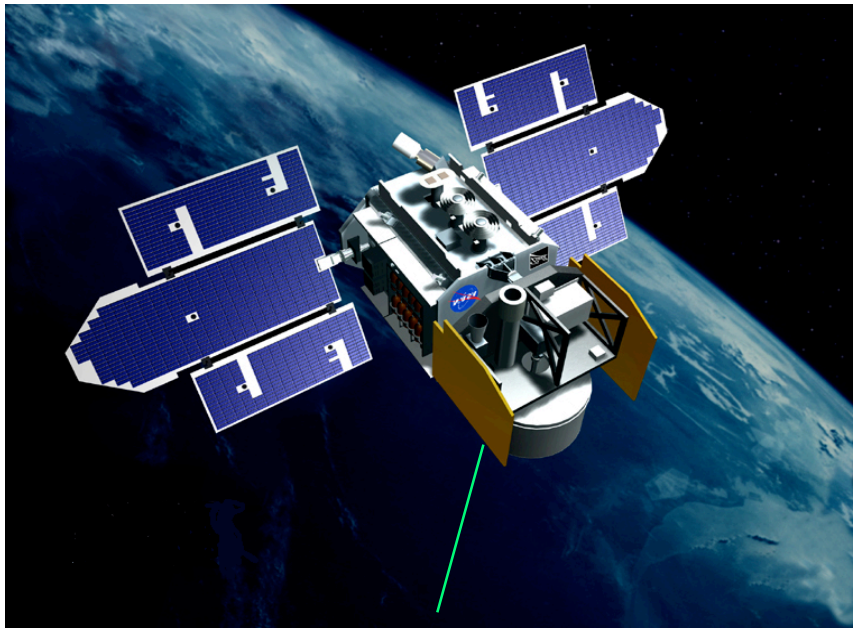
GEOSCIENCE LASER ALTIMETER SYSTEM

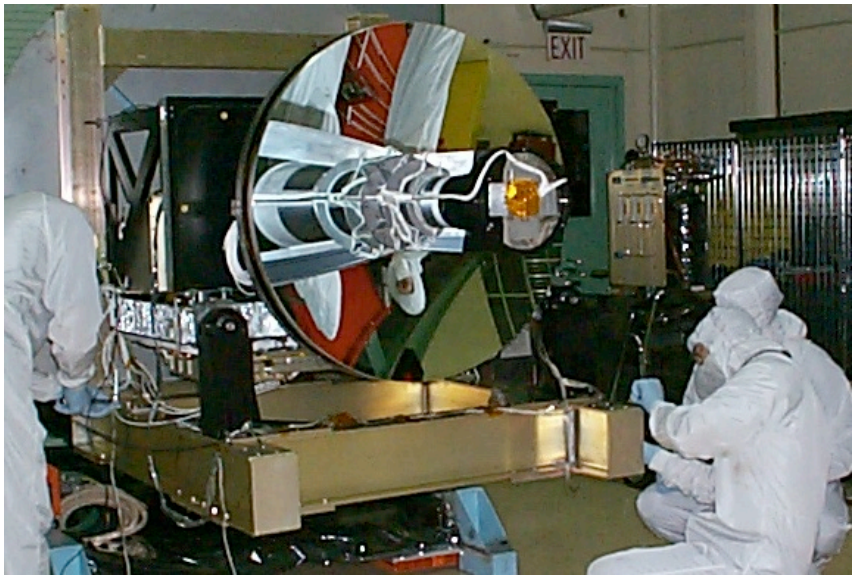


Cloud and Aerosol Lidar
532 and 1064 nm Channels
Nadir Surface Altimeter

Launch Date: 1/10/03
94° Inclination Orbit
Three Year Mission

GLAS Atmospheric Data Products

- **Calibrated backscatter cross section profiles**
- **Cloud and aerosol layer heights**
- **PBL height**
- **Polar Stratospheric Clouds (PSC)**
- **Cloud and aerosol layer extinction profiles and optical depth**



