

National Aeronautics and  
Space Administration

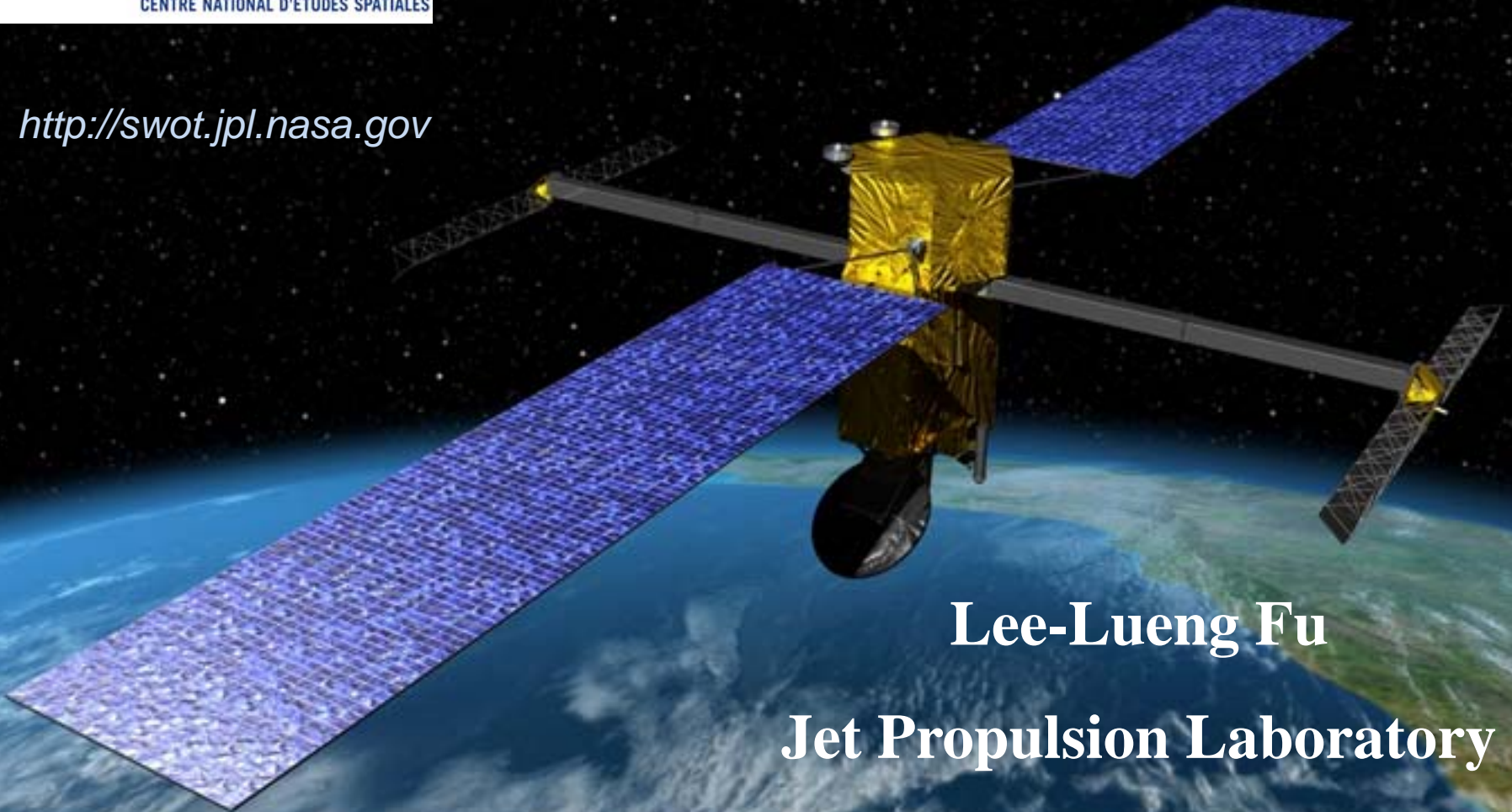
Jet Propulsion Laboratory  
California Institute of Technology  
Pasadena, California

