

# SUMMARY OF PRE-WORKSHOP USER SURVEY FOR SWOT VIRTUAL HACKATHON-2022

[Survey Period: Sept 2021- Jan 2022]

## WHERE ARE YOU WITH YOUR SWOT EARLY ADOPTER PROJECT?

1. **NOAA/CIRES (Toby Minear):** “This project has been stalled - we would like to have simulated SWOT data for assessment but do not have bodies available to run the SWOT simulator.”
2. **USGS (Rob Dudley):** “We've only recently joined the EA program and have yet to delve into using SWOT in earnest. We are interested in getting example SWOT data for one or more of our river study sites in order that we might see how we would ingest it into our existing satellite remote-sensing river gaging workflow for USGS.”
3. **Texas Water Development Board (John Zhu/Nelun Fernando):** “Waiting for SWOT to publish Level 2 or 3 Lake products data.”
4. **IIT Bombay (Indu Jayaluxmi):** -“We are able to run CNES Large scale simulator over our study region for hydrologic modeling using HEC-RAS. We created Sentinel-1 based Inland water dynamics Mapping System to generate time series of inland water extent shapefiles. Ongoing works on ensemble Kalman based data assimilation. We are putting the pieces together in one single framework and fine tuning of outputs is the next leg of our project.”
5. **ADPC (SERVIR):** “The project is currently working in Cambodia on the evaluation of several parameters that SWOT will be provided in the flood detection(extension, water Depth).”  
  
“We are still now at the "Customizing SWOT data for internal use. We hope to show the integration of Water level and discharge by SWOT (when available) into the Virtual Stream Gaging Information System (VRSGIS). Regarding with HYDRAFloods, we are interested to develop a small case study analysis on the surface water extent and flood depth information by SWOT.”  
  
“As we have already developed the apps with existing other sensors products, we are currently at the preprocessing and integration SWOT-like data to the apps as an additional data input. And also, our apps are already operationalized in the region, as soon as original SWOT data available, it may automatically operationalize for decision making process.”
6. **CNR (Sebastian LeGrande):** “The project on the Congo River is over since 2019. We can rephrase our EA project like that : "How can SWOT provide added-value for CNR operations on the Rhone River or to CNR Engineering clients?".
7. **Vortex.io (Guillaume Valladeau):** “vorteX.io proposes a large-scale solution for SWOT CalVal activities over hydrological surfaces. This vorteX.io micro-station service is already operational

for the Sentinel-3 mission over the Garonne river in France and will be soon deployed over Europe through a CNES/ESA collaboration.”

8. **IIT Delhi (CT Dhanya):** “Hydrological modeling is currently being set up to for the study area. Setting up of the hydrodynamic model would be the next step for further data assimilation with SWOT estimated river width and water surface elevations. Further, integration with GEE for automatically feeding the river width shapefile to CNES SWOT Simulator and to develop a front end user interface is envisaged.”
9. **Mercator-Ocean (Pierre-Yves Le Traon):** “First tests to assimilate SWOT simulated data in Mercator Ocean operational models are now completed.”
10. **CLS:** “CLS is actively working on the preparation of the use of SWOT in the DUACS multi-mission system to be able to propose high resolution topography and current maps for downstream user after the Calval Phase. We are currently in an active algorithm development phase (Crosscalibration, editing, filtering, mapping, ...).”

“We haven't done much yet to see how SWOT data will be used together with other water level data with conventional altimetry. This is something we will work on in the following months. We have also a pretty clear view on how SWOT data will help in monitoring reservoir and dams.”

11. **PCRWR (Bareerah Fatima):** “We have ran the simulation for waterlogged area and now working on the extent of few selected lakes.”
12. **Stantec:** “We are currently waiting for a realistic sample of faux/synthetic SWOT data that is representative of actual ground conditions.”
13. **UniBonn:** “The recent funding of our EA project within the national project SFB1502 ([https://www.lf.uni-bonn.de/en/research/crc-detect?set\\_language=en](https://www.lf.uni-bonn.de/en/research/crc-detect?set_language=en)) is expected to improve its visibility, as a PhD position has been opened and outputs will be used in hydrology modelling. Therefore "SWOT data improves RIVER DISCHARGE for EA BONN" is possible. Moreover the SFB1502 included a SWOT cal/val on the river Rhine under the 1-day track.”

## WHAT ARE YOUR SPECIFIC NEEDS OR HURDLES THAT NEED TO BE ADDRESSED?

1. **NOAA/CIRES (Toby Minear):**
  - If someone had SWOT simulated data available in the CONUS for a large river, we might be able to use that.
  - Using simulator to test and design the prototype for the operational decision support system using SWOT data.

