SWOT APPLICATION WORKING GROUP REPORT (2017-2018)

National Aeronautics and Space Administration

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1. MISSION OF SWOT APPLICATION WORKING GROUP (SAWG)

1. To build, maintain, and grow a critical mass of early adopters and a community of scientists, stakeholder agencies and end users interested in SWOT's unique capability for driving societal applications.
2. To stay close (but not ahead) of SWOT Science Team and Project and be aware of application-critical information (science, engineering and data issues).
3. To maximize the real-world application of SWOT data for solving critical societal problems after SWOT's launch in 2021.

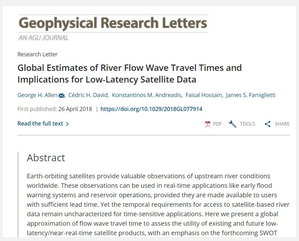
2. WHERE WAS SAWG AT LAST ST MEETING IN 2017?

SWOT APPLICATION WORKSHOP (April 5-6, 2017, Reston, Virginia)

Key issue addressed: identify and document acceptable data latency, application and support needs of SWOT data of user community.

Several wide-audience articles published on user community's needs on SWOT (BAMS, EOS, ASCE Civil Engineering, GRL(AGU) by Allen et al., 2018)

QUANTIATIVE BENEFIT OF LOW-LATENCY SWOT DATA


Geophysical Research Letters
AN AGU JOURNAL
Research Letter
Global Estimates of River Flow Wave Travel Times and Implications for Low-Latency Satellite Data
George H. Allen, Cédric H. David, Konstantinos M. Andreadis, Faisal Hossain, James S. Famiglietti
First published: 26 April 2018 | https://doi.org/10.1029/2018GL077914
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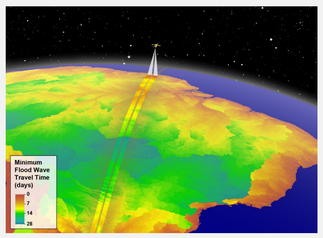
Abstract
Earth-orbiting satellites provide valuable observations of upstream river conditions worldwide. These observations can be used in real-time applications like early flood warning systems and reservoir operations, provided they are made available to users with sufficient lead time. Yet the temporal requirements for access to satellite-based river data remain uncharacterized for time-sensitive applications. Here we present a global approximation of flow wave travel time to assess the utility of existing and future low-latency/near-real-time satellite products, with an emphasis on the forthcoming SWOT

"≤2-day latency would allow a SWOT NRT product to be available before at least 63^{+6}_{-6}% and 53^{+5}_{-7}% of SWOT-observable flow waves reach the next downstream city and dam respectively."



3. KEY ACTIVITIES OF SAWG FROM 2017-PRESENT

- ❑ Prepare Early Adopter Call for Proposals and Launch Call (March 2018)
- ❑ Organize and prepare sample pre-SWOT and proxy datasets for Early Adopters
- ❑ Develop application tutorials on SWOT mission
- ❑ Organize Early Adopter Workshop
- ❑ Main theme for 2017-2018 "VISUAL BEFORE ACTUAL"
- ❑ VISUAL – FOCUS ON SWOT'S SAMPLING (orbit, repeat, coverage) rather than quantitative data on water elevations (ACTUAL)

More Information:

Hossain, F., A. Andral, and M. Srinivasan (2017), **Putting satellite maps of surface water to practical use**, *Eos, 98,*https://doi.org/10.1029/2017EO081157. Published on 19 September 2017.

Srinivasan, M., Andral, A., Dejus, M., Hossain, F., Peterson, C., Beighley, E., Pavelsky, T., Chao, Y., Doorn, B., Bronner, E., and Houpert, L., 2017: **Engaging the Applications Community of the future Surface Water and Ocean Topography (SWOT) Mission**, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-7/W3, 1497-1504, https://doi.org/10.5194/isprsarchives-XL-7-W3-1497-2015, 2015.

