

IPO Funded Airborne DWL for Cal/Val Planning

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WG on Space-based Lidar Winds

Oxnard, CA

7-9 February, 2001

Purpose

- To investigate several sampling and signal processing issues critical to space-based DWL data product generation and utilization
- To evaluate airborne DWL operational strategies using existing equipment before investing in additional airborne capability

Focus Issues

- Surface returns from oceans, rivers, deserts, and cloud tops
- Discrimination between near-surface aerosol motion and the motion of the underlying surface.
- Effects of PBL roll circulations on representativeness
- Establishing σ_m (lidar) from intercomparisons with other observing systems

Aircraft

- Twin Otter
- Cruise speed (65-165 kts)
- Operating altitudes (.2-8km)
- Range (~ 250-300 nms one way)
- Standard instrument set (temp,dew point, aerosols, turbulence probe, video..)
- Dropsondes
- INS

TODWL

(Twin Otter Doppler Wind Lidar)

- Transceiver (coherent detection)
 - 2.0125 μm (Thulium:YAG)
 - 6 mJ per pulse
 - 80 Hz rep rate
 - .3 μs pulse duration
- Scanner
 - 4" aperture
 - 2 axis motion controller
 - 240 degree outer axis range
 - 60 degree inner axis range

TODWL (cont)

- Data system
 - 1-500 Msample/sec
 - 8 bit resolution
 - Hard drive data storage (> 8 Gbyte)

TODWL Field Experiment 2001

- Late Spring 2001(21 May-8 June)
- Out of Monterey
- 4 flights (20 hours total)
- Participants
 - IPO (Emmitt, PI)
 - CIRPAS(Bluth, Co-I)
 - CTI
 - USGS
 - JPL?

General OPS Plan

- Flight 1
 - Ft Ord and Monterey Bay
 - Microwave sounder
 - Paved surface returns; grass and sand returns
 - Flat water surface returns (ponds)
 - Targets of Opportunity (TOO): cloud tops, white caps or breaking waves

TODWL OPS

- Flight 2
 - Coastal transects
 - CODAR overflights
 - Dropsondes (off shore)
 - TOOs

TODWL OPS

- Flight 3
 - River over flights w/ USGS
 - Vegetated surface returns
 - Rawinsonde comparisons
 - TOO's

TODWL OPS

- Flight 4
 - Open ocean returns (buoys, CODAR, Scatterometer, models)
 - Repeat of previous experiments if desired
 - TOOs

Related Matters and Follow-on

- Hydra-SAT
 - USGS and NASA
- CBLAST
 - ONR
- CAMEX 4
- NOAA/ETL overflights
- DoD/DoE groundbased lidar overflights