

An upgrade to SatCam iPhone Application to Support Community Participation

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Contact: Steven A Ackerman

SSEC has previously developed an iOS application named SatCam which allows users to capture sky and ground observations coordinated with the overpass of the NASA Terra, Aqua, and Suomi-NPP satellites. SatCam allows users to acquire images of sky conditions and ground conditions at their location anywhere in the world using the built-in iPhone, iPad or iPod Touch camera. The application tags the images with metadata including date, time, and geographic location, and then uploads the images to a central server. The server delivers the satellite imagery centered at the user's location back to the SatCam application as soon as the satellite data are available.

One of the SatCam App goals is to stimulate interest in science and technology by increasing participation of citizen scientists in the validation of a NASA satellite cloud detection algorithm. To achieve this goal, the application enables community participation in coordinated satellite and ground observations for the purpose of

- engaging the public in an active NASA research program where they can take part in an ongoing calibration/validation effort for cloud products derived from the Terra, Aqua, and Suomi-NPP satellites,
- providing a community-driven source of validation data for Terra, Aqua, and Suomi-NPP cloud products,
- increasing public awareness and appreciation of NASA earth satellite programs.

Under this grant, we sought to improve user interaction and enable users to share their observations and assessments of satellite cloud products in a collaborative environment. This was in support to the S'COOL program. The following modifications were made to SatCam to make it more usable to the S'COOL community.

- 1) We modified the original options for cloud cover estimation by the observer to better align the observations of cloud coverage needed with the S'COOL protocol is a suitable option: Clear (0-10%), Isolated (10-25%), Scattered (25-50%), Broken (50-90%) and Overcast (90-100%). This better aligns with the National Weather Service methods.
- 2) Included a 'Coast' scene to observer options of surface type (important for cloud mask validation).
- 3) In addition to the new sky category, we made an option for the user to select alert lead times of 5 and 2 minutes for satellite overpass (previously was only 10 minutes)
- 4) We included clearer instructions for taking pictures
- 5) A public web page was developed to improve access to observations. <http://satcam-test.ssec.wisc.edu/beta/records.html>

- 6) Modifications, current and planned, required web API changes as well. Code modifications included requiring the deletion of records and deployment to the operational server. Modified the code to provide the processing system with the 'sky_picture_time' field rather than the 'time' field, where 'time' was the time it was added to the direct broadcast.
- 7) Observations are synced with the server so that all of your old observations will be downloaded to your device when you sign in, so they are not lost when switch to a new device.
- 8) Moved the web backend for SatCam (e.g., the pass predictions, observation database) from a local to a SSEC web server managed by the technical computing group, making it more stable.
- 9) These changes were made keeping in mind our goal to adapt from the iPhone version of SatCam to other smart phones.
- 10) The updated SatCam app is available at <http://satcam.ssec.wisc.edu/dev/>. Official release will be done by Apple (search for SatCam in the App library)

Based on this project, a few other activities were identified and will be undertaken this year, though not funded directly by this project, and made available to the user community.

- 1) We will add an option to retrieve the day-night band for the Suomi NPP VIIRS instrument. While the user will not have to take a picture with the camera, they can download the data.
- 2) We plan to use SatCam observations to validate the MODIS cloud mask. Discussion with Dr. Chambers alerted us to her S'COOL on-line data base. We have downloaded some of that data and are exploring use of this data for validation of MODIS cloud mask.



Figure 1 An example image taken from an iPad while in Italy.