[Note: Both can be addressed before and during the Hackathon as they have been addressed for USGS]

**2. USGS (Rob Dudley):**

- Obtaining/generating example SWOT data for one or more of our study sites.
- Coding/scripting support to generate SWOT-like output for use in my models/tools
- Using simulator to test and design the prototype for the operational decision support system using SWOT data
- Developing a front end user interface on the web to facilitate decision making of my system that will use SWOT data
- Automating the entire chain of processing as cron jobs for enhancing or creating new decision support tools using SWOT data
- Visualization help to make it simple and easy for my agency (USGS) to make decisions using SWOT data

[Note: First issue has already been addressed. Some of the remaining issues are being addressed or can be addressed in 1 or two follow up hackathons/1-1 trainings]

**3. Texas Water Development Board (John Zhu/Nelun Fernando):**

- I appreciate your student can help to make the lake polygon shapefile for a couple more unmonitored lakes. There are about 200 major reservoirs, but only about 118 are monitored. So we must have the lake polygon shapefile for the rest 82 unmonitored reservoirs. By the last Hackathon, I think you did about 60. It would be good to have all 82 in file, so we can retrieve SWOT data for all 82 unmonitored lake data immediately after it is published. [Note: This issue has been completely resolved and TWDB is ready for the Hackathon!]
- Coding/scripting support to generate SWOT-like output for use in my models/tools

**4. IIT Bombay (Indu Jayaluxmi):**

- Cal/Val orbit based simulation taking too long processing time and generating heavy data. How do we handle this?
- Regarding reference height used as input to SWOT simulator -  
Is it possible for us to utilize multiple in-situ measurements as reference heights along a river channel represented by a single polygon? Are there any other methods for assigning reference heights to the SWOT simulator? Like methods that can incorporate bathymetric variations which is important in the case of data assimilation on high-resolution models.
- How to reduce the uncertainty in SWOT from unknown bathymetry of channels ?
- How efficient is the CNES SWOT hydrology simulator over hilly terrain (as it does not consider layover effects)?

- Need quantitative information on the data latency of SWOT (for design of data assimilation system)
- Cloud computing help to automate the processing and analysis of SWOT data in my tools/models for operational use
- PO.DAAC and other NASA DAACs and coordination with Google Earth Engine for developing of the prototype system

[Note: The last two issues have been addressed somewhat via PO.DAAC cloud hackathon that IITB participated in. All other issues are addressable before and during the hackathon with CNES support – Damien Desroches]

5. **ADPC:**

- We would like emphasize the importance of developing an approach for validation of SWOT-like water extents and elevation data products with in-situ or existing other sensors/models products.
- Need to understand chain of processes/analysis from SWOT data to output in agency environment
- Using simulator to test and design the prototype for the operational decision support system using SWOT data
- Developing a front end user interface on the web to facilitate decision making of my system that will use SWOT data
- Automating the entire chain of processing as cron jobs for enhancing or creating new decision support tools using SWOT data
- Visualization help to make it simple and easy for my agency to make decisions using SWOT data

6. **CNR (Sebastian LeGrande):**

- Coding/scripting support to generate SWOT-like output for use in my models/tools
- Learning types of products that will be available when SWOT will be launched.
- Learning from other EA projects participating at the Hackathon.

[Note: All the above can be addressed as they are already organized thematically on the SWOT Applications website. Just need to point them and walk through them with CNR if needed]

7. **Vortex.io (Guillaume Valladeau):**

- Developing a front end user interface on the web to facilitate decision making of my system that will use SWOT data.
- Visualization help to make it simple and easy for my agency to make decisions using SWOT data
- Cloud computing help to automate the processing and analysis of SWOT data in my tools/models for operational use
- PO.DAAC and other NASA DAACs and coordination with Google Earth Engine for developing of the prototype system

**8. IIT Delhi (CT Dhanya):**

- We expect that the challenge would be to automatize the system with data from GEE, SWOT simulator and hydrodynamic models, while scaling up the model temporally and spatially. Currently, our GEE scripts, SWOT Simulator and hydrodynamic models are run separately and manually. Further, development of a front end user interface for easy use of the package by utilizing agencies would require experts who can provide coding support.
- Coding/scripting support to generate SWOT-like output for use in my models/tools
- Using simulator to test and design the prototype for the operational decision support system using SWOT data.
- Developing a front end user interface on the web to facilitate decision making of my system that will use SWOT data.
- Automating the entire chain of processing as cron jobs for enhancing or creating new decision support tools using SWOT data.

**9. Mercator-Ocean (Pierre-Yves Le Traon):**

- Simulate how to reduce SWOT errors over the ocean thanks to advanced intercalibration processing methods (beyond the crossover minimization)
- Coding/scripting support to generate SWOT-like output for use in my models/tools
- Using simulator to test and design the prototype for the operational decision support system using SWOT data.