GLAS Validation During THORpex

ER-2 Aircraft Mission, February 18th - March 12th 2003

Experiment Description

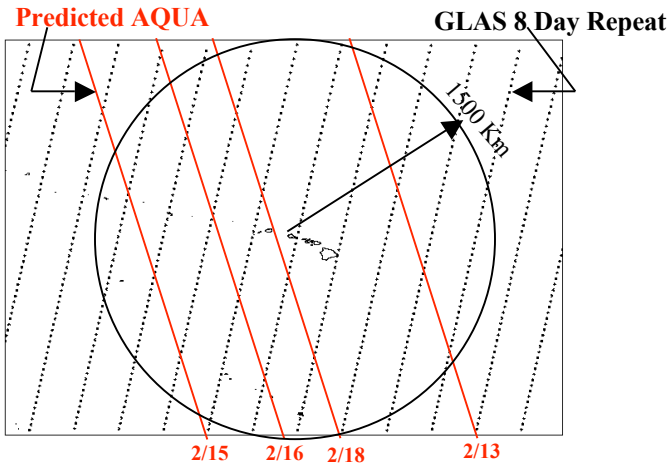
(a) THORpex will occur February 18th through March 12th in Hawaii

(b) THORpex objectives include the collection of validation data sets for assessing the impact of satellite observations on weather prediction

(c) GLAS validation will occur as part of the AQUA validation component of THORpex

(d) GLAS (descending) and AQUA (ascending) local overpasses occur within 2 hours of each other

- There will be a GLAS track within 1500 km of Hawaii each day for the duration of THORpex
- Total of 3 - 5 GLAS under flights expected



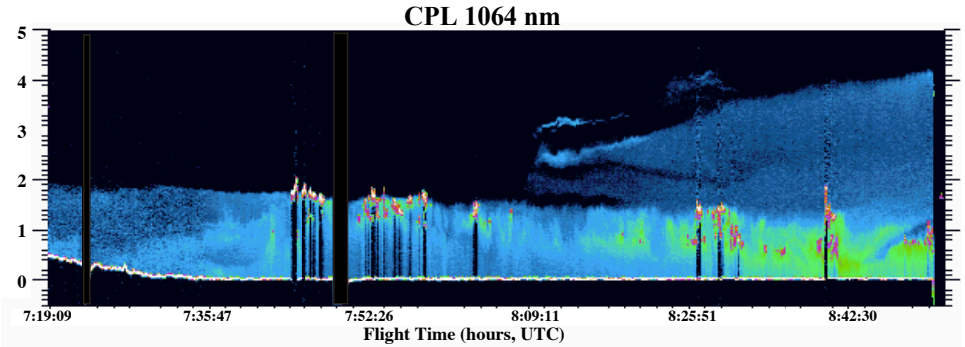
ER-2 Validation Measurements

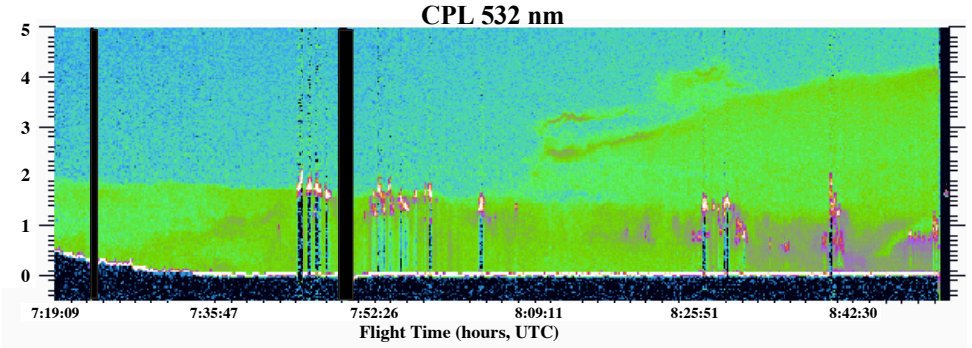
Cloud Physics Lidar (CPL):