# Surface Water and Ocean Topography (SWOT) Mission

Mission Overview



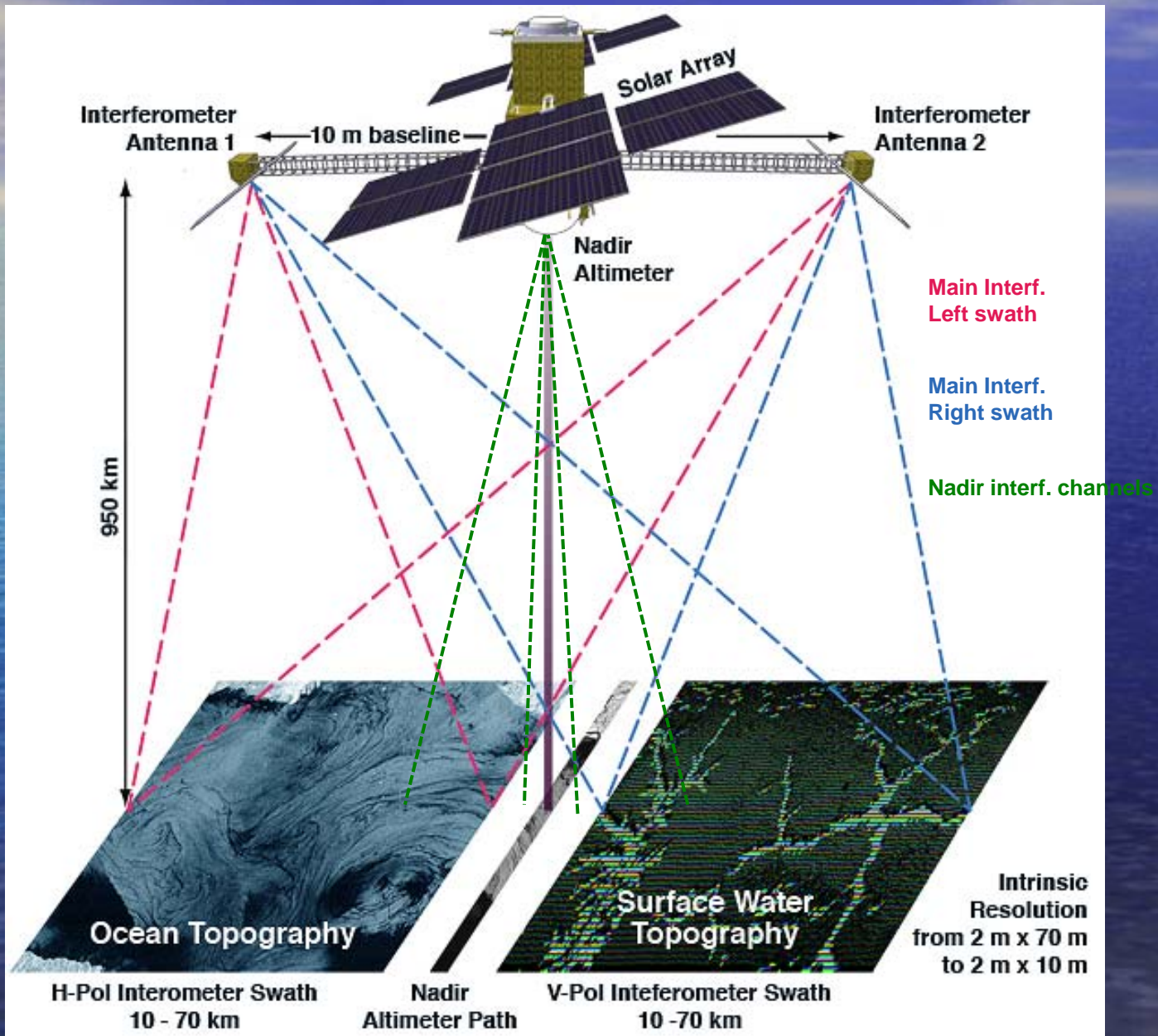
<http://swot.jpl.nasa.gov>



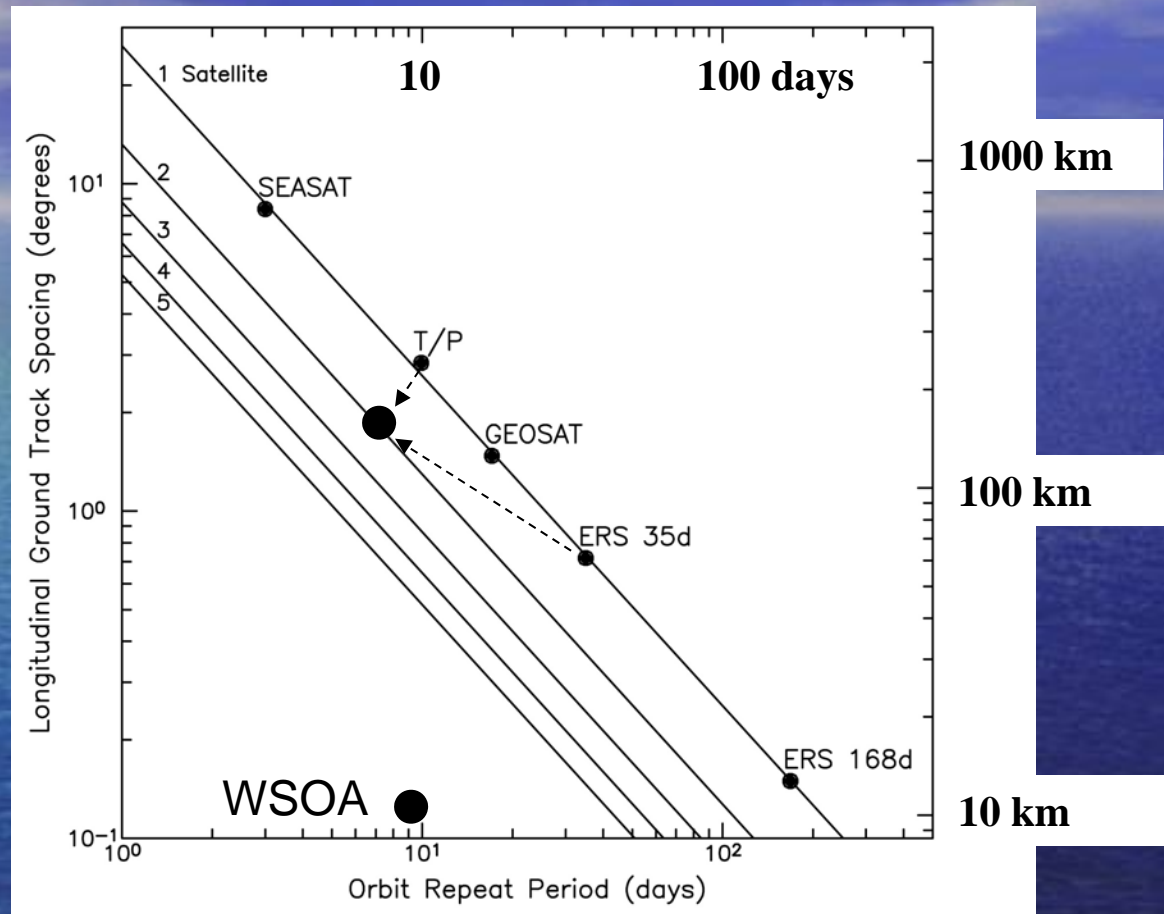
