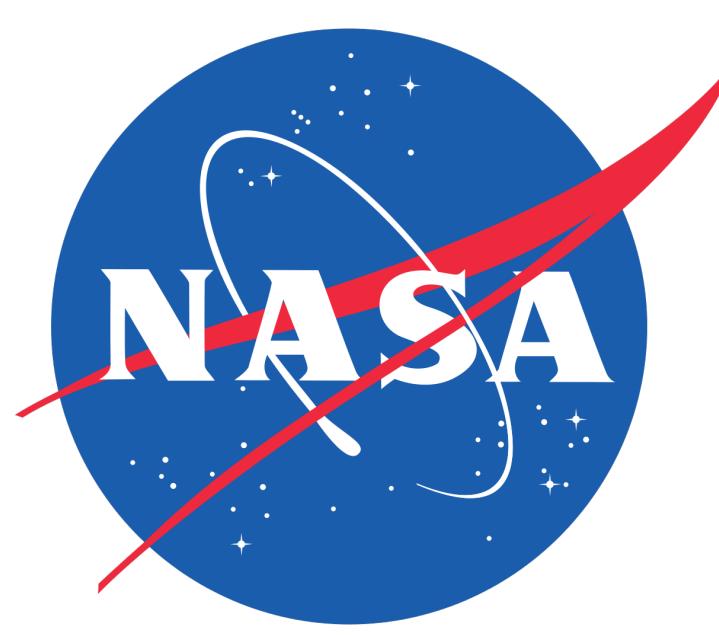




PSEUDO INVARIANT AND COASTAL TARGET FEASIBILITY

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OVERVIEW

Systems Tool Kit (STK), which is used for the simulation and analyses of our satellite in order to evaluate the performance of the satellite in simulated time, will also provide a certain measure of feasibility for various targets. The desired targets include pseudo invariant targets, which are vital to the calibration of the satellite, and coastal targets such as Sapelo Island, which are vital to completing the mission.

PSEUDO INVARIANT TARGETS

Pseudo Invariant Targets are required for the calibration of SPOC. They provide a means of verifying sensor performance. All of the sites tested are Radiometric Sites. A good site for calibration is one with high spatial uniformity and high surface reflectivity. The site should also be temporally invariant. The site should be arid, so that clouds and precipitation will not pose a problem. Six were chosen to test.



Figure 5: Libya 4 Radiometric Site

Pseudo Invariant Targets in which the feasibility was tested:

- Libya 1(24.42 N, 13.35 W)
- Libya 4 (28.55 N, 23.39 E)
- Mauritania 1 (19.40 N, 9.30 W)
- Mauritania 2 (20.85 N, 8.78 W)
- Algeria 3 (30.32 N, 7.66 E)
- Algeria 5 (31.02 N, 2.23 W)

REFERENCES

- [1]Adams, Arogeti, Ilango. (January 2018) SPOC Experiment Plan, v1. UGA Small Satellite Research Laboratory
[2] "Radiometric Sites." Remote Sensing Technologies , USGS, 8 Jan. 2013.

WHAT IS SPOC?

Spectral Ocean Color Satellite (SPOC) is an adjustable multispectral imager that will image the Earth from Low Earth Orbit (LEO). It will monitor coastal wetlands status, estuarine water quality (wetland biophysical characteristics and phytoplankton dynamics), and near-coastal ocean productivity. SPOC will quantify vegetation health, primary and ocean productivity, suspended sediments, and organic matter in coastal regions.

COASTAL TARGETS

The SPOC mission will return several multispectral data products, using its SPOCEye payload system, related to oceanic productivity at various target sites in order to study large-scale changes over time. Many of these targets will be on the East Coast of the United States. Below is a list of East Coast Targets* whose feasibility was studied.

- Sapelo Island*
- Skidaway Island*
- Grand Bay NERR
- Bayou Sauvage National Wildlife Reserve
- Cumberland Island*
- Jekyll Island*
- St. Catharines Island
- Ossabaw Island*
- Wassaw Island*
- St. Simons Island*