4. SWOT EARLY ADOPTER WORKSHOP – 26-27 May 2018

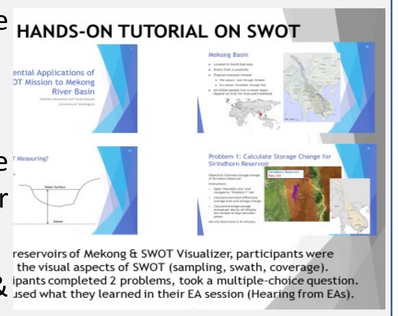
SWOT Early Adopter Workshop Venue – Boston in Northeastern University (May 29-30, 2018) and via a webinar for distance participants.

Northeastern University

48 attendees in total

GOALS OF THE WORKSHOP:

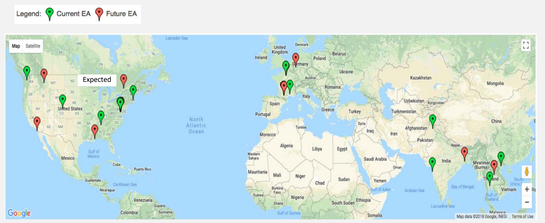
1. Engage EAs in an instructive and hands-on activity to broaden their experience with the mission and with satellite data.
2. Increase outreach and user engagement for SWOT mission.
3. Introduce the "Class of 2018 SWOT Early Adopters" to the SWOT mission, its capabilities, and remote sensing for hydrology
4. Provide hands-on experience to understand the potential & limitations of SWOT mission
5. Hear from the EAS, their planned use of SWOT data, feedback, needs etc.



reservoirs of Mekong & SWOT Visualizer, participants were the visual aspects of SWOT (sampling, swath, coverage). ipants completed 2 problems, took a multiple-choice question. sed what they learned in their EA session (Hearing from EAs).

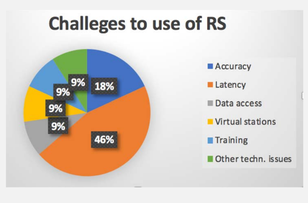
5. WHAT THE EARLY ADOPTERS SAID

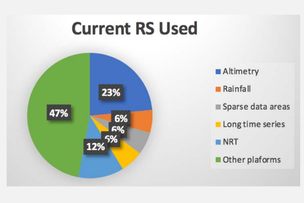
- ❑ Better **access to SWOT simulated data and timely engagement with NASA/CNES/SWOT expertise**
- ❑ Assimilation of SWOT Water Surface Elevation to **improve initialization of National Water Model** & Discharge prediction.
- ❑ Availability of SWOT Data **in GIS format** (e.g. Hydroweb Theia) with **historical data**.
- ❑ Importance of having a **short latency and a priori uncertainty**.
- ❑ Need to focus on examining **real -time urban flood forecasting** scenario with SWOT and explore **calibration of hydrodynamic models**.
- ❑ Usefulness of SWOT data in **transboundary river and reservoir monitoring**
- ❑ Improvement of current altimeter-based **virtual stream-gauging** system
- ❑ Agricultural DSS needs to be ready for ingesting SWOT data.
- ❑ Improvement of operational monitoring and forecasting of water and also hydrologic models and monitoring transboundary rivers and reservoirs.

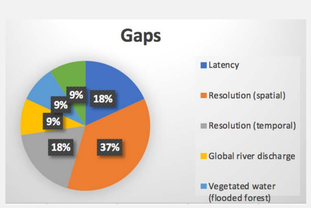


Geographic distribution of Early Adopters - current and potential

6. SURVEY RESULTS FROM EARLY ADOPTER QUESTIONNAIRES







Suggestions for Additional Support;

- Technical & financial support for R&D project in "small" companies
- Convenient data access; provide easy-to-use, free website for downloading products
- Funding for universities, pilot projects
- Research collaborative programs

7. PLANS FOR 2018-2019

1. Complete Workshop Report.
2. Disseminate key outcomes of workshop in wide-audience forums (EOS, BAMS etc.).
3. Initiate Early Adopter Program (6+ proposals received) and Provide guidance to EAs.
4. Maintain engagement and continue outreach with user community.
5. Plan and prepare for the 2019 SWOT USER WORKSHOP (Quantitative – Simulator-based)

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