Lee-Lueng Fu

Jet Propulsion Laboratory

# Measurement Configuration



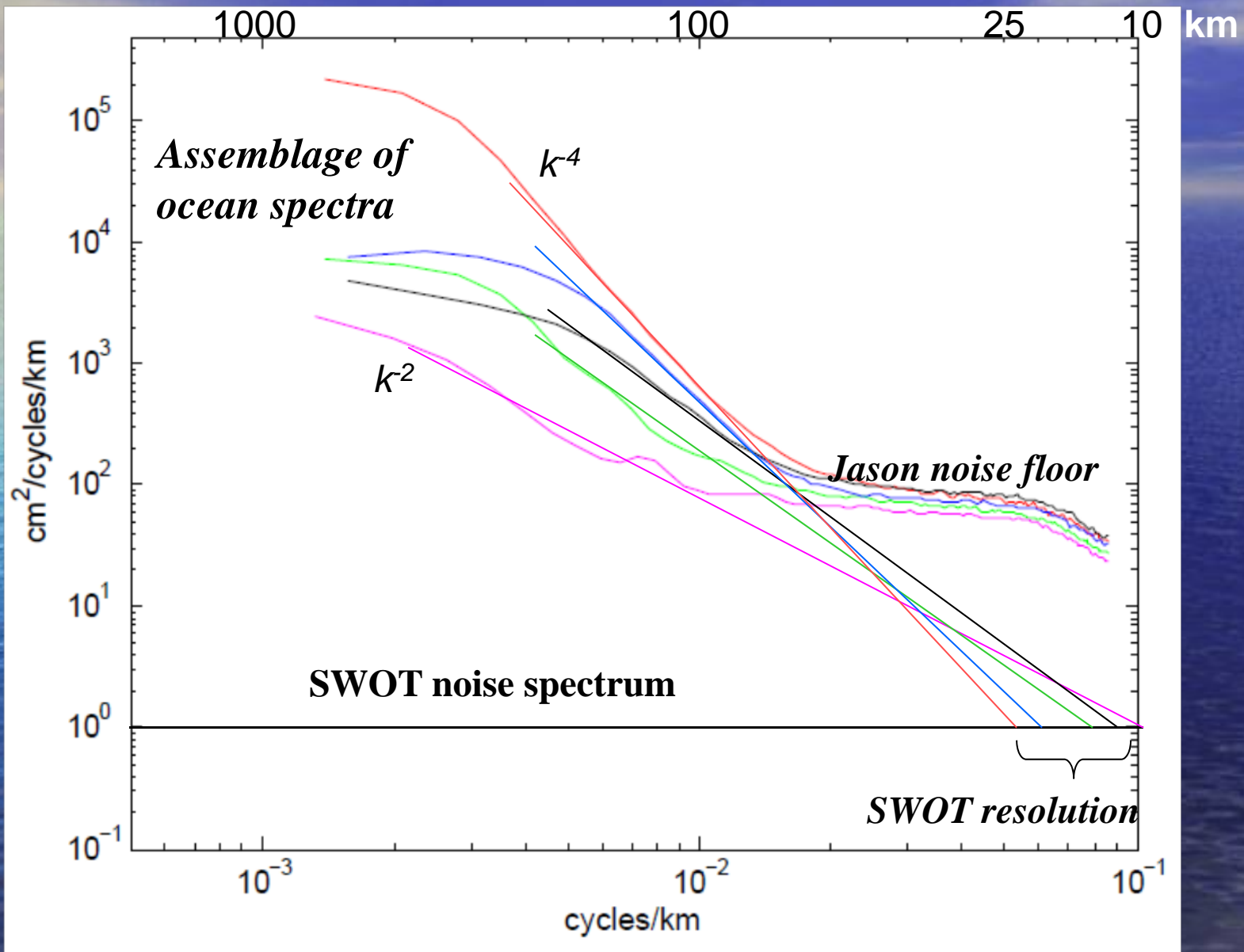
# Space time sampling of radar altimetry missions