**10. CLS:**

- Cloud Computing
- Using simulator to test and design the prototype for the operational decision support system using SWOT data

**11. PCRWR (Bareerah Fatima):**

- We want to understand which form of data we will get from SWOT.
- We need training for our team in the following: code debugging, training on modelling, model calibration, automating the chain processes and analysis, front end for decision making, analysis from SWOT data output to agency environment.

**12. Stantec:**

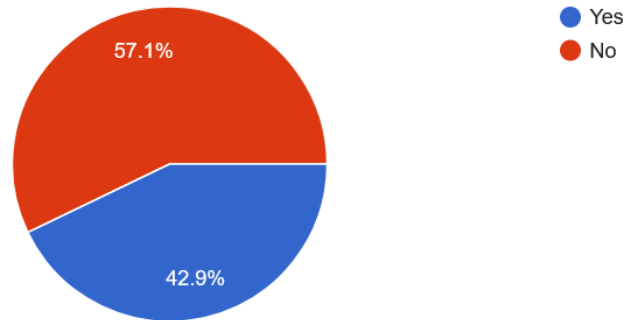
- We currently are unable to generate realistic SWOT hydrology data without resorting to creating a hydrology model.
- Need to learn the format and schema of SWOT data.

**13. UniBonn:**

- Training on modelling and model calibration; automating processing/analysis from SWOT data. Discussion of error simulation would be of interest.

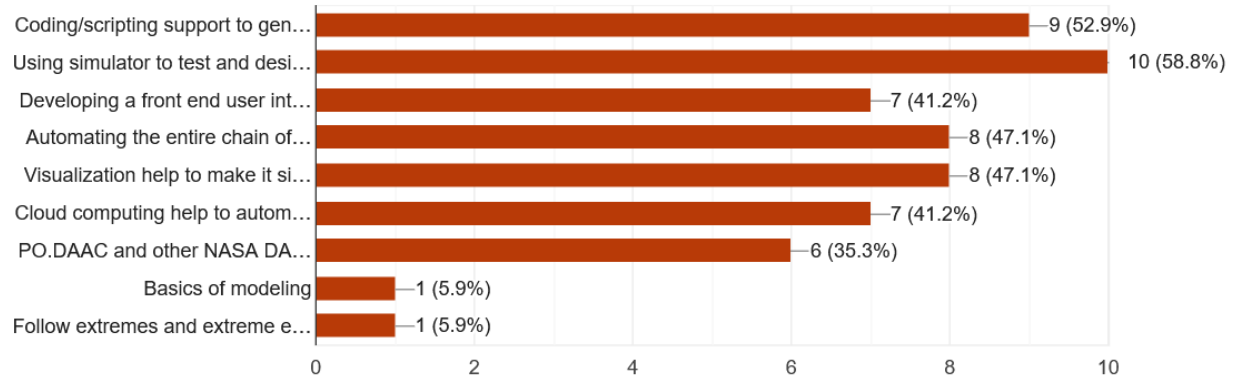
6. If you have used the SWOT Simulator (CNES Large-scale Hydrology; CNES Ocean or JPL SLC simulator), would you like further training on it?

14 responses



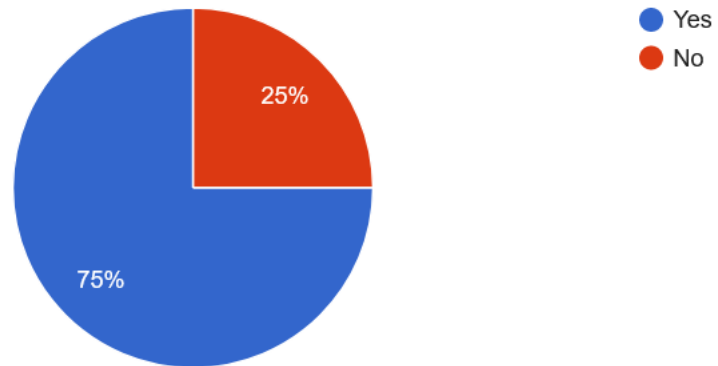
10. With barely a year left for SWOT launch, the goal of this hackathon is to help advance those EAs (who have made significant progress already) to the finish line. This finish line is a 'success story' that results in actual use of SWOT data in a routine manner to improve existing decision making or create opportunities for new ones. As a program, our singular aim is to create as many headlines in 2023-2024 as possible that read along the lines of "Agency Y improves X in region Z using SWOT data for ...." (eg SWOT L2 lake data helps improve summertime water supply forecasting and reduces cost of management for Texans). So with that in mind, we have come up with a list items that your agency may need. The list is not exhaustive. Please tick all that apply and/or use 'Other' to add what we did not cover below. This will help us prepare specific tools your agency will need to get to the finish line after SWOT launch.

17 responses



16. Do you have familiarity with linux system and shell/python scripting?

16 responses



17. Do you have GIS familiarity (ArcGIS or QGIS)?

16 responses

