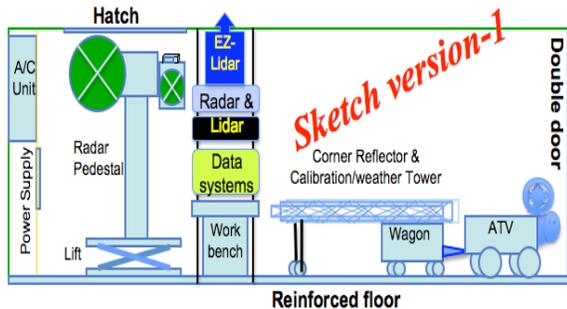


ACHIEVE

*Aerosol-Cloud-Humidity
Interactions Exploring &
Validating Enterprise*

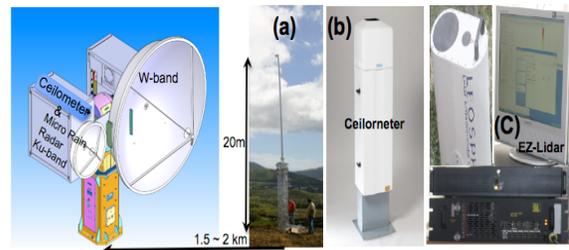


ACHIEVE Concept sketch

Description: Accurate retrievals of aerosol and cloud properties from space-borne sensors have been achieved with certain degrees of confidence. One of the most difficult tasks remaining to be resolved is when aerosols and clouds co-exist and interact with each other. Solid ground-based observations of the aerosol-cloud-water cycle interactions are critical for providing independent assessments. ACHIEVE, extending the success of SMART-COMMIT mobile facility, is being built to provide urgently needed test-bed data with high temporal and spectral resolutions. A synergy of ground-based & airborne remote sensing and in-situ measurements will serve well in supporting satellite retrievals and validation as well as diagnostic/prognostic modeling studies.

Like SMART-COMMIT, all ACHIEVE instruments will be integrated in a twenty-foot weather-sealed trailer with thermostatic temperature control. These three mobile laboratories can be deployed and operated together or individually. ACHIEVE will be equipped mainly with active remote sensing instruments: a 95 GHz and 24 GHz radar

mounted on a heavy-duty pedestal (cf. Fig. a), a near-IR ceilometer (cf. Fig. b), and a UV-wavelength lidar for aerosol extinction (cf. Fig. c). In addition, two passive scanning microwave radiometers in SMART operate in complement with ACHIEVE.



Future Plans

- Complete instrument integration for field operation no later than March 2011
- First field deployment to the 7 South East Asian Studies (7-SEAS) in March 2012, in concert with validating Glory, NPP, etc.

ACHIEVE Data Products

- Cloud mask and cloud type
- Cloud base/top heights
- Cloud liquid/ice water content
- Precipitation occurrence
- Cloud optical thickness and effective radius profiles
- Aerosol precursors below clouds

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References

URL <http://smart-commit.gsfc.nasa.gov/>

ACHIEVE Parameters

- Cloud radars: 24 and 95 GHz frequencies
- Radiometers: 20, 36, and 89 GHz
- Ceilometer: 910 nm wavelength
- Lidar: 355 nm wavelength