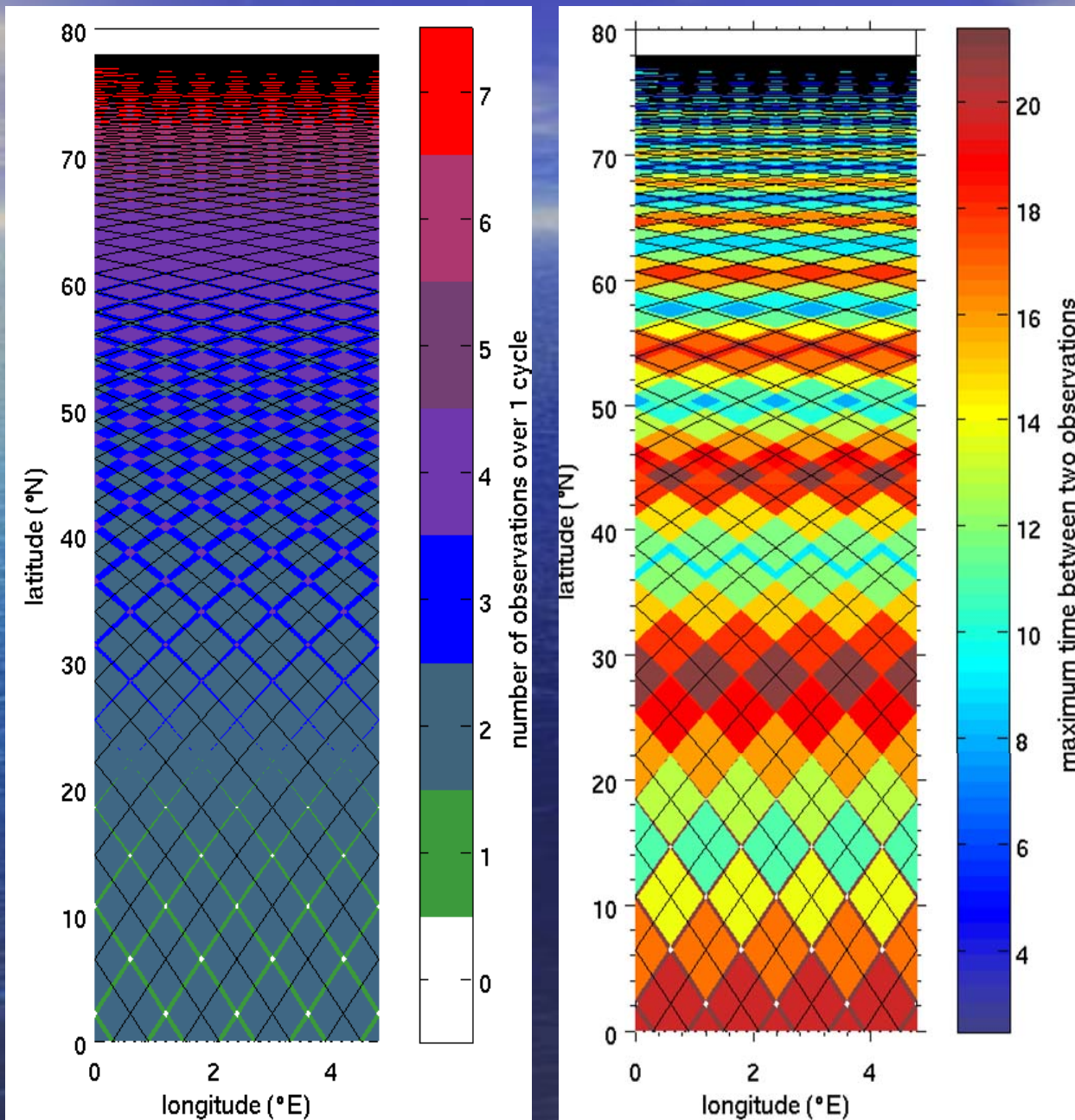
SWOT ●

1 km

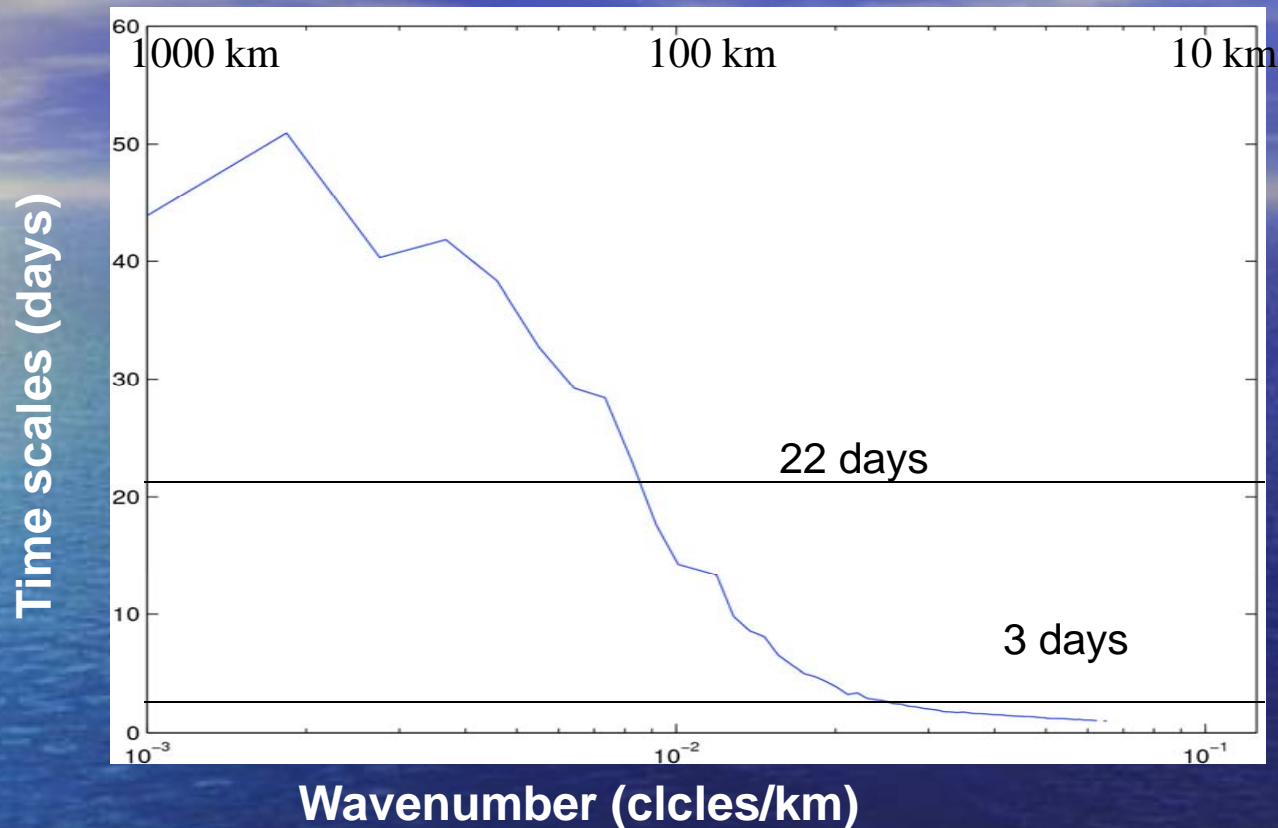
# Spatial Resolution



# SWOT Sampling characteristics (78 deg inclination, 22 day repeat orbit)



# De-correlation time scale as function