on Agricultural Statistics (NATCAS).

Venue: USDA National Agricultural Library in Beltsville Maryland (Washington, DC Metro Area)

Objective: Agricultural monitoring using Earth observations (EO) has advanced rapidly in recent years, with scientific and computational developments leading to operational implementation of activities and improvements in monitoring and forecasting at national to global scales. Federal agencies in Canada and the US have collaborated on a number of these activities to work toward solutions to common scientific and operational monitoring goals. Internationally, the GEOGLAM program has similarly focused on advancing the use of EO for operational agricultural monitoring.

The purpose of this meeting is to identify gaps and challenges for the operational user community, to share recent results from the research community relevant to operational agricultural monitoring using EO, to identify priority areas for operational R&D activities as well as those approaching readiness levels suitable for transition to operational application, and to discuss plans for future collaboration towards a strong US-Canada agricultural monitoring collaboration. The workshop will also provide input to the USDA Emerging Technologies Task Force.

The first two days will consist of presentations and targeted discussion on operational user needs and recent results, emerging technologies, and methodologies, with an emphasis on those with high readiness levels for operational application in the areas of:

Crop Land/Crop Area Mapping
Crop Phenology and Crop Stage
Crop Yield and Production
New Data Inputs and Approaches
Emerging Methods and Technologies

The third day will be programmatic meetings focused on discussing and developing plans for future collaboration toward implementing a strong US-Canada agricultural monitoring research collaboration through the Joint Experiment on Crop Assessment and Monitoring (JECAM). A separate meeting will focus on special topics for the North American Tripartite Committee on Agricultural Statistics (NATCAS).

The outcome of this meeting will be a set of priorities where shared progress can be made on advancing the use of Earth Observation towards operational activities and for research and development.



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Day 1 and 2 Topics: Current Research to Operational Priorities and Activities in AAFC and USDA and new developments in the Research Domain.

- *What priority work can be done at research level to advance this science and overcome barriers?*
- *How can US-Canada-Mexico collaboration enhance progress on these objectives?*
- *Each session will be followed up with strategic discussion on challenges and gaps in EO science and utilization for operational monitoring systems*

Day 1 – February 13, 2018

8:30 Arrival

8:45 – 10.30 Session 1. Introduction - State of the Practice

- **Objectives of the Meeting** – *Chris Justice (GEOGLAM, UMD)* – 10 minutes
- **Welcome** – *Seth Meyer (WAOB)* – 10 minutes
- **Short Overviews on current state of the practice & agency research needs** – 10 minutes each
 - **USDA NASS** – *Rick Mueller*
 - **USDA FAS** – *Bob Tetrault*
 - **AAFC (Agriculture and Agri-Food Canada)** – *Andrew Davidson*
 - **STC (Statistics Canada)**– *Frédéric Bédard*
 - **SIAP (Servicio de Información Agroalimentaria y Pesquera)** – *Guillermo Martinez*
- **USDA's contribution to Satellite Needs Working Group** - *Glenn Bethel* (10 minutes)

10:30 – 11:00 Coffee

11.00 – 12.15 Session 2. Crop Land Mapping / Crop Area Mapping – 15 minutes each

- **Crop Type Identification and Area Estimation** – *Matt Hansen (UMD, EOFSAC)*
- **Field Size Estimation** – *Lin Yan (SDSU)*
- **Fallow field identification** – *Rick Mueller (USDA) and Forrest Melton (NASA Ames)*
- **Early Season Crop Identification** – *Pierre Defourny (Louvain)*
- **Crop/Non Crop Masks** – *Dave Johnson (USDA)*

12:15-12:30 Open Discussion on Crop Land & Crop Area Mapping

12:30 – 1:30 Lunch

1:30 – 2:15 Session 3. Crop Phenology and Crop Stage - 15 minutes each

- **Quantitative Crop Condition Indicators** – *Ritvik Sahajpal (UMD)*
- **Crop Phenology** – *Mark Freidl (BU)*
- **Scaling SAR to support Ag-MRV** – *Nathan Torbick (Applied Geosolutions)*

2:15 – 3:30 Session 4. Crop Yield and Production - 15 minutes each

- **Crop Yield Monitoring at Coarse Resolution**– *Belen Franch (UMD/GSFC, EOFSAC)*
- **Crop Type and Yield Estimation Regression-based** – *Sergii Skakun (UMD/GSFC, EOFSAC)*



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- High Resolution Yield Estimation for Crop Insurance – *Shibendu Ray (Mahalanobis NCFC)*
- Yield Using Hybrid Modeling Approach – *Mutlu Ozdogan (U. Wisconsin)*
- Next Steps in Satellite Fluorescence – *Kaiyu Guan (Illinois)*

3:30-4:20 Open Discussion on Crop Phenology, Crop Yield and Production Modelling – *Bob Tetrault*