- Cloud and aerosol layer heights
- PBL height
- Calibrated attenuated backscatter
- Optical depth
- Cloud multiple scattering

MODIS Airborne Simulator (MAS):

- Total column optical depth
- Cloud particle size
- Background radiance





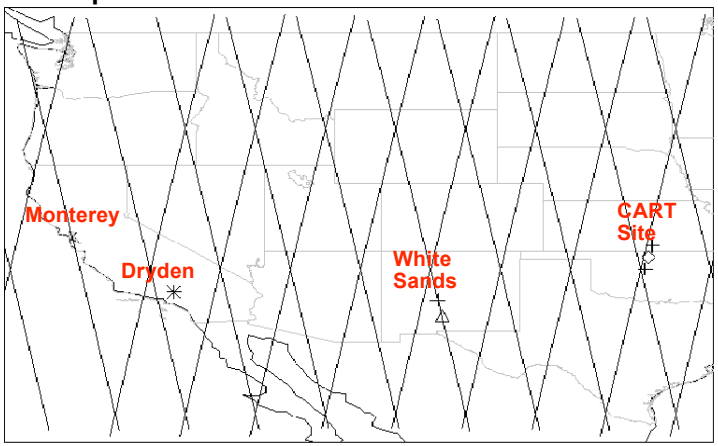
GLAS Targeted Validation Effort

ER-2 Aircraft Mission, April 2003

Experiment Description:

- Based out of Dryden (March 24th - April 17th) to minimize cost
- 5-7 total flights (35 flight hours) spending about 1 hour on the GLAS track
- At least 1 flight over MPL/AERONET ground sites in Monterey CA, White Sands NM and possibly Oklahoma CART site
- At least 1 night flight
- Other flights will target specific weather conditions

GLAS 8 Day Repeat Orbit



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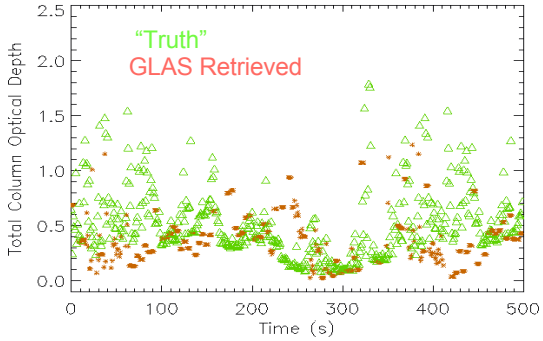

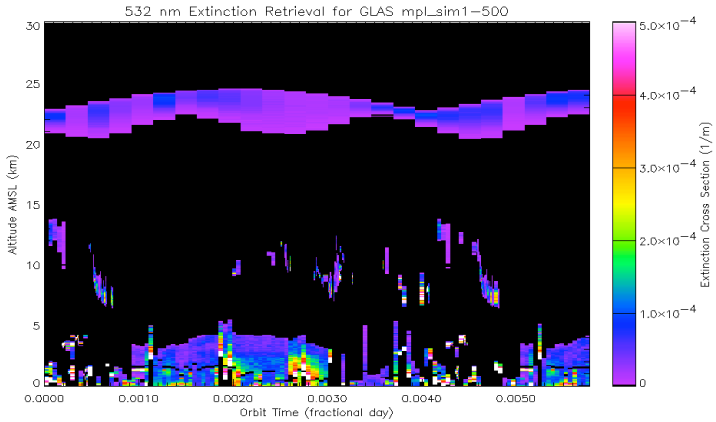

GLAS Validation Methods

1. **The CPL and MPL data from both THORpex and the Dryden flights will be processed with existing well proven algorithms to retrieve:**
   - Cloud and aerosol layer height
   - Optical Depth
   - Calibrated Backscatter

   The CPL and MPL optical depth retrievals will be validated with ground observations when possible

2. **The corresponding GLAS data will be analyzed using the I-SIPS (ICESat Science Investigator-led Processing System) algorithms**

3. **Compare the retrieval results for coincident data and adjust I-SIPS algorithms if necessary**

Cloud Boundaries