of wavenumber



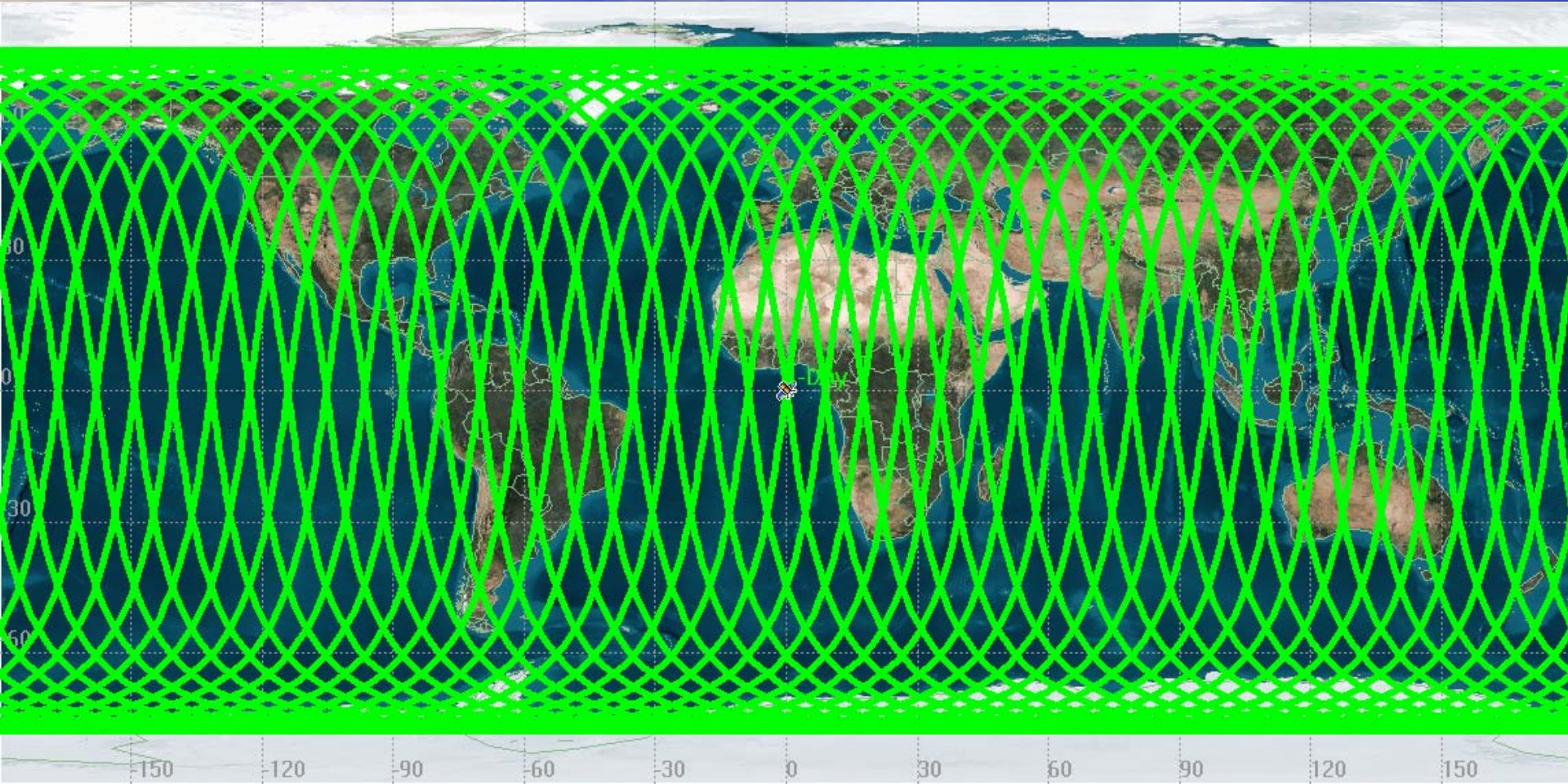
The known characteristics of mesoscale / submesoscale are found again:

- Decorrelation of ~50 days for mesoscale (~500km)
- Decorrelation of 5-10 days for submesoscale (~50km)