Day 2 - February 14, 2018

8:30 Arrival

8:45 – 10:00 Session 5. New Data Inputs and Approaches - 15 minutes each

- Rainfall Estimation (GPM) – *Dalia Kirschbaum (NASA GSFC)*
- Status of Satellite Soil Moisture – *Catherine Champagne (AAFC)*
- Land Data Assimilation for FEWSNET – *Amy McNally (NASA GSFC, EOFSAC)*
- Soil Moisture Data Assimilation in Process Based Models – *Wade Crow (USDA/NASA)*
- Remote sensing Inputs to crop models – *Prasad Bandaru (UMD, EOSFAC)*

10:00-10:30 Open Discussion on New Data Sets and Approaches – *Catherine Champagne (AAFC)*

10:30 – 11:00 Coffee Break

11:00 – 12:00 Session 6. Emerging Methods and Technologies - 15 minutes each

- Added-values of high spatiotemporal remote sensing data in crop yield estimation – *Feng Gao (USDA)*
- Harmonized Landsat-Sentinel 2 Data Status and Plans – *Jeff Masek (NASA GSFC)*
- Field-based data collection methods (MAGE App) – *Chris Wasko (CACI)*
- DESCARTES experience with Crop identification and Yield forecasting – *Steve Brumby (Descartes Labs)*

12:00 – 12:30 Open Discussion on Emerging Methods and Technologies – *Andrew Davidson (AAFC)*

12:30 – 1:30 Lunch

1:30 – 2:15 Session 7. Planned Missions - 15 minutes each

- NISAR – *Paul Siqueira (NISAR, U Massachusetts)*
- ECOSTRESS and Evapotranspiration – *Martha Anderson (USDA ARS)*
- Radarsat Constellation – *Heather McNairn (Agriculture Canada)*

2:15 – 3:50 Session 8. Structured Discussion, Summary and Wrap-Up – *Chris Justice, Catherine Champagne*

3:50 – 4:00 Close of Meeting – *Linda Young (USDA)*



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Day 3 – February 15, 2018

US-Canada Collaboration on Earth Observation Monitoring: Research to Operations

The purpose of this meeting is to discuss ongoing and potential activities to help improve crop monitoring using earth observation in Canada and the United States through cross site activities and collaborations. This will build on the previous two days of discussion on emerging methods and talk about concrete research plans that can improve method development and operational implementation

8:30 – 8:45 Welcome & Arrival – *Catherine Champagne (Agriculture Canada)*

8:45 – 9:00 Overview of US-Canada Collaboration on Earth Observation & Meeting Objectives

9:00 – 9:15 JECAM & Earth Observation Collaborative Priorities – *Pierre Defourny (JECAM)*

9:15 – 9:30 USDA LTAR and LTER Sites – *Teferi Tsegaye (USDA)*

9:30 – 9:45 Earth Observation at LTAR/LTER Sites – *Alisa Coffin (USDA ARS)*

9:45 – 10:00 Research to Operations in Practice – *Bob Tetrault (USDA) and Andrew Davidson (AAFC)*

10:00 – 10:20 Coffee Break

Overview of Research Sites for Earth Observation Work (each site will present a brief description of the site and current and planned projects and objectives)

10:20 – 10:35 Iowa LTAR Site – *Mike Cosh (USDA-ARS)*

10:35 – 10:50 Tifton Georgia LTAR Site – *Alisa Coffin (USDA-ARS)*

10:50 – 11:10 Michigan LTER Site – *Guanyuan Shuai (Michigan State), Anita Simic (Bowling Green U)*

11:10 – 11:20 Connecticut River Valley Site – *Tracy Whelan (University of Massachusetts)*

11:20 – 11:40 Manitoba JECAM Site – *Heather McNairn (Agriculture Canada)*

11:40 – 12:00 Ontario JECAM Site – *Catherine Champagne (Agriculture Canada)*

12:00 – 1:00 Lunch

1:00 – 1:20 Soil Moisture Active Passive Mission – *Mike Cosh (USDA-ARS)*

1:20 – 1:50 JECAM SAR Inter-comparison project

- Crop Type Mapping – *Laura Dingle Robertson (Agriculture Canada)*
- Biomass/LAI Mapping – *Medhi Hosseini & Heather McNairn (Agriculture Canada)*

1:50 – 2:20 NISAR Agricultural Cal/Val Strategy – *Paul Siqueira – (University of Massachusetts)*

2:20 – 2:40 Discussion: Strategy for NASA NISAR Product & Validation Activities

2:40 – 3:00 Coffee Break

3:00 – 3:40 Structured Discussion on Key Priorities for Research to Operations – *Heather McNairn*

3:40 – 4:00 Future Directions and Action Items – *Catherine Champagne*