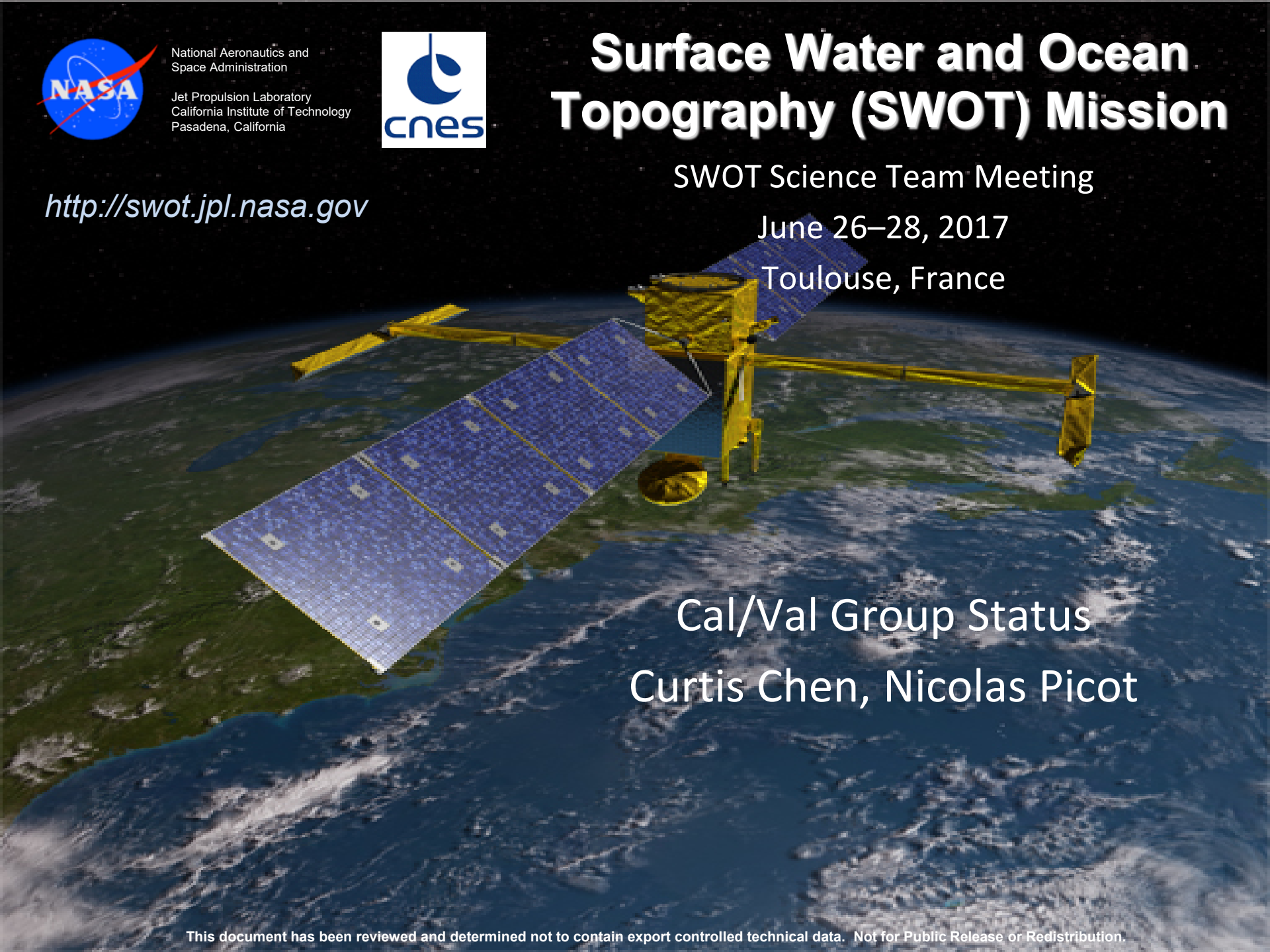


National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

# Surface Water and Ocean Topography (SWOT) Mission

SWOT Science Team Meeting

June 26–28, 2017

Toulouse, France

http://swot.jpl.nasa.gov

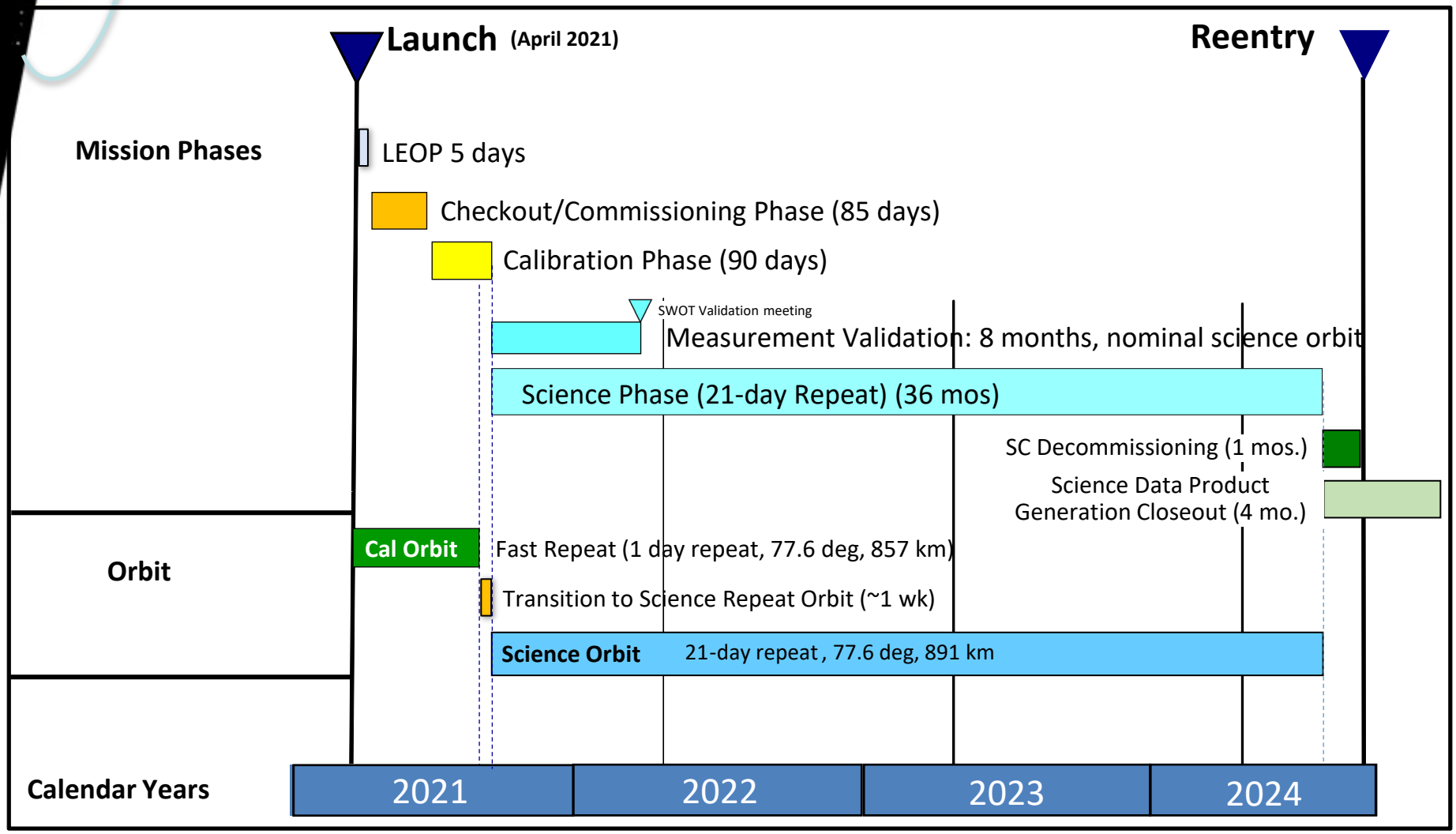
## Cal/Val Group Status

Curtis Chen, Nicolas Picot

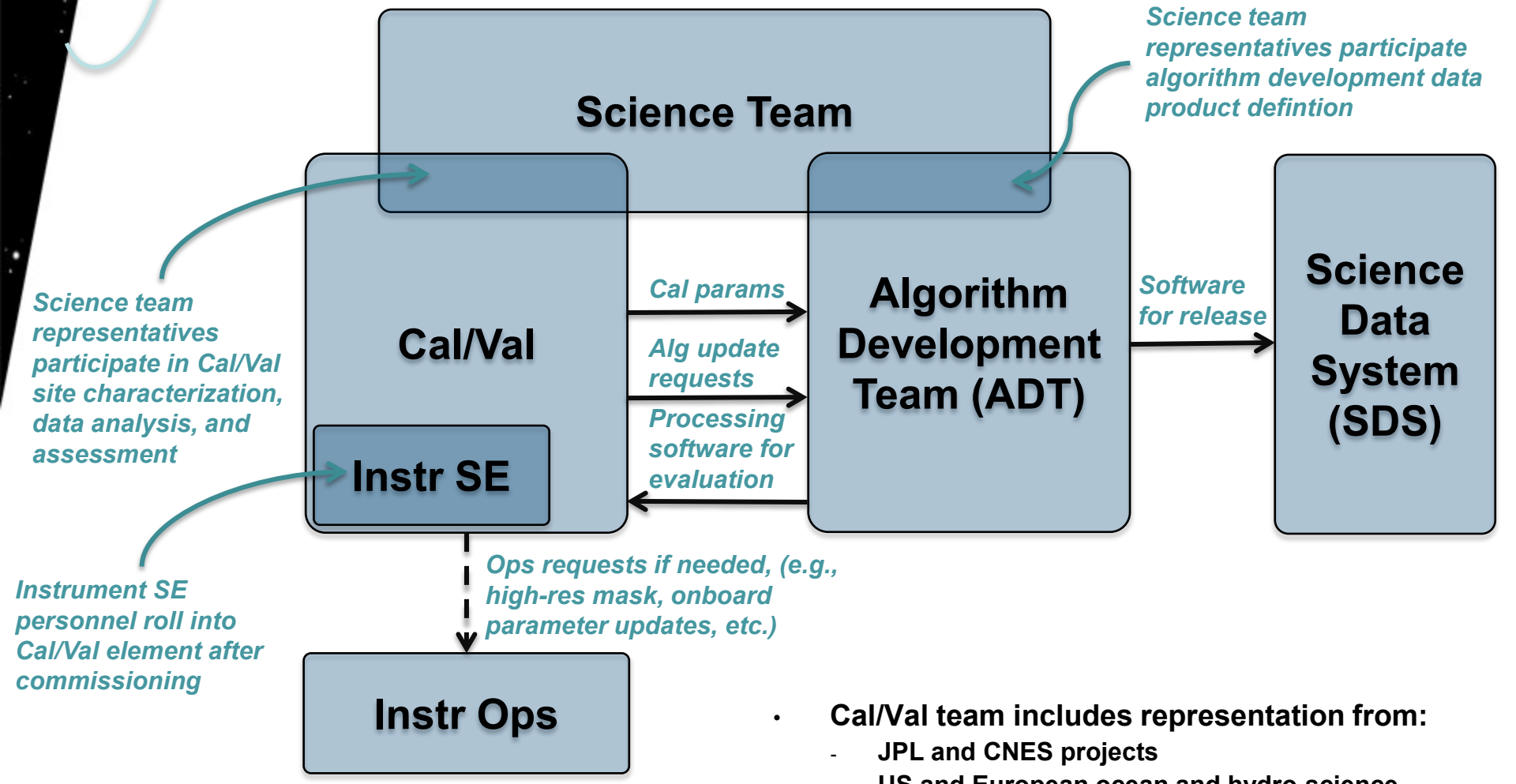
# Cal/Val Overview

- Basic objectives of Cal/Val:
  - Estimate calibration parameters for ground processing based on flight data
  - Validate measurement performance: Does system behave as expected, and if not, what can/should we do?
  - Validate measurement with respect to high-level requirements: Does performance meet mission success criteria?
- Major activities of Cal/Val team:
  - Collect truth data at identified Cal/Val sites for comparison with SWOT measurements
  - Compare SWOT measurements to external truth data
  - Compare SWOT measurement characteristics to models and simulations
  - Resolve anomalies
  - Plan and coordinate above efforts with other entities/organizations

# Mission Phases/Timeline



# Team Organization in Cal/Val Phase

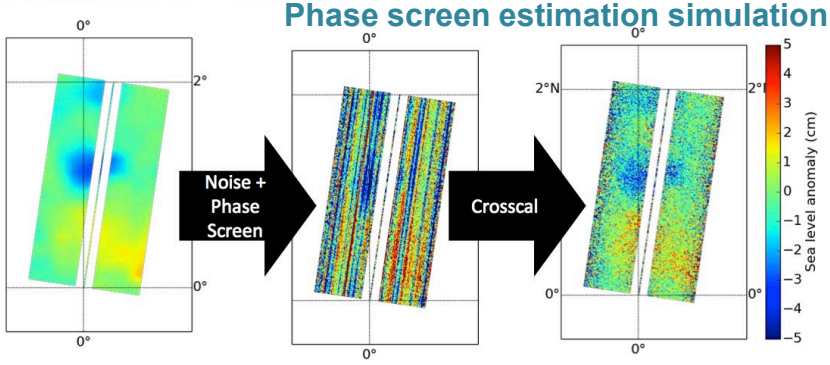




- **Cal/Val team includes representation from:**
  - **JPL and CNES projects**
  - **US and European ocean and hydro science**
  - **External government agencies**