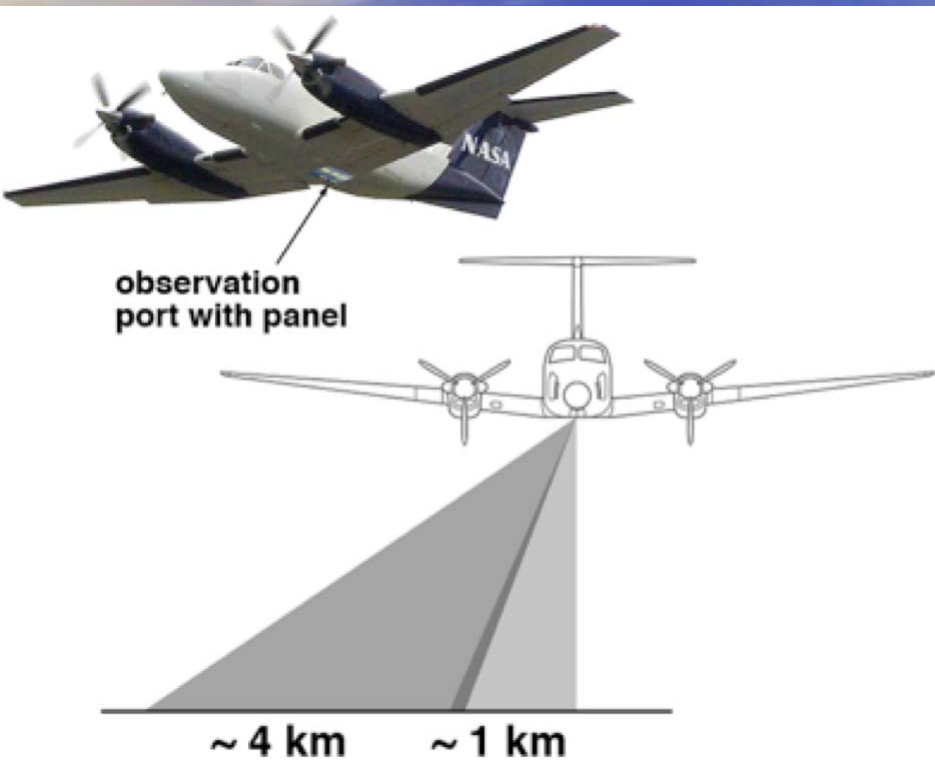
This result is local for the Oregon coast region.

→ Possible comparison for different regions, make maps ....

# 3-Day Repeating Groundtrack



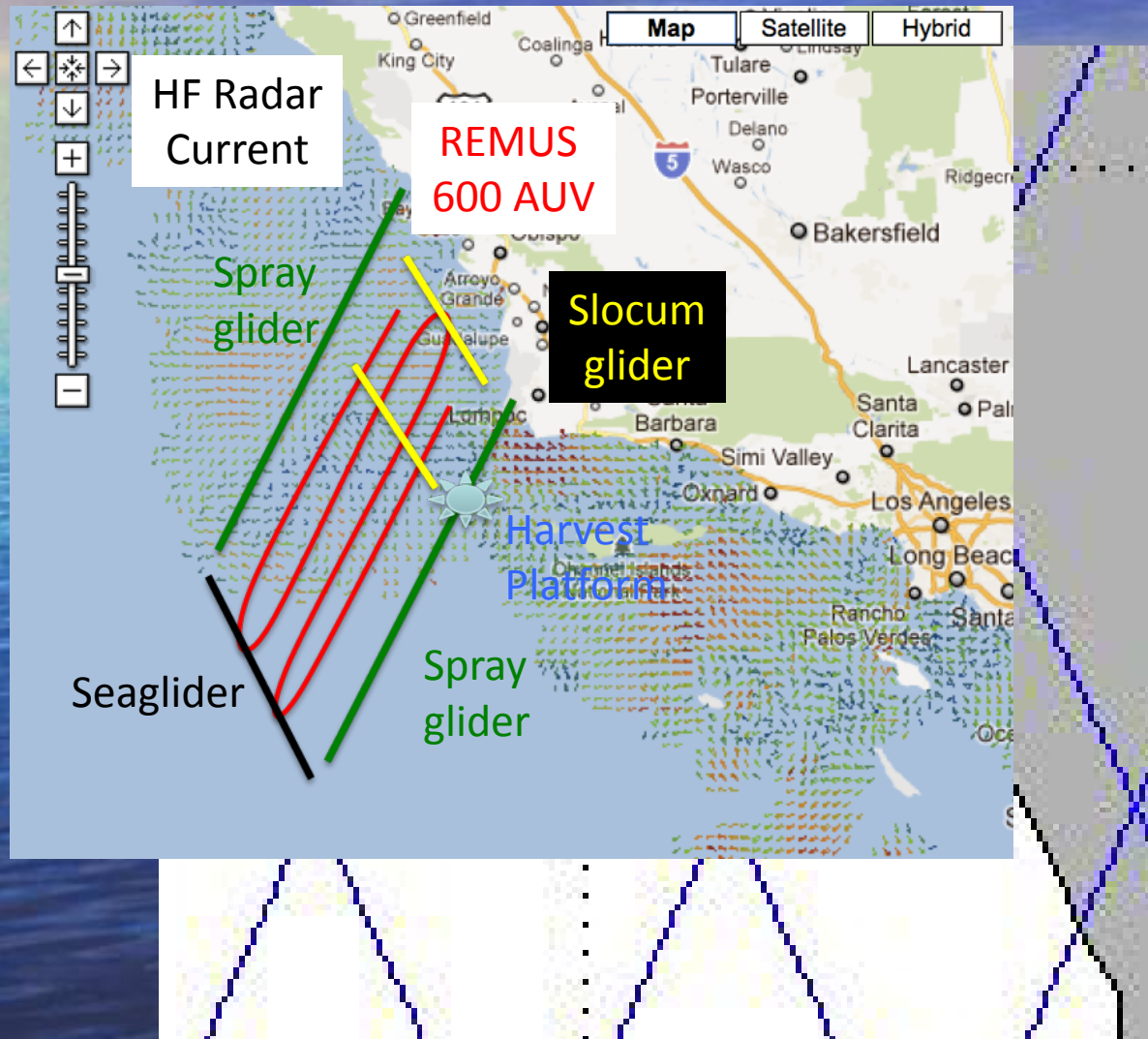
# AirSWOT



- Nominal 5 km swath
- Range resolution: 75cm/1.9m
- Azimuth resolution: <1m
- Ka-band SAR interferometer/altimeter measures water level elevation with a precision of ~3 cm over 50 m pixels (or, equivalently, 1.5 mm precision over 1 km pixels)
- Final accuracy depends on GPS, IMU, and calibration
- Incidence angles: 0°--~25°
- Additional measurements: Ka-band radar cross section, radial surface water velocity, near IR imagery
- Check-out platform: King Air B200