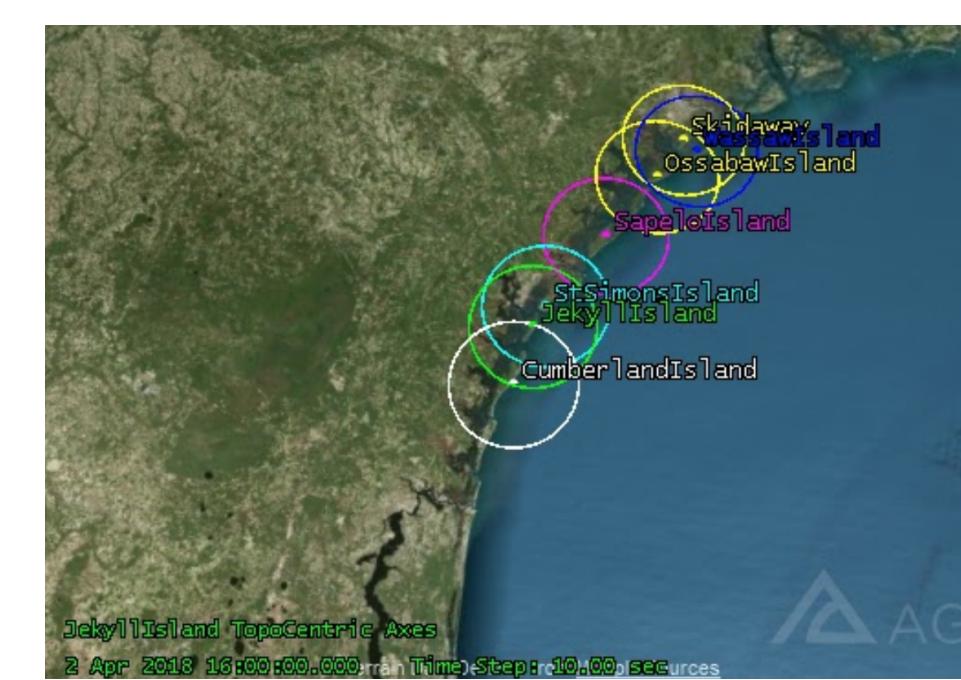


Figure 6: East Coast Targets

FUTURE RESEARCH

- Refining current target lists; both Pseudo Invariant and Coastal targets.
- Creating an operation schedule. This schedule is dependent on knowing when SPOC will pass over the intended targets and having the satellite take images.
- Incorporate the fine sun sensor into the simulation.

PSEUDO INVARIANT TARGETS RESULTS



Figure 1: SPOC in orbit

The simulation to test the feasibility ran for a simulated time of a year. To ensure that the pass times occurred in daylight, there was a Sun-Ground Elevation Angle constraint put on SPOC from -60 degrees to 60 Degrees. Using the Access tool, access times, within the constraint, of the satellite to each Radiometric Site were found.

All six sites had about 2000 access times over the course of a year. Algeria 5 had the most (2244) and Mauritania 1 had the least (1930). There was a total of 12,572 passes, and the average pass time across all six sites was 862.6 seconds, or about 14 minutes and 23 seconds. Solely based on pass times, each of these Radiometric Sites could feasibly be used to calibrate the satellite.

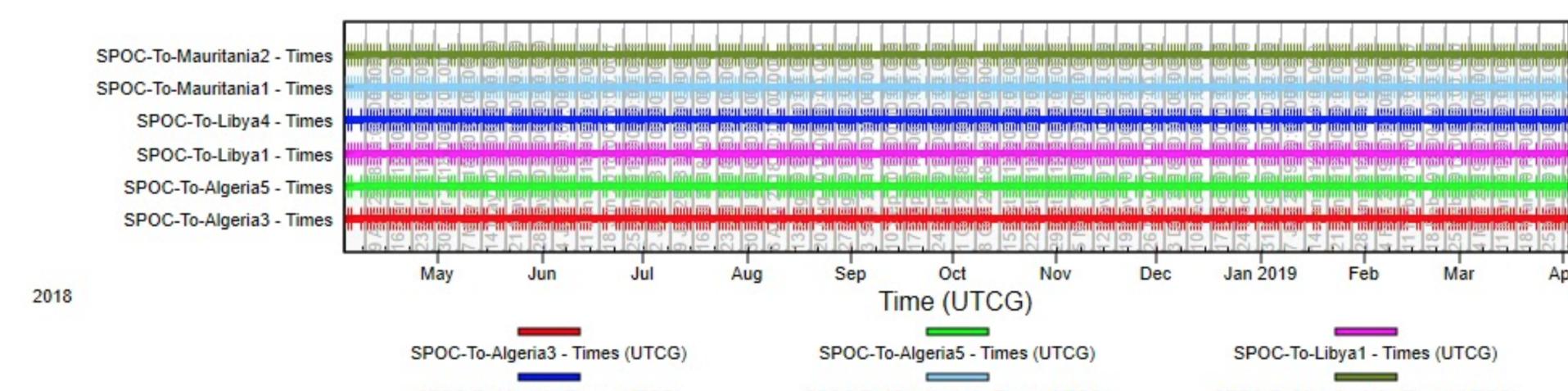


Figure 2: Access times for the Pseudo Invariant Targets