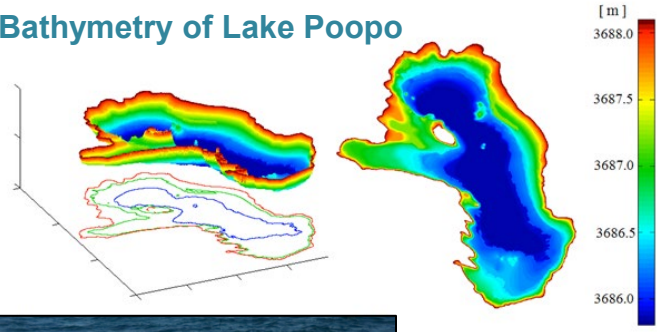
# Cal/Val High-Level Status

- Most of Cal/Val plan is at level of maturity appropriate for current phase project:
  - Have identified key calibration parameters and approaches for estimating them
  - Have identified validation approaches for both key error budget terms and science products for both ocean and surface water measurements
  - Have identified specific Cal/Val sites and instrumentation per site consistent with above calibration and validation approaches
    - Have established baseline sets of Cal/Val sites (by name) for US and French Phase CDE planning
    - Potential "value-added" sites from external partners/contributors have also been identified
  - Cal/Val plan is documented in JPL D-75724 (initial release expected before Project CDR)
- Many Cal/Val aspects have high heritage from Jason series (e.g., nadir altimeter, POD, AMR); focus of Phase A work has been SWOT-unique aspects (e.g., phase screen, ocean submesoscale validation, water mask, layover, discharge, etc.)
- **Ocean Cal/Val at 15–100 km wavelengths remains key open issue (see below)**

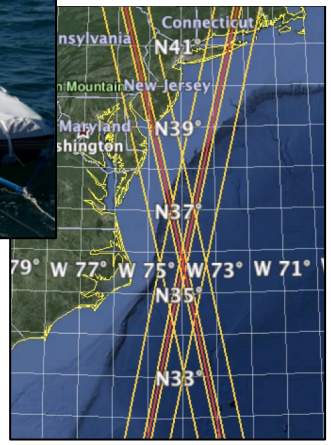
Phase screen estimation simulation




Bathymetry of Lake Poopo




GPS float system




Gulf Stream Cal/Val site


# Ocean Cal/Val Status

- AirSWOT had been planned as primary ocean Cal/Val asset for wavelengths shorter than 100 km
- Resolution of AirSWOT issues (reviewed Oct 2016):
  - Root cause of “spectral hump” is understood
    - Issue is due to interaction between ocean waves and height measurement
    - Effect on SWOT can be absorbed
  - AirSWOT is not suitable for ocean Cal/Val and no longer planned
  - AirSWOT is still planned for hydro Cal/Val (no similar wave effects for hydro)
- Alternatives to AirSWOT are being considered (not mutually exclusive) and are major focus of Thursday ocean Cal/Val meeting:
  - Airborne lidar
  - in situ approaches
- Other Cal/Val approaches (global statistical approaches) will complement these, especially at longer wavelengths
- Nadir altimeter Cal/Val has high heritage from Jason series

# Hydrology Cal/Val Status

- List of Tier 1 hydro Cal/Val sites has been defined
  - List of Tier 2 sites is in development
  - Site instrumentation plans/standards are being refined
- Pre-launch field campaigns will answer key questions for relating field data to SWOT data
  - Summer 2017 field work (Prairie Potholes) has begun
  - Includes AirSWOT flights (in conjunction with ABoVE work)
- Post-launch data from Cal/Val sites will provide validation data over variety of hydro target types
  - Details of validation methods are in work
  - AirSWOT is planned for hydro Cal/Val

- Hydrology Cal/Val discussion is on meeting agenda for Tuesday morning hydro splinter session (in addition to Thursday hydro Cal/Val meeting)

# Cal/Val Meetings

- Cal/Val meetings for ocean and hydro groups will occur in parallel on Thursday (see agenda)