# AirSWOT-SCB daily flight during 4-week: Jason-2 over-flight, HF radar surface current, glider/AUV T/S profiles, data assimilation models



North of Pt. Conception considerations

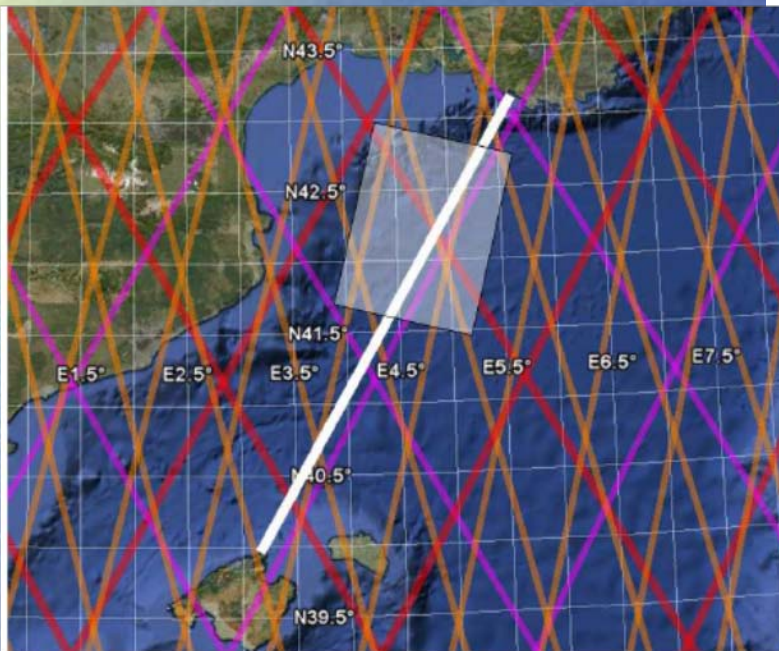
Advantages:

- No island effect
- Extended HF radar coverage

Issues:

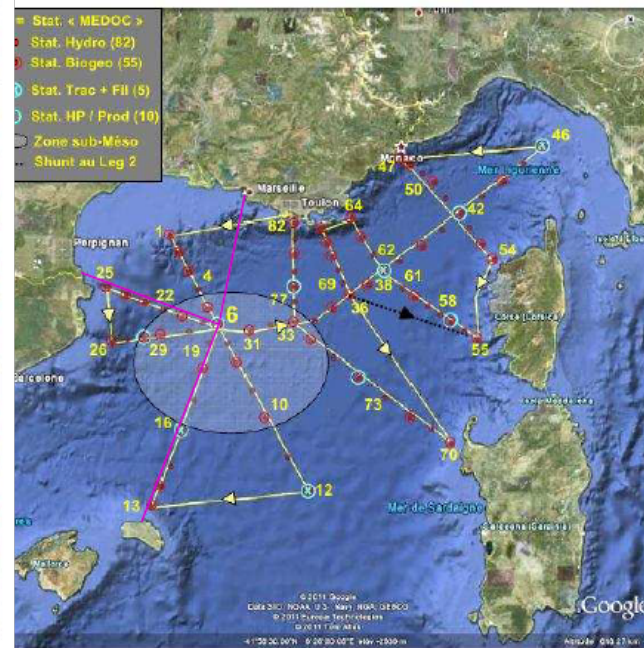
- Strong wind
- Waves
- Internal tides

# AirSWOT Med Sea Experiment



ENVISAT + Jason-1 + Jason-2 + Glider + AirSWOT (white rectangle).

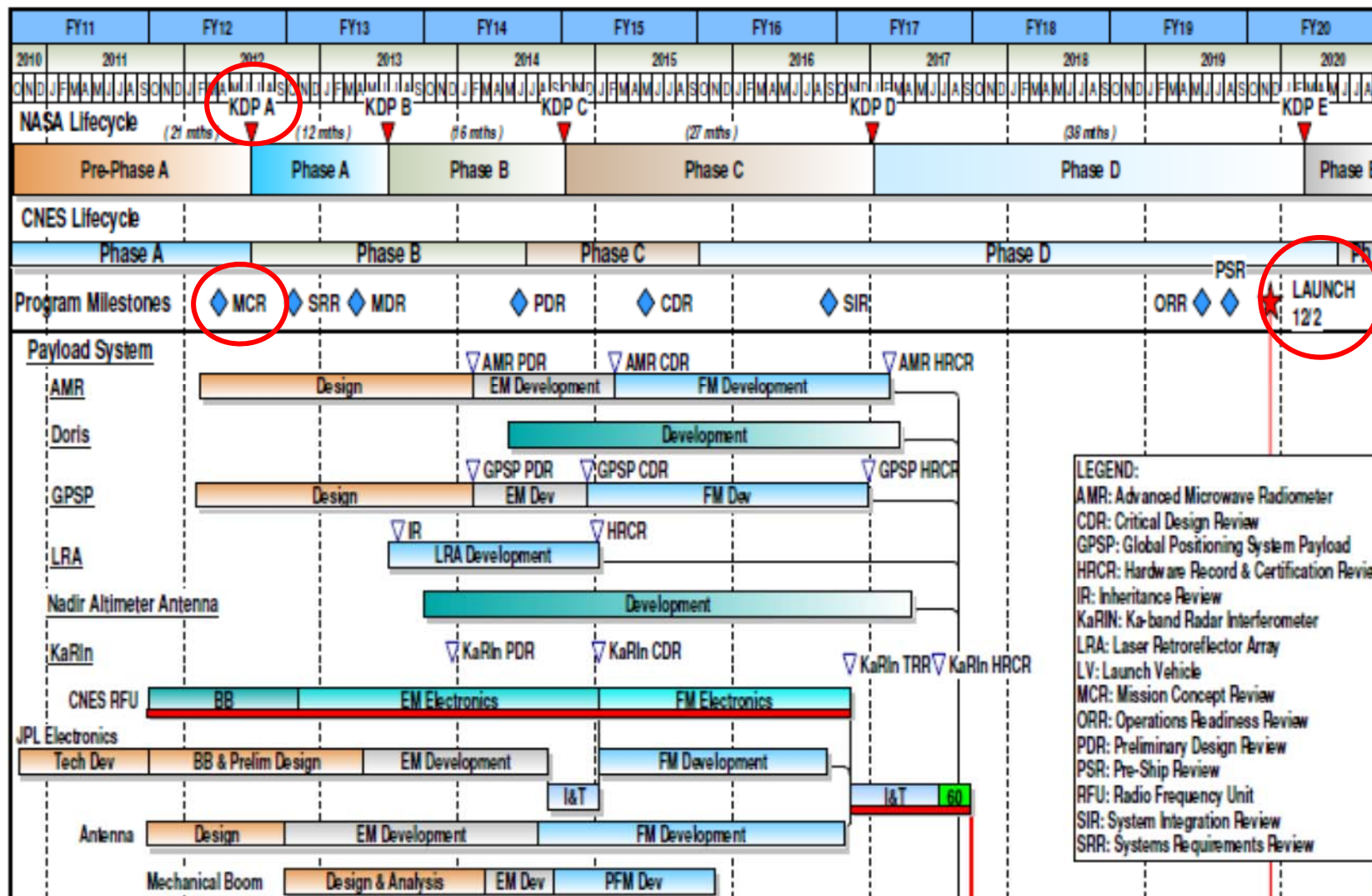
MerMex-DoWEx2013 : Apr-May 2013



- Gliders
- Hydrography
- + Argo,
- + surface drifters



# SWOT Top Level Schedule

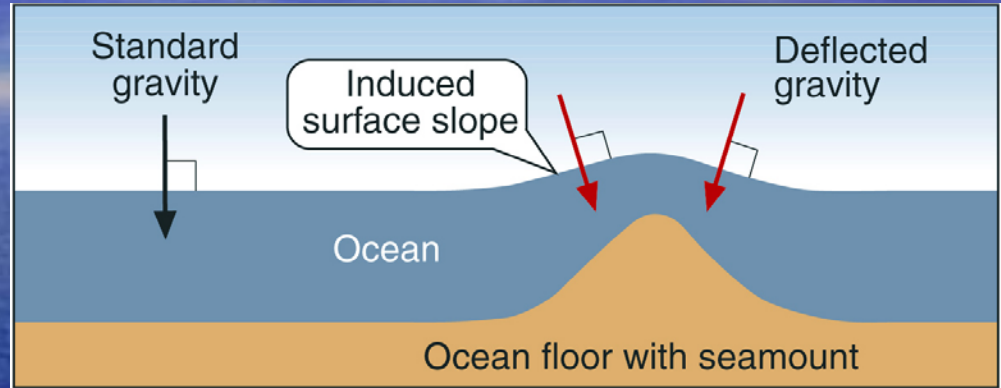


# Additional Applications

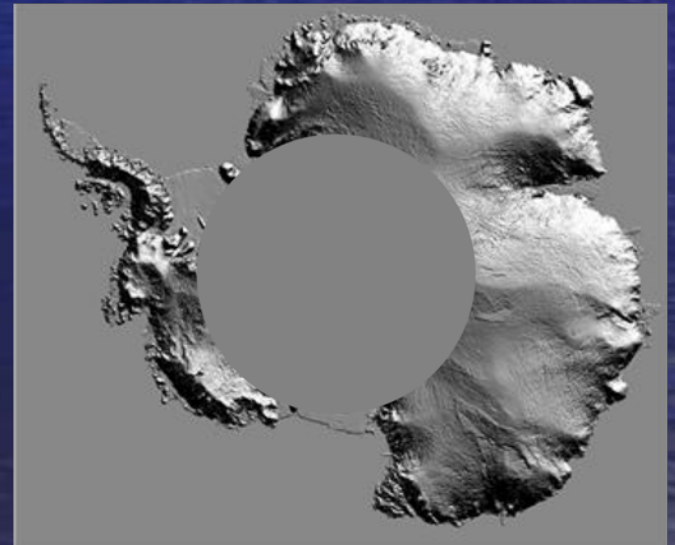
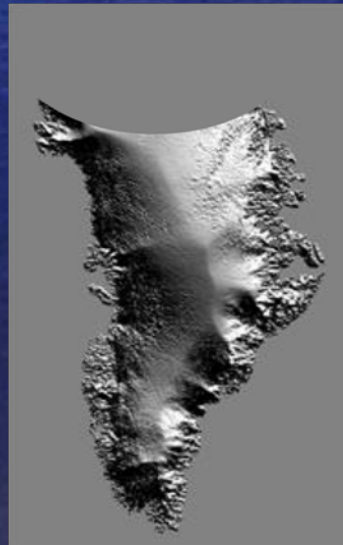
## Sea Ice Freeboard



## Ocean Bathymetry



## Ice Sheet Topography



# **A Joint NASA/CNES solicitation for the formation of a Science Definition Team (SDT)**

- **Primary thematic science (Oceanography and Hydrology)**
- **Secondary thematic science (Coasts, Cryosphere, etc)**
- **Methodologies (SWOT products and services)**
- **Risk reduction/simulation (Airborne program and simulator)**
- **NASA ROSES release in February, 2012**